Federal Aviation Administration

DOT/FAA/AM-15/21
Office of Aerospace Medicine
Washington, DC 20591

Assessing the Effectiveness of the Conditions AMEs Can Issue Program: 2013-2014

Ann I. Norris
Valerie J. Skaggs
Thomas R. Chidester

Civil Aerospace Medical Institute
Federal Aviation Administration
Oklahoma City, OK 73125

December 2015

Final Report

NOTICE

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/AM-15/21		

4. Title and Subtitle	5. Report Date
Assessing the Effectiveness of the Conditions AMEs Can Issue Program: 2013-2014	December 2015
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Norris AI, Skaggs VJ, Chidester TR	

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
FAA Civil Aerospace Medical Institute P.O. Box 25082 Oklahoma City, OK 73125	11. Contract or Grant No.

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Office of Aerospace Medicine Federal Aviation Administration 800 Independence Ave., S.W. Washington, DC 20591	14. Sponsoring Agency Code

15. Supplemental Notes

16. Abstract

Introduction: This paper describes the results from a two-year review of the Conditions an AME Can Issue (CACI) monitoring safety assurance process. When an aviation medical examiner (AME) examines an airman during the medical certification process, there are conditions for which an AME must defer to Aerospace Medicine before the airman's certificate is issued. In 2013, the Office of Aerospace Medicine implemented changes for nine specific medical conditions to allow AMEs to process more applicants immediately following the examination. This process became known as Conditions an AME Can Issue (CACI). A review was needed to document the certification changes over time.

Methods: Medical certification data from 2013 and 2014 were analyzed to determine the number of CACI-related conditions processed in the system. The study criteria for the first analysis included only those certificates that had at least one of the CACI pathologies and where the AME issued a non-time limited certificate. Criteria for the second analysis included certificates that only had one condition assigned to it, and that condition was a CACI. Certificates were individually examined to determine whether AMEs utilized the CACI process appropriately.

Results: The percentage of CACI certificates AMEs issued correctly increased slightly from 85% in 2013 to 91% in 2014. The percentage of certificates that also contained the proper CACI documentation improved from 19% in 2013 to 47% in 2014. When the certificates were categorized by each specific condition, the results of most categories improved between the two years. For the second analysis where CACI was assessed in the most ideal setting, the percentage of certificates where the AMEs issued correctly and wrote proper CACI documentation in the comments increased from 17% in 2013 to 51% in 2014. AMEs mismanaged 39% of the certificates in 2013 compared to only 9% in 2014.

Discussion: The results of our study indicate AMEs are applying the CACI criteria without decreasing pilot safety. There was a substantial improvement in AME compliance over the two-year study. However, the study identified opportunities for continuing AME education aimed at what is required to issue appropriately for specific medical conditions. As more conditions are added to the CACI protocol list, systematic safety and quality assurances need to be implemented.

17. Key Words	18. Distribution Statement
Medical Certification, Safety Assurance, CACI, Aviation, Medical Examiners	Document is available to the public through the Internet: www.faa.gov/go/oamtechreports

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	13	

ACKNOWLEDGMENTS

We acknowledge and thank many people in the Aerospace Medical Ccertification Division. First, we thank Dr. Raad Abbas, the AAM-300 Quality Assurance physician who reviewed a sample of our study's certificates to ensure we correctly categorized the exams in our analysis. Also, David Nelms provided data so we could determine the prevalence of deferred exams in the system. Others in AAM-300 who answered our questions through this process included Rita Wiley, Mitch Selensky, Dr. Judith Frasier, and Dr. Brian Johnson. We also thank Christy Hileman in AAM-600, who patiently and expertly provided the MANTRA data we requested for this analysis.

Contents

Assessing the Effectiveness of the Conditions AMEs Can Issue Program: 2013-2014

Assessing the Effectiveness of the Conditions AMEs Can Issue Program: 2013-2014

INTRODUCTION

This paper describes the results from a two-year review of the CACI monitoring safety assurance process. When an aviation medical examiner (AME) examines an airman during the medical certification process, there are conditions for which an AME must defer to the Federal Aviation Administration before the airman's certificate is issued. In 2013, the Office of Aerospace Medicine (OAM) implemented changes for nine specific conditions that would allow AMEs to process more applicants immediately following the examination. This process became known as Conditions AMEs Can Issue (CACI). OAM determined the nine conditions posed low safety risk in certification. However, a safety assurance review was needed to document the certification changes over time.

Background

A top priority of the current Federal Air Surgeon is to increase the number of airmen that leave their AME's office with a valid medical certificate the day of their exam and decrease the number of certificates AMEs must defer (Fraser, 2014). Due to constrained resources, application software changes, and staff attrition in the Aerospace Medical Certification Division, the number of days it took to process an airman application that was initially deferred increased from 2012 to 2013. To combat these issues, the Medical Certification Division collaborated with the OAM Safety Risk Management (SRM) team to determine specific medical conditions that represented controlled risk of flight safety, due to the extremely low likelihood of an accident, but potentially high severity of impact from mismanagement of the conditions. OAM identified nine medical conditions that posed low safety risk in certification, but all required an airman who possessed one of these conditions to obtain a special issuance medical certificate at that time. These conditions later became known as the original CACI conditions.

To estimate the effect the CACI process would have on the current airmen application workflow, the SRM team categorized all active airmen currently in the AMCD system based on whether they possessed one or more of the nine identified conditions. The results indicated 20 percent of active airmen possessed at least one of the proposed CACI conditions. Moreover, based on a range of assumptions about additional pathology an airman could possess in addition to the CACI conditions, we estimated the future impact in the Document Imagining Workflow System (DIWS) to range from a 6-17 percent decrease in workflow after the successful implementation of the CACI process (Johnson et al., 2012). Therefore, the CACI process would reduce the resources needed by the FAA to assess condition status and process certifications for seemingly low-risk conditions and allow those resources to shift to processing applications representing greater risk.

OAM also sought to determine a potential association of CACI medical conditions and having a fatal aviation accident. Based on data from OAM's Medical Analysis Tracking Registry-Autopsy Program Team (MANTRA), of 931 cases, 92 cases involved pilots that possessed one of the proposed CACI conditions in a fatal accident. The SRM team cross-referenced these 92 cases with their National Transportation Safety Board (NTSB) factual reports, and none of the medical conditions were documented as being causative or a factor leading to the accident. Thus, OAM concluded that the CACI process would allow AMEs to use their medical expertise to more efficiently issue an unrestricted certificate to those airmen with stable medical conditions that did not pose a significant medical risk for flight safety.

To meet the CACI requirements, a new policy was implemented for the process, in which AMEs must document and notate specific requirements on CACI worksheets for each of the nine conditions during an examination. In each instance, the AME must determine if 1) the airman "meets certification criteria" for the specific condition, 2) the "airman had a previous Special Issuance for this condition and now meets the regular issuance certification criteria," or 3) the "airman does NOT meet certification criteria" for the specific condition and must be deferred to OAM for further examination (FAA, 2014).

OAM determined the nine conditions posed low safety risk in certification, as long as AMEs were issuing these certificates appropriately. However, a safety assurance review was needed to document the certification changes over time. In June 2014, we completed our initial analysis of the 2013 CACI implementation, highlighting the need for more education and promotion of CACI procedures and documentation requirements among AMEs. Responding to the results, the Federal Air Surgeon published additional AME guidance for the CACI protocol in his editorial in the August 2014 Federal Air Surgeon's Medical Bulletin (Fraser, 2014). We concluded that a follow-up analysis should be conducted for 2014 CACI data to determine how well AMEs complied with guidance published in the Medical Bulletin and to the additional online resources OAM's Aerospace Medicine Education Division (AMED) provided.

The goal of this two-year study was to describe the results from the CACI monitoring safety assurance process. This study focused on two aspects of the CACI process. In the first analysis, we assessed whether CACI reduced the safety of AME certificate issuance. In the second analysis, we took a different approach, by using the simplest form of CACI cases described in the Methods section to determine the overall AME compliance rate for the process each year.

METHODS

The SRM team analyzed three months of medical certification data from 2013 to determine the number of CACI-related conditions processed in the system during the last quarter of the fiscal year. We identified separate study samples for the two analyses. It was not feasible to review the thousands of CACI certificates OAM received each month, so a representative sample of certificates were individually examined and categorized based on correct issuance and documentation. Cases were selected for the sample if they contained any changes in administrative or medical pathologies in their certificate during this time period.

Analysis 1

For the first analysis, the study criteria represented only those certificates that had at least one of the CACI medical pathologies (pathcodes) and where the AME issued a certificate that was not time-limited, meaning the certificate was valid for the entire period of a normal certificate, without having to meet other medical guidelines in between recertification periods. We repeated the analysis for the same three months of 2014 CACI data to compare with the 2013 analysis.

The analyses were performed on certificates that had at least one of the original nine CACI conditions: 1) Arthritis, 2) Asthma, 3) Glaucoma, 4) Hepatitis C, 5) Hypertension, 6) Hypothyroidism, 7) Migraine, 8) Pre-Diabetes, and 9) Renal Cancer. The colitis condition was added in 2014 and was therefore included in the three-month 2014 analysis as the tenth CACI condition.

The certificates were separated into four categories in the analyses: 1) Appropriate Issuance, where an AME issued a non-time-limited certificate with proper CACI worksheet documentation in the notes; 2) Incomplete Error, where the AME issued a non-time-limited certificate but failed to appropriately cite proper CACI documentation in their notes; 3) Inappropriate Error, where an AME failed to provide proper documentation to determine the airman's non-time-limited status; and 4) Inappropriate Error where the certificate was reversed when OAM determined a special issuance or denial was needed after the AME had already issued a non-time-limited certificate. We measured these four categories using the overall number of certificates, and then examined the improvement between 2013 and 2014 by comparing each individual CACI condition.

Analysis 2

For the second question in the study, the SRM team added another analysis to obtain a group of certificates with the simplest medical histories possible. We assumed that where cases are simple, involving a single medical pathology, they are most likely to be acceptable under CACI guidance, giving the best scenario for the use of the policy. We used the same three months of 2013 data included in the first analysis. From this group, we obtained and individually reviewed a sample of those certificates that *only* had one pathcode assigned to it, and that pathcode was a CACI condition. We repeated the process for the three months of 2014 data.

These certificates were categorized according to deferral, non-time-limited issuance, and time-limited certificate issuance status. The seven categories were 1) Appropriate Deferral, where the AME deferred because the airman's condition was not CACI eligible at the time of the exam, 2) Inappropriate Deferral, where the AME deferred even though the airman was actually CACI-eligible, 3) Appropriate Non-Time-Limited Issuance, where an AME issued a non-time-limited certificate with proper CACI worksheet documentation in the notes, 4) Incomplete Issuance, where the AME issued a non-time-limited certificate but failed to appropriately cite proper CACI documentation in the notes, 5) Inappropriate Issuance, where an AME inappropriately issued a non-time-limited certificate without initial sufficient evidence or failed to provide all documentation, 6) Appropriate Time-Limited Issuance, where the applicant was appropriately issued a time-limited certificate because the airman's certificate was not CACI-eligible, and 7) Inappropriate Time-Limited Issuance, where the AME issued a time-limited certificate when the airman's certificate should have been CACI-eligible.

RESULTS- ANALYSIS 1

2013

Results from the first analysis evaluated whether CACI was appropriately applied and documented when the AMEs issued non-time-limited certificates, and are shown in Table 1. Overall, 493 cases were reviewed, with 418 certificates fitting into one of the four categories. Seventy-five certificates of the original 493 were taken out of the total because they were not CACI-related (i.e., historical pathcodes or pathcodes that were not related to the nine original CACI conditions).

In 85% of the certificates, AMEs issued certificates correctly. However, only 19% of certificates properly noted CACI protocol, as required by the CACI procedure. About 15% of certificates were either issued incorrectly or without proper documentation of proof to issue. During these three months, there was only a minor improvement in these incorrectly issued certificates (17.1% to 14.4% to 13.6%).

2014

Overall, we reviewed 692 cases, with 626 certificates fitting into one of the four categories in Table 2. Sixty-five certificates of the original 692 were taken out of the total because they were not CACI- related. One certificate was removed because it was still in the workflow queue.

Over 91% of the certificates were issued correctly. More than half (51%) of these certificates properly noted CACI protocol where indicated. About 9% of certificates were either issued incorrectly or without proper documentation of proof to issue. During these three months, there was a substantial improvement in these incorrectly issued certificates (14.9% to 10.2% to 5.3%).

Table 1: Three-Month Summary of AME Actions for 2013 CACI Certificates

Month	Outcome (%)				Total
	Incorrect Issuance		Correct Issuance		
	Appropriately Issued and Documented	Incomplete Error- Failed to cite CACI	Inappropriately Issued- Insufficient Evidence	OAM Certificate Reversal/Change to SI	
Jul.	30 (17.8)	110 (65.1)	21 (12.4)	8 (4.7)	169
Aug.	20 (15.2)	93 (70.5)	15 (11.4)	4 (3.0)	132
Sep.	29 (24.8)	72 (61.5)	8 (6.8)	8 (6.8)	117
Total	**79 (18.9)**	**275 (65.8)**	**44 (10.5)**	**20 (4.8)**	**418**

Table 2: Three -Month Summary of AME Actions for 2014 CACI Certificates

Month	Outcome (%)				Total
	Incorrect Issuance		Correct Issuance		
	Appropriately Issued and Documented	Incomplete Error- Failed to cite CACI	Inappropriately Issued- Insufficient Evidence	OAM Certificate Reversal/Change to SI	
Jul.	39 (44.8)	35 (40.2)	9 (10.3)	4 (4.6)	87
Aug.	112 (43.9)	117 (45.9)	19 (7.5)	7 (2.7)	255
Sep.	140 (49.3)	129 (45.4)	12 (4.2)	3 (1.1)	284
Total	**291 (46.5)**	**281 (44.9)**	**40 (6.4)**	**14 (2.2)**	**626**

Closer Comparison of 2013 and 2014

After we examined the overall results, we also wanted to determine if the AMEs demonstrated improvement, based on each type of CACI medical condition the AMEs were presented with at the time of the exams. The results are presented in Table 3. Overall, 493 CACI pathcodes from the 418 certificates were included in the analysis that contributed to the AMEs' issuance decisions in 2013. We compared those to the 651 significant CACI pathcodes from the 626 certificates in 2014.

Arthritis

The percentage of incorrect issuances for certificates with the arthritis codes increased between 2013 and 2014. This indicated AMEs still needed education on properly citing the CACI protocol for this condition.

Asthma

AMEs slightly improved the percentage of correct issuances from 2013 to 2014. AMEs needed further education in what was required to issue without a special issuance, as indicated by the 22% and 16% incorrect issuance in 2013 and 2014, respectively.

Glaucoma

AMEs improved in appropriately issuing and documenting certificates with the glaucoma pathcode between the two years (10% vs. 46%). However, even in 2014, more than 25% of these certificates were issued incorrectly.

Hepatitis C

There was nothing substantial to examine since there were very few certificates in each year with hepatitis C from the analysis. The lack of certificates with hepatitis C in the study could mean that many AMEs did not understand they could issue without a special issuance for this condition, or they were not as comfortable doing it.

Hypertension

The majority of certificates included in this study contained either hypertension or hypothyroidism pathcodes. There was an improvement in AMEs appropriately issuing between the two years (22% compared to 54%). In addition, only 3% of the hypertension certificates were incorrectly issued in 2014 compared to 8% in 2013.

Table 3: Comparison of AME performance by CACI Condition for 2013 and 2014

CACI Pathcode		Outcome (%)				Total
		Correct Issuance		Incorrect Issuance		
		Appropriately Issued and Documented	Incomplete Error-Failed to cite CACI	Inappropriately Issued- Insufficient Evidence	OAM Certificate Reversal/Change to SI	
Arthritis	2013	2 (5)	42 (93)	1 (2)	0 (0)	45
	2014	1 (5)	13 (62)	5 (24)	2 (9)	21
Asthma	2013	7 (13)	35 (65)	11 (20)	1 (2)	54
	2014	18 (25)	42 (59)	7 (10)	4 (6)	71
Glaucoma	2013	2 (10)	10 (53)	3 (16)	4 (21)	19
	2014	5 (46)	3 (27)	2 (18)	1 (9)	11
Hepatitis C	2013	1 (50)	1 (50)	0 (0)	0 (0)	2
	2014	1 (100)	0 (0)	0 (0)	0 (0)	1
Hyper-tension	2013	59 (22)	193 (70)	12 (4)	11 (4)	275
	2014	231 (54)	182 (43)	11 (3)	2 (0)	426
Hypo-thyroidism	2013	10 (15)	39 (60)	15 (23)	1 (2)	65
	2014	41 (53)	27 (35)	9 (11)	1 (1)	78
Migraine	2013	5 (31)	6 (37)	3 (19)	2 (13)	16
	2014	4 (22)	12 (67)	2 (11)	0 (0)	18
Pre-Diabetes	2013	1 (12)	5 (63)	0 (0)	2 (25)	8
	2014	3 (37)	2 (25)	1 (13)	2 (25)	8
Renal Cancer	2013	2 (22)	5 (56)	1 (11)	1 (11)	9
	2014	0 (0)	1 (50)	0 (0)	1 (50)	2
Colitis	2013	N/A	N/A	N/A	N/A	N/A
	2014	2 (13)	7 (47)	5 (33)	1 (7)	15

Hypothyroidism

Results for hypothyroidism were similar to hypertension. AMEs improved in appropriately issuing the certificates (15% in 2013 compared to 53% in 2014). The percentage of incorrect issuances decreased from 25% in 2013 to 12% in 2014.

Migraines

There were fewer appropriate documentation and issuances for certificates with the migraine pathcode in 2014 compared to 2013 (22% vs. 31%). However, the number of incorrect issuances with the migraine pathcode decreased 3-fold between the two years (32% vs. 11%).

Pre-Diabetes

Similar to the results of the arthritis pathcode certificates, AMEs increased the number of incorrect issuances for certificates with the pre-diabetes codes between 2013 and 2014. There were more appropriate issuances in 2014, but the cases for both years were very small for this pathcode, so it was difficult to ascertain if AMEs understood the CACI process for this condition.

Renal Cancer

This condition was also difficult to compare because there were only two certificates in 2014 with renal cancer pathcodes in the analysis. Again, this might have been because AMEs were unsure if they could issue without a special issuance using CACI criteria.

Colitis

The colitis pathcode was only included in the 2014 analysis, but it gave a suitable comparison to the other 2013 conditions since OAM recently introduced the colitis CACI worksheet in April 2014. The exams with this pathcode had the most incorrect issuances (40%) of all the individual pathcodes, and AMEs appropriately issued only 13% of the time.

RESULTS- ANALYSIS 2

2013

For the second analysis, we wanted to determine how well AMEs utilized the new CACI process in its most ideal form. Using the same three months as in the first analysis, we obtained a sample of those certificates that *only* had one pathcode assigned to them, and that pathcode was a CACI condition. This identified 93 certificates to individually review. Two were removed because they were still in the workflow queue, and six additional certificates were removed because the conditions were not CACI-related conditions. The remaining 85 certificates fit into seven categories outlined below, along with a table to breakdown the categories by month.

As displayed in the table, 38% of the time AMEs appropriately deferred, meaning the certificates were not CACI eligible or the airman did not have complete paperwork at the time of his exam. Thirteen percent inappropriately deferred when the airman's certificate was actually CACI-eligible. Nine percent of the AMEs appropriately issued certificates to the airmen by writing proper CACI worksheet documentation on their examination information. Twenty-three percent of AMEs performed an incomplete issuance error because they failed to write "CACI" in comments in the examination notes. Finally, 3.5% of the time AMEs inappropriately issued a non-time-limited certificate without initial sufficient evidence pertaining to the condition or failing to provide all the required documentation to OAM at the time. AMEs appropriately issued a time-limited certificate 4.7% of the time due to the condition not being CACI-eligible. Eight percent of the time AMEs inappropriately issued a time-limited exam when it could have been issued based on the CACI criteria.

The highlighted table columns in Table 4 represent the total number of exams where the CACI process could have been utilized. Summing these 4 columns and examining the criteria, the SRM team calculated 46 out of the 85 certificates were CACI-eligible (54%). AMEs mismanaged 18 of these 46 cases (39%) due to either inappropriately deferring or inappropriately

Table 4: 2013 Exams Containing Only One Pathcode

Month	Outcome (%)							Total
	Defer		Issue Non-Time Limited			Issue Time Limited		
	Appropriate	Inappropriate	Appropriate w/Comments	Incomplete Error	Inappropriate	Appropriate	Inappropriate	
Jul.	8 (23.5)	6 (17.6)	7 (20.6)	7 (20.6)	0 (0.0)	3 (8.8)	3 (8.8)	34
Aug.	17 (48.6)	3 (8.6)	1 (2.9)	9 (25.7)	1 (2.9)	1 (2.9)	3 (8.6)	35
Sep.	7 (43.8)	2 (12.5)	0 (0.0)	4 (25.0)	2 (12.5)	0 (0.0)	1 (6.25)	16
Total	**32 (37.6)**	**11 (12.9)**	**8 (9.4)**	**20 (23.5)**	**3 (3.5)**	**4 (4.7)**	**7 (8.2)**	**85**

issuing a time-limited certificate when it could have been issued based on the CACI criteria. There were only eight (17.4%) of the 45 instances where AMEs actually wrote proper CACI documentation in the comments, which is similar to the 19% of certificates that had appropriate CACI documentation in the 2013 first analysis.

2014

The SRM group repeated the second analysis for the same three months in 2014 as used in 2013. From this group, we obtained a sample of those certificates that *only* had one pathcode assigned to them, and that pathcode was a CACI condition. This identified 311 certificates, which we individually reviewed. One certificate was taken out of the total because it was still in the workflow queue, and 18 additional certificates were taken out because the conditions were not CACI-related conditions. The remaining 292 certificates fit into the seven categories.

Based on Table 5, in general, there were a smaller proportion of certificates that needed to be deferred in 2014 compared to 2013. This indicated the CACI process helped more of these airmen obtain a non-time-limited certificate quickly. Seventy-three percent of the time AMEs utilized the appropriate CACI process to issue a non-time limited certificate. The highlighted table columns represent the total number of certificates where the CACI process could have been utilized. Summing these four columns, we calculated that 236 of the 292 certificates were CACI-eligible (81%). Table 6 demonstrates there was substantial improvement from 2013 to 2014, based on the results of Analysis 2.

DISCUSSION

Analysis 1

The results indicate AMEs substantially improved compliance with CACI protocol over the two-year study period. At the conclusion of the study, more than 91% of AMEs correctly issued CACI certificates. The percentage of correctly issued certificates that also appropriately documented CACI criteria improved from 22.3% in 2013 to 50.9% in 2014. The percentage of inappropriate issuances declined not only from 2013 to 2014, but also declined throughout the 3-month period in 2014 (decreased to 5.3% in September 2014).

When categorizing certificates by specific conditions, the SRM team discovered most of the categories contained opportunities for continuing AME education aimed at what is required to issue appropriately for specific pathcodes such as asthma, arthritis, glaucoma, and migraine conditions. The lack of certificates from certain pathcodes in the analyses may indicate AMEs still do not understand they can issue without a special issuance limitation in these instances. Examining the colitis pathcode categorization

Table 5: 2014 Exams Containing Only One Pathcode

Month	Outcome (%)							Total
	Defer		Issue Non-Time Limited			Issue Time Limited		
	Appropriate	Inappropriate	Appropriate w/Comments	Incomplete Error	Inappropriate	Appropriate	Inappropriate	
Jul.	19 (38.8)	6 (12.2)	12 (24.5)	7 (14.3)	3 (6.1)	0 (0.0)	2 (4.1)	49
Aug.	6 (5.7)	5 (4.7)	46 (43.4)	37 (34.9)	7 (6.6)	1 (1.0)	4 (3.8)	106
Sep.	9 (6.6)	3 (2.2)	62 (45.3)	50 (36.5)	6 (4.4)	5 (3.6)	2 (1.5)	137
Total	**34 (11.6)**	**14 (4.8)**	**120 (41.1)**	**94 (32.2)**	**16 (5.5)**	**6 (2.1)**	**8 (2.7)**	**292**

Table 6: Two-Year Comparison of CACI-Eligible Certificates

Comparison Category	2013	2014
• Percent certificates that were CACI eligible	54%	81%
• Percent certificates where CACI was not utilized correctly	39%	9%
• Percent certificates where AMEs wrote proper CACI documentation in comments	17%	51%

provided a comparison with other conditions in 2014 that were implemented the previous year. The colitis certificates contained the highest inappropriate issuance percentage (40%), which indicates that AMEs require more than a year to fully understand the new OAM issuance requirements.

OAM's AME Quality Assurance (QA) physician provides oversight of the AMEs by reviewing a random selection of certificates on a semi-annual basis to determine how well the AMEs certified the airmen. Our results were consistent with the QA physician's findings of 9-10% error rates of AME performance in 2013 and 2014. The QA physician attributed more than 90% of identified errors to the CACI program (Abbas, 2014). The rise in the overall number of CACI certificates identified in August and September of 2014 was likely attributed to the Federal Air Surgeon's Medical Bulletin article that reminded AMEs of appropriate CACI protocol (Fraser, 2014). The significant decrease of inappropriate issuances during the three-month period may have also been a direct benefit from that article. Finally, this analysis identified a need for continual AME education regarding CACI procedures and documentation.

Analysis 2

To answer the second question posed, we added another analysis to obtain a group of certificates with the simplest medical histories as possible. We analyzed how CACI was being utilized by AMEs in its simplest form, or the efficiency that would be gained from the CACI process if AMEs only had to worry about the one applicant pathology to certificate. We discovered missed opportunities where AMEs did not fully utilize the CACI process. However, the percentage where AMEs could have issued without a time-limited restriction, but did not, decreased from 40% in 2013 to 9.3% in 2014. The vast improvement in all areas of AME appropriate documentation and issuance signified general increased awareness and education of CACI criteria for 2014. This was also consistent with OAM's estimation of a two-year period for AMEs to fully understand and comply with most major rule changes.

Previous research confirmed there was very little risk associated with certifying certificates with CACI conditions if the conditions meet the specified criteria (Johnson et al., 2012). The results of this study indicate that AMEs applied the CACI criteria without increasing safety concerns of AME certificate issuance. To compare the pre-CACI implementation research using the OAM's Autopsy MANTRA database, we reexamined the data post-CACI implementation. There were eight fatal cases documented where the pilot-in-command had at least one CACI condition recorded on his certificate from an exam on or after April 2013, the date when CACI was implemented. After cross-referencing these cases with the NTSB factual reports, none of the causes or factors in the accidents was due to medical conditions. Therefore, the CACI process has not increased the medical risk for flight safety.

Updates to the CACI Process

From the time this two-year study concluded, the AMCD made updates to the CACI process to improve the expectations of the CACI process during the medical certification examinations. They updated the CACI worksheets in the Guide to Aviation Medical Examiners with simplified wording for the AME to use in the comments section. This increased compliance by AMEs that did not write the previous lengthy statements about CACI qualifications. To increase airmen compliance, the AMCD started sending informational letters to the airmen who renew their medical certificates if they possess a qualified CACI condition. This letter explains the CACI process, why the airmen are no longer required to obtain a special issuance, a list of steps for the airmen to comply with before their next exam, and where they can access online materials. Moreover, OAM recently released CACI worksheets for prostate and testicular cancer to make them consistent with the other CACI condition procedures. Additionally, they have released worksheets on three new CACI conditions, bladder cancer, kidney stones, and chronic kidney disease to increase the number of medical certification applicants that no longer require a special issuance (FAA, 2015).

One of the Federal Air Surgeon's objectives is to increase the percentage of airmen that can obtain a medical certificate the same day the AME performs the medical examination. The purpose of the CACI process is to allow more airmen to obtain a non-special issuance exam without going through the deferral process. Over the last four years, there has been a 20% reduction in the percentage of deferred medical certificates, decreasing from approximately 5% to slightly less than 4%. On the other hand, the percentage of special issuances has stayed relatively the same since CACI has been implemented, at approximately 6.5% of all active airmen in the system. However, OAM expects fewer special issuances in the near future. Because the CACI process has only been implemented for a few years, many of the pilots in the system have not yet renewed their certificates since OAM made the new changes to CACI. In a few years, more airmen will go through the renewal process, and OAM expects to see an even greater reduction of special issuances in the system.

RECOMMENDATIONS

Due to limited resources, studies conducted on specific AME protocol are often not feasible. The Medical Certification division has recently made several improvements to the CACI process. However, to increase AME compliance with the CACI process, OAM should create auto-populated CACI phrases for AMEs in their comments section of the airman's medical certificate. Additionally, to improve internal auditing of the system, they should start systematically flagging the CACI certificates routed to the AMCS for routine safety and quality assurance. Based on these results, OAM would benefit from continual AME education aimed at what is required to issue appropriately

for specific CACI pathcodes that have been more difficult for AMEs to comply with, such as asthma, arthritis, glaucoma, and migraine conditions. Future safety assessments will be required to determine how AMEs and airmen are complying with the newly implemented CACI condition protocol.

REFERENCES

Abbas R. *AAM-300 Quality Assurance (QA) Program*. January-June 2014 Internal OAM Report. Oklahoma City, OK. Dec 2014.

FAA. (2014). *Guide for Aviation Medical Examiners- CACI Conditions*. Federal Aviation Administration Office of Aerospace Medicine. Retrieved December 2014 from: http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/certification_ws/

FAA. (2015). *Guide for Aviation Medical Examiners- CACI Conditions*. Federal Aviation Administration Office of Aerospace Medicine. Retrieved September 2015 from: http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/certification_ws/

Fraser JR. From the Federal Air Surgeon: CACI Update. *The Federal Air Surgeon's Medical Bulletin 2014*. 52(3): p. 2-3.

Johnson BD, Frazier J, Selensky M. *CACI Program-Conditions AMEs Can Issue.* Presented at the 2012 FASMT meeting, Oklahoma City, OK. Nov 2012.