Under-Reporting of Self-Reported Medical Conditions in Aviation: A Cross-Sectional Survey

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BACKGROUND: The applicants' self-declaration of medical history is crucial for safety. Some evidence indicates that under-reporting of medical conditions exists. However, the magnitude in a population of aviation personnel has not been reported earlier.

- **METHODS:** A total of 9941 applicants for medical certificate/attestation for aviation-related safety functions during the last 5 yr up to December 2019 were registered at the Civil Aviation Authority Norway. E-mail addresses were known for 9027 of these applicants, who were invited to participate in a web-based survey.
- **RESULTS:** Among the 1616 respondents, 726 (45%) were commercial pilots, 457 (28%) private pilots, 272 (17%) air traffic controllers, and the remaining were cabin crew or crew in aerodrome/helicopter flight information service (AFIS or HFIS, respectively). A total of 108 were initial applicants. The age group 50+ constituted the largest proportion of respondents (53%). Aeromedical certification in general was believed to improve flight safety "to a high" or "very high extent" by 64% of the respondents. A total of 188 individuals (12%) admitted having under-reported information related to one or more categories, including mental (3%) or physical health (4%), medications (2%), and drug use, including alcohol use (5%). Among these, 21 participants believed their own under-reporting "to some" or "to a high extent" affected flight safety. In total 50% of noninitial applicants reported that they knew colleagues who had under-reported information. Analyses revealed that being a commercial pilot showed a higher risk for under-reporting compared with other classes and the perception of aeromedical examiners in a supportive or authoritative role reduced the risk.
- **CONCLUSIONS:** Under-reporting of medical conditions could be significant in aviation. Further studies should be conducted to investigate the true extent of under-reporting and its impact on flight safety and what mitigating measures might be recommended.
 - **KEYWORDS:** aeromedical selection, under-reporting.

Strand T-E, Lystrup N, Martinussen M. Under-reporting of self-reported medical conditions in aviation: a cross-sectional survey. Aerosp Med Hum Perform. 2022; 93(4):376–383.

A nnually worldwide there are millions of personnel, in different branches from military to transportation, space exploration, and other safety- or performance-related industries, undergoing medical certification in order to perform safety-related duties or tasks. Usually personnel are required to undergo regular health examinations and assessments which also involve thousands of certified medical professionals. In addition to the individuals directly involved (applicants and assessors), the process usually involves employers, administrative bodies, and/ or regulatory bodies. Overall, the system draws a significant amount of resources from several parties. In aviation alone, it is estimated about 300,000 airline pilots, in addition to an even bigger group of other safety critical personnel, are undergoing annual mandatory examinations to achieve their privileges.

Aviation is considered a safe system due to high standards and to a high degree of compliance with procedures and regulations for all subparts of the system. From accident investigations, 70–80% of all accidents could be attributed, at least in part, to human error.^{17,19} Medical conditions have been found to jeopardize flight safety at a rate of one accident per two million flight hours.⁶ Medical incapacitation particularly related to disturbance of consciousness, neurological conditions, the gastrointestinal system, heart disease, or medical impairment reducing essential functions such as vision and cognitive

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This manuscript was received for review in November 2020. It was accepted for publication in January 2022.

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DOI: https://doi.org/10.3357/AMHP.5823.2022

processes all pose a risk to flight safety. It has been reported that medical factors constitute the root cause in about 4.7% of all aviation accidents.⁵

Medical certification can be regarded as an important factor for the prevention of aircraft accidents. To reduce the risk of medical conditions as the main or contributory cause of fatal accidents in aviation, the International Civil Aviation Organization (ICAO) sets standards for medical certification of aircrew and other personnel in positions related to safety for aviation activities. Even clinically irrelevant conditions could pose a hazard and, thus, it is important to declare it and have it assessed by professionally trained aeromedical examiners. In Europe, to become an aeromedical examiner (AME), the applicant must be medically qualified and hold a certificate of specialist training in any specialty. In addition, the applicant must attend a basic course in aviation medicine to become a Class 2 AME. This allows an AME to certify all aircrew classes except medical class (MC) 1 (commercial pilots) and MC 3 [air traffic controllers (ATCOs)]. To certify these two classes an additional course in aviation medicine (advanced), including practical training, is mandatory to become a Class 1 AME. In Norway, most AMEs are primarily general practitioners (GPs). In an aeromedical assessment, as is the case in any general medical assessment of patients, the anamnesis of the applicant constitutes a large part of the final assessment.¹⁰ The medical history is traditionally and for all practical purposes achieved through self-declaration from the applicant. This system of medical certification is, thus, based on trust where the applicant self-declares his or her medical conditions. This is followed by a physical examination by the AME.

The Germanwings crash in the French Alps in 2015 with 150 fatalities is one of the most important modern accidents where aeromedical certification and underreporting of conditions were key contributions that led to the event.⁶ The pilot in command deliberately crashed the plane. He had struggled with anxiety, depression, and suicidal thoughts for years, and was seen by a psychiatrist while attending his pilot training. During the period of 8 mo before the crash the pilot had visual problems and a sleep disorder, and he was referred to a psychiatric hospital for assessment and treatment for a possible psychosis. He was prescribed mirtazapine, escitalopram, dominal, and zolpidem without reporting these facts to his AME.³ According to Commission Regulation (EU) No. 1178/2011, the pilot should have sought aeromedical advice and, by not doing so, this was clearly a serious example of under-reporting a medical condition.

Although AMEs are the frontline workers, regulators in defined cases directly take part in the certification process of more complicated cases and also oversee the process. They report that they regularly become aware of applicants withholding crucial information that could have consequences for safety. Official statistics are not available to display the magnitude or severity of such issues.

Clinical experiences, anecdotes, autopsy studies, and knowledge of human behavior indicate that under-reporting of medical conditions exists even in the high compliance culture of aviation, but the magnitude and impact on the certification process is unknown. However, in medical certification there are limited studies available to highlight the scope of under-reporting.

One large autopsy study by Canfield and coauthors found, after autopsy of 4143 pilots who died in an aviation accident, that psychotropic drugs were only reported by 14 (6%) of 223 pilots, cardiovascular drugs were reported by 69 (46%) of 149 pilots, and only 1 (7%) of 15 pilots reported taking neurological medications.⁴ Similarly, Sen et al. found under-reporting of antidepressants in 52 (88%) of 61 aviators post mortem.¹⁵ Botch and Johnson found that disqualifying substances were present in 21 accidents (all general aviation) among the 2184 accidents in the period under study (2000–2006).²

The main aim of this study was to estimate the prevalence of under-reporting of medical conditions in the aeromedical certification process. Secondly, the study examined different predictors of under-reporting, including the type of license and the relationship with the AME.

METHODS

Participants and Procedure

We conducted a cross-sectional web-based survey for all holders or applicants of medical certificates or attestations registered at the Civil Aviation Authority Norway in the 5-yr period preceding December 2, 2019. This included commercial pilots who held MC 1 certificates, private pilots who held MC 2 certificates, and ATCOs who held MC 3 certificates. The remaining categories were either cabin crew (holder of a medical attestation), crew in aerodrome/helicopter flight information services (AFIS/HFIS), or national pilots of smaller aircraft holding either light-aircraft pilot licensing medical or national certificates (MC other).

A total of 9441 individuals with Norwegian social numbers were identified and thus eligible for inclusion. Of these, email addresses could be retrieved for 9027 by linkage to the public contact and reservation registry, and they were invited to participate in February 2020. Responses were accepted for a window of 2 wk and no reminders were sent out. The study closed March 4, 2020. The proportion responding was 17.9%. Age and gender for all the invitees could be derived from the social number, including birth date, which was used to link each case to an e-mail address through the contact registry. Age distribution among the invited was as follows: <30 yr 22.4%, 30–39 yr 22.2%, 40–49 yr 20.8%, and 50+ years 34.4%. Gender distribution among the invited was 30.3% women.

Participation in the study was voluntary and anonymous. This was stated in the information letter to the participants and thus Institutional Review Board approval was not required. By agreeing to participate the invitees gave their consent.

Forms were created in a web-based application Nettskjema, a secure solution for online data collection (https://www.uio. no/english/services/it/adm-services/nettskjema/), and a link to the survey was distributed with Mailchimp. Nettskjema was used in anonymous mode, meaning that it was not possible to link responses to email addresses used for distributing the invitation. The invitees or the public were not involved in the design, analysis, or the writing up of this study. Demographic variables were restricted to age in categories to secure anonymity to the respondents.

Questionnaire

The survey consisted of three forms. One for holders of certificates in the Norwegian language and a second one translated to English; the third form was a slightly adapted version, only in Norwegian, dedicated to those having undergone initial application only without subsequent aeromedical assessments. One question about insurance was omitted in this form. The main difference was the wording of the questions which referred to the initial assessment which applicants had previously completed which was then compared to any previous assessments that the license holders had experienced. After a screening question, the participant was directed to the correct form and language version.

A total of 27 questions were included (all questions with responses and number of missing responses are shown in **Table AI** online, https://doi.org/10.3357/amhp.5823sd.2022). An open free text field was reserved for comments at the end of the questionnaire. Questions were designed so that the respondents remained anonymous. Regarding the free text field, the respondent was explicitly advised against submitting data that could identify the questionnaire to a particular individual in order to ensure the respondent's anonymity.

Under-reporting was defined as having answered yes to any of the questions #19–22: Have you ever under-reported/withheld information from an AME about your 1) physical health, 2) mental health, 3) use of medication, or 4) drug use including alcohol?

Statistical Analyses

Descriptive statistics were used to describe the basic features of the data. The Chi-squared test was used to determine whether there was a statistically significant difference in the expected frequencies and the observed frequencies between groups.

Missing data was omitted for analyses. Cronbach's alpha (internal consistency) was estimated for two scales identified by principal components analysis (Varimax rotation). Alpha values >0.70 are considered satisfactory.⁷ Scale 1 included questions #7, 9, 10, 11, and 12 and Scale 2 questions #8, 13, 14, 15, and 16 as referred to in supplemental Table AI online. Scale 1 (AME support) was based on items with high loadings on the first component and was a collection of questions on how the respondent perceived their relationship with their AME, particularly in relation to raising issues about his/her health. The second component was a collection of questions to map the perceived effect of check-ups in detecting problems. These questions were combined into Scale 2 (AME authoritative). Cronbach's alpha showed alpha levels of 0.90 for Scale 1 and 0.81 for Scale 2, indicating good to excellent reliability for the two computed scales.

Logistic regression analysis was applied to investigate the association of the dependent variable "have or have not under-reported" against independent variables [age groups (age <30, 30-39, 40-49, and 50+ coded as numeric 1-4), lossof-license insurances (yes/no; "not relevant" was coded as "no"), medical certificate class (1, 2, 3, and other), extent of perceived AME support (numeric, mean of scale 1), and extent of AME perceived as authoritative (numeric, mean of scale 2)]. The interaction terms age*AME support, age*AME authoritative, insurance*AME support, and insurance*AME authoritative was included in a separate step. An interaction effect exists when the effect of an independent variable on a dependent variable changes depending on the value(s) of one or more other independent variables.¹¹ The interactions terms we included were the ones believed to have potential to change the values of others pre-analysis. The statistical package used was R version 3.6.1. A priori no potential confounders or effect modifiers were suspected.

RESULTS

Among the 1616 respondents, 108 (6.7%) completed the form for initial applicants and 29 (1.8%) used the form in English. A total of 726 were Class 1 commercial pilots/MC 1, 457 private pilots/MC 2, and 272 air traffic controllers/MC 3. The remaining 160 (10.0%) were either cabin crew, crew in aerodrome/ helicopter flight information service (AFIS/HFIS), or national pilots of smaller aircrafts/MC other, except for one case where the data was missing. The age group 50+ constituted the largest proportion (overall 52.7%) of respondents in all classes except MC 3 (**Fig. 1**).

Loss-of-license insurance is an insurance that compensates the license holder, usually economically if the license is revoked due to medical conditions. The terms might vary among different insurance companies and usually operators provide such insurance for commercial pilots and ATCOs. Among those where loss-of-license insurance was relevant (excluding initial applicants, MC 2, and those in other classes where reporting this was not relevant), a total of 81.1% within MC 1 group had this insurance, 78.0% within MC 3, and 55.1% within MC other.

A total of 188 individuals (11.6%) admitted having underreported information to the AME related to one or more of the conditions, including mental health (3.3%), physical health (4.2%), medications (1.7%), or drugs including alcohol use (5.4%) (percentages listed at each condition represent the proportion of responders having under-reported related to the given condition).

Most frequently commercial pilots admitted they under-reported (15.9%), while corresponding numbers for private pilots was 4.6%, ATCOs 8.8%, and other medical classes 14.0%. For commercial pilots a total of 30 of 702 answered that loss-of-license insurance was not relevant for them. Among the remaining 671 with complete data on under-reporting, 17.6% of the 544 having insurance, and 10.2% among the 127 who did not have insurance admitted under-reporting (P = 0.04). The



Fig. 1. Number of respondents in different age groups, stratified by medical class.

proportion of respondents having under-reported varied between 10.1% and 13.6% in the different age groups (P = 0.24).

Among those who admitted having under-reported, 21 participants believed their own underreporting could have affected flight safety "to some" or "to a high extent". Characteristics of these responders are shown in **Fig. 2**. When excluding 108 initial applicants, 49.0% (N = 739) responded that they knew colleagues who had underreported information, and 229 (31.0%) of them believed this affected flight safety "to a high extent". The 229 were distributed among different classes as follows: 109 (15.7%) MC 1, 54 (13.2%) MC 2, 12 (8.1%) MC 3, and 54 (23.4%) MC other.

A total of 6.0% of all respondents reported they knew someone who had been classified as unfit by the AME and still carried out the activity they were assessed unfit for. The largest proportion of respondents reporting this were found among the MC 1 and MC other (including cabin crew) groups, 6.2% and 12.2%, respectively. On the other hand, only 2.5% of respondents within MC 3 were aware of others having performed their duty while being considered unfit by professionals. The participants provided feedback related to possible reasons for underreporting (**Fig. 3**).

Participants were asked to score A) to what extent the medical check-ups being carried out are 'charting' different conditions; and B) when visiting the AME, to what extent they feel they can address issues related to the condition. By 'charting' we mean to map out the condition and with 'address' we mean that the applicant can initiate a discussion about issues related to the condition. Results for both are displayed in **Fig. 4**.

In response to question A) ('charting'), "to a very low" or "low extent" was most frequently reported for mental health conditions (49.8% of participants) and, correspondingly, for drug use was 31.5%, physical health 12.0%, and for use of medication 26.4%. Further, the response to question B) ('address'), "to a very low" or "low extent" was most frequently reported for



Fig. 2. Visual tree of those 188 having underreported and who, considering the situation, could have impacted flight safety to some or to a high extent (severity). MC: medical class.

Assumed cause of under-reporting (self and others)	Percentage	MC	Age
Consequences for own career	69	 .	.ıl.
Consequences for the operator	7	.	
Personal reasons for not sharing information	24	.	
Do not want to share with an AME	19	L.	
The process was not facilitated to reveal the information	7	h.,	.du
Self-assessment that the condition was not relevant to flight safety	40	h. .	
Other	12	I. .	. I .

Fig. 3. Percentages of responses according to assumed causes of underreporting. The columns medical class (MC) and age display the characteristics of respondents related to each cause within the following categories from right to left respectively: MC 1, 2, 3, and other; and age <30, 30–39, 40–49, and 50+ yr.

mental health conditions (22.1% of participants) and correspondingly for drug use was 14.7%, physical health 10.4%, and for use of medication 8.4%.

The majority of responders understood that aeromedical certification is important for increased flight safety. A total of 46.1% of the responders believe aeromedical certification in general affects flight safety "to a high extent" and 17.7% "to a very high extent". The distribution of responses was not significantly different between the groups of those 188 responders having under-reported compared with the remaining who stated they had not under-reported (P = 0.30).

In separate questions as many as 61.0% of all respondents reported their aeromedical examiner (AME) "to a high" or "very high extent" as supportive, while 57.9% noted that their AME "to a high" or "very high extent" was an authoritative examiner. A total of 31.6% of all respondents replied that if the aeromedical examination was performed by the GP assigned to that person, they believed "to a high" or "very high extent" that flight safety would be improved. Further, a total of 36.7% answered "to some extent".

Among the 1436 respondents with complete data for all variables, we found it more likely that private pilots (MC 2) and ATCOs (MC 3) under-reported medical conditions compared



Fig. 4. To what extent respondents feel they can address all issues when visiting their AME and to what extent they think that the medical check-ups are charting their health related to physical health, mental health, drug and alcohol use, and medication use.

Table I. Logistic Regression of Underreporting as the Dependent Variable (Not Having Underreported is Reference).

	ODDS RATIO	P-VALUE	95% Cl
Intercept	8.79	< 0.01	3.25, 23.78
Age group (cont*)	0.92	0.39	0.76, 1.11
Loss-of-license insurance			
Yes (Ref)	1.00	-	
No	0.76	0.21	0.50, 1.17
Medical class (MC)			
1 (commercial) (Ref)	1.00	-	
2 (private)	0.21	< 0.01	0.11, 0.42
3 (ATCO)	0.47	0.01	0.25, 0.86
Other	0.90	0.66	0.56, 1.44
Supportive AME (cont)	0.68	0.01	0.50, 0.91
Authoritative AME (cont)	0.51	< 0.01	0.40, 0.64

*cont = continuous variable; Ref = Reference; CI = confidence interval; ATCO = air traffic controller; AME = aeromedical examiner.

to commercial pilots based on the logistic regression analysis (**Table I**). The results also indicated that individuals scoring high on the two scales assessing the AME as supportive (Scale 1) rather than authoritative (Scale 2) were less likely to underreport (Table I). Model fit was $\chi^2(7) = 138.2$ (P < 0.01) and Pseudo-R² (McFadden) = 0.013. An additional step with the four interaction terms included did not improve the model significantly and was therefore excluded from the table.

DISCUSSION

A total of 11.6% responders to this survey admitted underreporting their own medical conditions during the process of initial or renewal of their medical certificate. This is a serious finding which undermines the system of medical certification and thus potentially jeopardizes flight safety. The results are not unexpected as they coincide with beliefs both from authorities and certificate holders across different member states. Results are now better documented and systematically assessed. However, this is most likely not the whole picture and only represents the minimum level because this survey only addresses under-reporting that could be known to the responder (intended errors) and which they are willing to admit. In addition, unintended underreporting happens quite frequently and it is understandable that some conditions, particularly the ones that are considered trivial, are forgotten. Even in a clinical setting where reporting of medical conditions (comorbidities) is important for the patient, it is well known that they forget to report their diagnoses.9 One reason could be that chronic diseases they live with are not regarded as a disease, but as an inherent part of life.

In this study most of those respondents admitting underreporting believed the condition to be of less importance for flight safety. In responders who admitted under-reporting, both their own and others, 40% of them believed the condition was not relevant to flight safety. As many as 69% of responders believe that the consequences for their own career was the reason for under-reporting.

One could argue that under-reporting would be more frequent among those not protected by a loss-of-license insurance. Such insurance means the insured will be economically compensated if the medical certificate is lost due to medical reasons. Among commercial pilots the opposite was observed as there was a larger proportion of respondents admitting underreporting in the group of those having loss-of-license insurance. Correspondingly, in the regression analyses, loss-of-license insurance was not identified as an important factor when predicting under-reporting. The financial aspect may not be the only reason for under-reporting as many pilots and other professionals in aviation have a strong professional identity. This means that loss of license may not be only about losing income, but also an important part of the loss of professional status.

While the regression analyses identified that medical class and how applicants perceived the AME (supportive or authoritative) as important for under-reporting, it is important to state that that there was much unexplained variance in the analyses. This means that other factors, not included in the model, would be of importance to explain the variable outcome.

From other studies in psychology and behavioral sciences we know that people sometimes lie, on the average twice per day,⁸ and conceal health information.¹³ The decision to lie or withhold information is influenced by many factors, including personality traits, external factors, the chances of getting caught, and available self-justifications.¹⁶ Most people seek to appear fair and honest and will negotiate a balance between self-interests and available self-justifications when facing a situation where withholding information about health problems may seem beneficial. Possible self-justifications may be that the condition was not relevant to flight safety, as listed as a possible reason by many in this study. The decision to withhold information may also be influenced by optimistic bias, which is the tendency for people to think that they are less at risk than the average person.¹⁴ This may also apply to aviators when assessing the risk of having a medical problem causing an accident. Factors that in this study reduced the likelihood of under-reporting was having a supportive or authoritative AME or not being a commercial pilot.

The finding that more than half of the responders believed "to some" or "higher extent" that the whole certification process would be improved if it was conducted by the GP, must be interpreted in light of the national system. In Norway every citizen is assigned to a specific GP and this physician will usually be involved in most of the medical events occurring to the assigned person. The GP will by default receive medical reports or summaries from almost all private specialists and all hospitals involved in medical care of the person assigned to them. This is probably the basis for the belief in the GP's role to enhance the system. Most AMEs in Norway are GPs, and some of the applicants for a medical certificate would thus know that their GP is an AME. However, they are free to choose any AME they wish.

To our knowledge there are no other comparable studies published with results of applicants admitting underreporting of medical conditions in aviation. However, if we look to other sectors, Dow and Turmel conducted a study to investigate the degree of voluntary declaration for drivers (automobiles).¹² They did so by linking registries of medical data (provincial health insurance agency and the Ministry of Health and Social Services) and crash, infraction, and licensing data from the Société de l'Assurance Automobile du Québec. They concluded that there is serious underreporting of medical conditions which is considered to negatively affect driving. Under-reporting was found among 84-99% of license holders in the different groups of medical conditions such as visual disorder, epilepsy, diabetes, psychiatric disorder, drug/alcohol abuse, etc. Many drivers with conditions that may influence driving report their more benign condition while omitting to report the condition that could affect their permit status. We believe crewmembers and other individuals subject to medical licensing in aviation are more likely to report medical conditions than drivers for several reasons. Firstly, there is a mature safety culture among crewmembers, where human factors and impact of errors are more emphasized. Secondly, many of the crewmembers have loss-of-license insurance providing them with financial support in case of medical unfitness. Thirdly, license holders in aviation are often working in teams where medical issues or conditions can be difficult to hide. Also, the medical certification process is thorough and they are frequently reminded at annual check-ups about the need for mandatory reporting.

Limitations of the study include no link between the invitation and the response. This means there was no actual control of who responded and who did not. However, this concern seems not very relevant, as there is no obvious advantage to be gained for some former license holders who are no longer requiring medical certification to take part in this survey. We are aware that mass distribution of emails could lead to invitations entering spam filters and thus never reaching the attention of the invitee, which could account for the low response rate. Since the recruitment included all individuals who had held a certificate for the last 5 yr, some of the responders had been out of business for a period of time. Surveys are prone to recall bias and this is one of the main limitations in this study. Given the setting of the questions, recall bias is believed to underestimate rather than overestimate the current finding.¹

In the invitation for the current study, the association with a regulatory body (Civil Aviation Authority Norway) would presumably make underreporting, which could be considered a violation of regulations, less likely. The study was thus designed to be anonymous and we stated this clearly to invitees. The results indicate that many were not affected by the association to a governmental authority as they still admitted underreporting, which for some probably could be classified as fraud. Anyway, we believe the magnitude of under-reporting that is evident in these results just represent a minimum share of the actual magnitude.

While this study has a cross-sectional design, conducted in one country and the age groups are skewed toward the older part of the population, we have to caution regarding the generalization of the results. However, there are no reasons for underreporting to be higher in Norway than other countries as there are beneficial social security agreements and insurances for the population. Also, the group of older respondents who are finishing their careers might be more prone to admit their underreporting and thus just to a higher degree reveal the true extent, while at the same time this group might have more conditions to report.

A strength of the study is that the population was recruited from a complete national cohort of aviation personnel where we were able to access emails for almost every certificate holder in the country. The fact that it was not an interview situation, but self-administered response, was believed to raise the rate of actual trustworthy response to sensitive questions.¹⁸

Finally, this study shows under-reporting is confirmed by the applicants and holders themselves. Actions must be taken to understand further the extent and impact of under-reporting in medical certification and how it could be mitigated as it could have fatal consequences for flight safety and other safety critical systems.

ACKNOWLEDGMENTS

Financial Disclosure Statement: The authors have no competing interests to declare.

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#	QUESTIONS & RESPONSE ALTERNATIVES	Ν
1.	What is your age?	
	29 or vounger	163
	30-39	274
	40-49	327
	50 or older	851
	Missing	1
2.	How many years have you been holding a medical certificate for aviation activity?	
	1–5 yr	152
	6–10 yr	193
	11 yr or more	1163
	Missing	108
3.	What type of medical certificate do you hold?	
	Class 1 Commercial Pilot	726
	Class 2 Private Pilot	457
	Class 3 Air Traffic Controller	159
	Other	272
	Missing	2
4.	Do you have a Loss of License insurance?	
	Yes	773
	No	555
	Not relevant	176
	Initial applicants not asked this question	108
	Missing	4
5.	To what extent do you think that medical certification contributes to increased flight safety?	
	To a very little extent	24
	To a little extent	104
	To some extent	455
	To a large extent	743
	To a very large extent	286
	Missing	4
6.	Indicate which of the suggestions below you believe could contribute to increased flight safety. Several crosses are possible [more than	
	one answer possible].	
	Better education of aeromedical examiners	347
	Liberalization of aeromedical regulations and their application	294
	Stricter aeromedical regulations	128
	Stricter sanctions and measures for individuals withholding information about their medical conditions	366
	Less waiting time for proceedings of applications	483
	More information to employers and organizations about the certification process	194
	More information to holders of and applicants to medical certificate about their obligations to report about decrease in medical fitness	827
	Missing	212
7.	To what extent do you experience that the Aero-Medical Examiner (AME) is supporting you?	
	To a very little extent	41
	To a little extent	123
	To some extent	466
	To a large extent	716
	To a very large extent	267
	Missing	3
8.	To what extent do you perceive the AME as authoritative?	
	To a very little extent	30
	To a little extent	121
	To some extent	528
	To a large extent	731
	To a very large extent	204
	Missing	2
9.	When you are visiting the AME - to what extent do you feel you can address all issues related to your physical health?	
	To a very little extent	49
	To a little extent	119
	To some extent	366
	To a large extent	747
	To a very large extent	333
	Missing	2
		(Continued)

# QUESTIONS & RESPONSE ALTERNATIVES	Ν
10. When you are visiting the AME - to what extent do you feel you can address all issues related to your mental health?	
To a very little extent	125
To some extent	440
To a larce extent	565
To a very large extent	243
Missing	13
11. When you are visiting the AME - to what extent do you feel you can address all issues related to your use of medications?	15
To a very little extent	45
To a little extent	89
To some extent	325
To a large extent	785
To a very large extent	349
Missing	23
12. When you are visiting the AME - to what extent do you feel you can address all issues related to your drug use? Including alcohol.	
To a very little extent	90
To a little extent	142
To some extent	380
To a large extent	649
To a very large extent	314
Missing	41
13. To what extent do you think that the medical check-ups that are being carried out are charting your physical health?	
To a very little extent	43
To a little extent	151
To some extent	502
To a large extent	726
To a very large extent	190
Missing	4
14. To what extend do you think that the medical check-ups that are being carried out are charting your mental health?	0.54
To a very little extent	251
To a liftle extent	549
To some extent	506
To a large extent	230
Notice of the second seco	/0
Missing	10
15. To what extent do you think that the medical check-ups that are being camed out are charting your use of medication?	110
To a very indeextent	200
To a new extent	520
	470
	470
Missing	22
Missing	22
To a very little extent	145
To a little extent	353
To some extent	562
To a large extent	373
To a very large extent	150
Missing	33
17. Have you ever disagreed with the AME regarding his or her assessment of your medical condition?	55
Yes	99
Νο	1405
Missing	112
18. If you are aware that colleagues or other applicants have underreported/withheld information for an AME, to what extent may this have affected flight safety? Consider the most significant cases when answering.	
To a very little extent	108
To a little extent	178
To some extent	224
To a large extent	154
To a very large extent	75
Not familiar to me	749
Missing	128

(Continued)

# QUESTIONS & RESPONSE ALTERNATIVES	N
19. Have you ever underreported/withheld information for an AME about your physical health?	
Yes	67
No	1544
Missing	5
20. Have you ever underreported/withheld information for an AME about your mental health?	
Yes	54
No	1558
MISSING	4
Yes	27
No	1578
Missing	11
22. Have you ever underreported/withheld information for an AME about your drug use? Including alcohol.	
Yes	87
No	1522
Missing	7
23. If you answered yes (to at least one of the questions 19–22) about yourself having underreported/withheld information for an AME, did you consider the situation to be such that it could have an impact on flight safety?	
To a very little extent	147
lo a little extent	49
To some extent	2/
To a large extent	10
To a very large extent Have not underconstant/withheld information	1038
Missing	340
24 If you answered yes (to at least one of the questions 19–22) about yourself having underreported/withheld information for an AME did	5-10
you consider the possibility of addressing the problem to a support group?	7
Yes, but I did not wish to involve a support group	8
Yes, but I don't have admission to a support group	6
No. I did not wish to involve a support group	32
No, but I had done it if a support group was available	13
No, I am not familiar with a support group or if it is available	53
No, not relevant	1102
Missing	395
25. Do you know of someone who has completed activity they are unfit for, despite unfit assessment by an AME?	
Yes	97
No	1513
MISSING 26. Do you think that the level of cafety would have been higher with regard to discovering health conditions if the check we was carried	6
out by a General Practitioner who is familiar with the individual's medical history?	470
To a very little extent	1/8
To a nulle extent	500
To a large extent	353
To a very large extent	154
Missing	9
27. If you are familiar with underreporting by yourself or others, what do you think is the reason for It? Several crosses are possible [more	2
than one answer possible].	
Consequences for own career	806
Consequences for operator	88
Personal reasons for not sharing information	286
Don't want to share with an AME	222
The process was not facilitated to reveal the information. (Please elaborate more in the open space below.)	84
Self-assessment that the condition was not relevant to flight safety	46/
Uller	148
1711551119 28. If you have any comments to the survey or the apromedical cortification process, please feel free to enter them below. If possessory refer	455
to the relevant question. Make sure that what you write does not identify you.	
[Free text field]	366
Missing	1250