

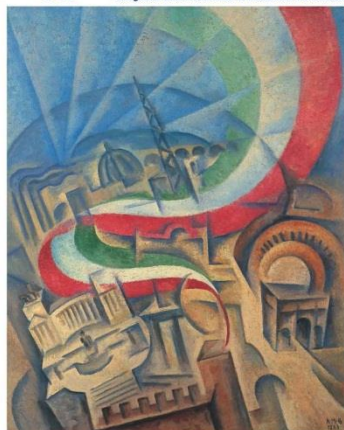


**AERONAUTICA MILITARE  
COMANDO LOGISTICO**

**ISTITUTO DI MEDICINA AEROSPAZIALE «ALDO DI LORETO» - ROMA**



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65<sup>th</sup> International Congress of Aviation and Space Medicine  
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Congresso Internazionale di Medicina Aeronautica e Spaziale



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# **CARDIOVASCULAR RISK FACTORS IN FLIGHT PERSONNEL. AN ITALIAN SURVEY.**

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# DISCLOSURE

- No conflict of interest.
- The content of this presentation is the personal believing and opinion of the Authors and do not necessarily reflects the official position of the Italian Air Force, the Italian Ministry of Defence and the Italian Government.

# BACKGROUND

- Acute physical incapacitation during flight is a major threat due to possibly catastrophic consequences.
- The risk of acute incapacitation in flight is defined as «acceptable» if it is limited within the 1% rule.
- The aim of medical checks for flight personnel is to rule out any medical condition with related risk of acute incapacitation greater than 1%.
- Cardiovascular diseases are one of the most important causes of physical incapacitation.



# MITIGATION STRATEGIES



- Studies on medical conditions at high risk of acute incapacitation;
- Change medical requirements;
- Implementation of new «ideal» diagnostic protocols (not or minimally invasive, high predictive, accurate, cost effective, etc.);
- Short intervals between medical checks;
- Risk assessment including considerations on operational aspects;
- Medical limitations & prescriptions;
- Risk factors management and control.



# IMAS CVS RISK FACTORS MONITORING



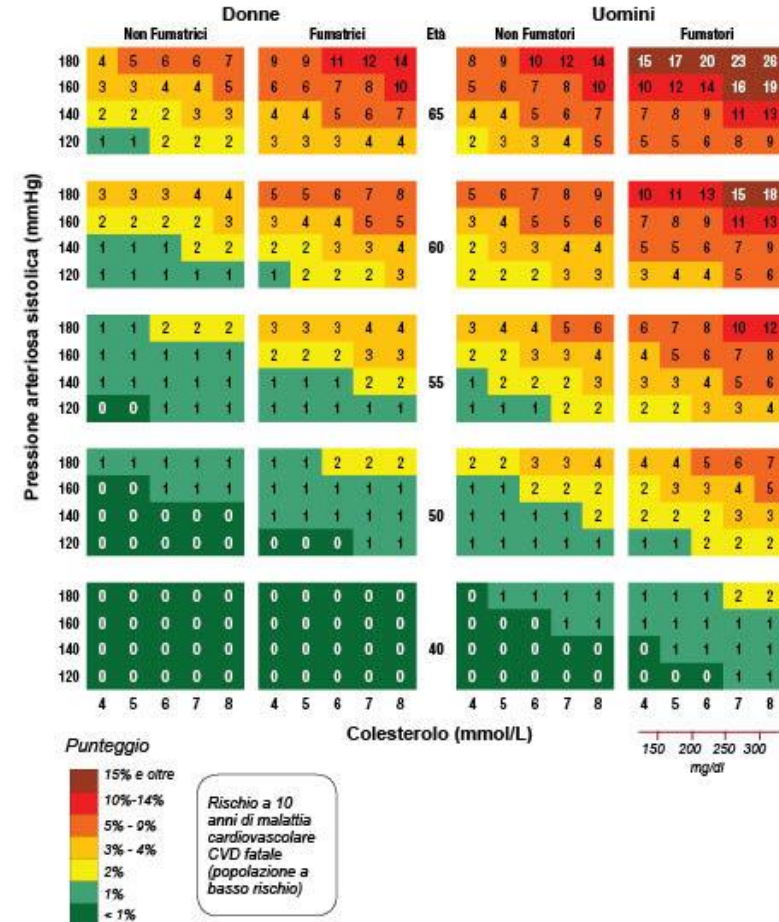
- A CVS Risk Score based on the protocol of the Istituto Superiore di Sanità has been introduced in the aeromedical check since 2014.
- The score reflects the probability of major CVS events within the next 10 years.
- After two years, the score has been computed for most aircrews seen at the IMAS of Rome.
- The individual CVS Risk Score is not considered as it in the aeromedical decision process leading to the medical certification, but it is released to the subject with recommendation of adequate changes in lifestyle if necessary.



# IMAS CVS RISK SCORE



- Gender
- Age
- Diagnosis of diabetes and/or hypertension
- Smoke habits
- Total cholesterol
- Blood glucose
- Systolic blood pressure



# STUDY PART #1

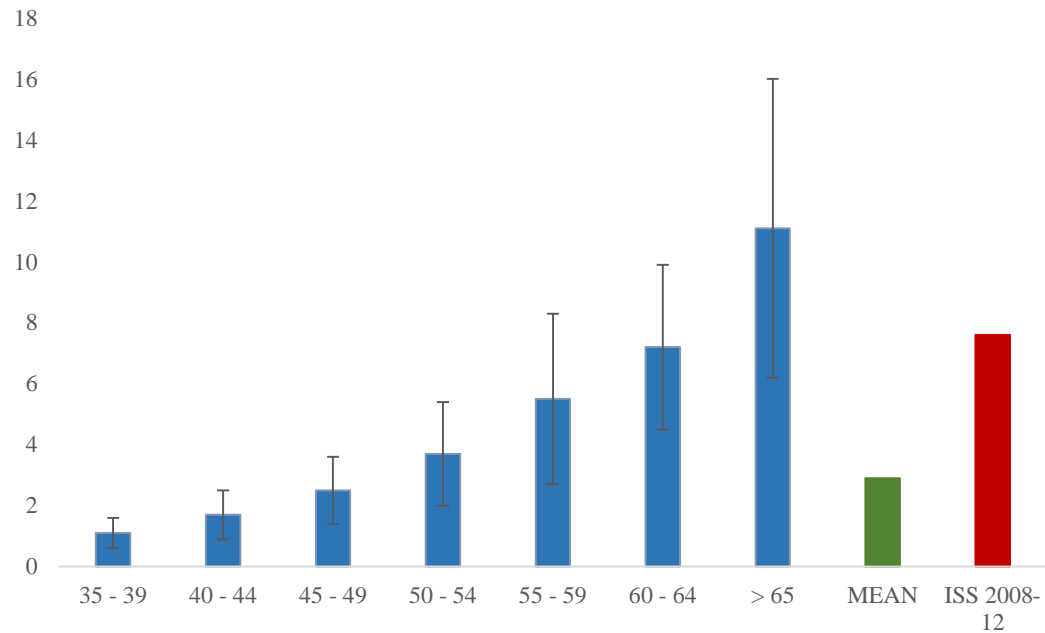
- Subjects: 4097 flight personnel civilian & military (122 female) between October 2014 e December 2015.
- Methods: Database review and analysis.
- Inclusion criteria: flight personnel for whom at least an individual CVS Risk Score were available in the indicated period.
- Exclusion criteria: female gender.
- Final analysis conducted on: 3975 male.
- Statistical analysis: ANOVA, 2x2 contingency table.

# RESULTS

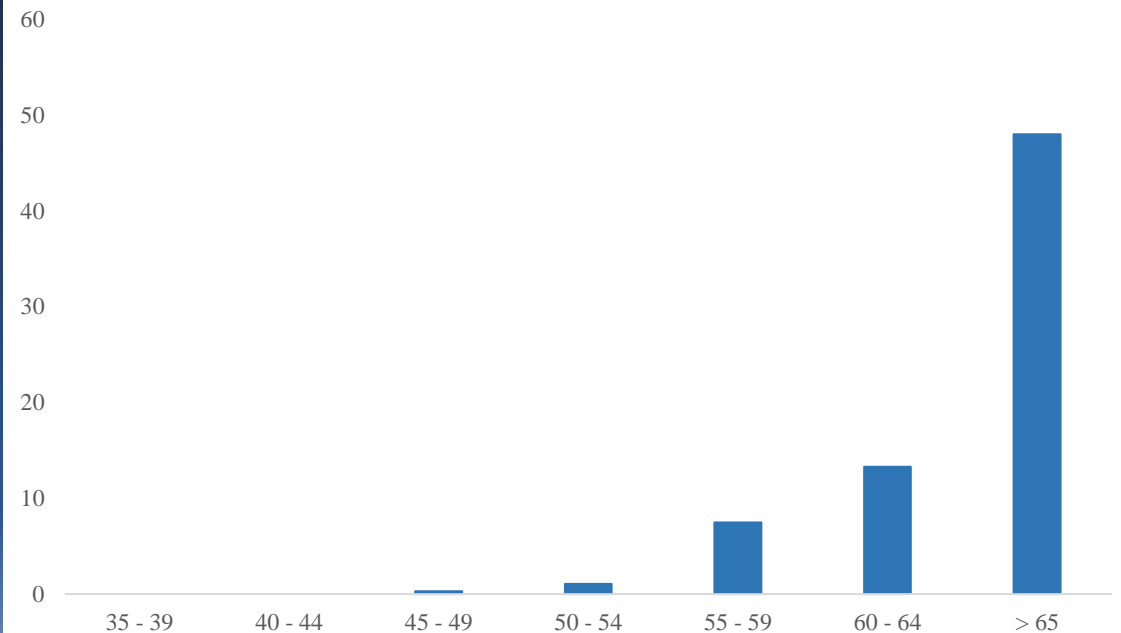
## CVS RISK INDEX



MEAN INDIVIDUAL RISK SCORE FOR AGE



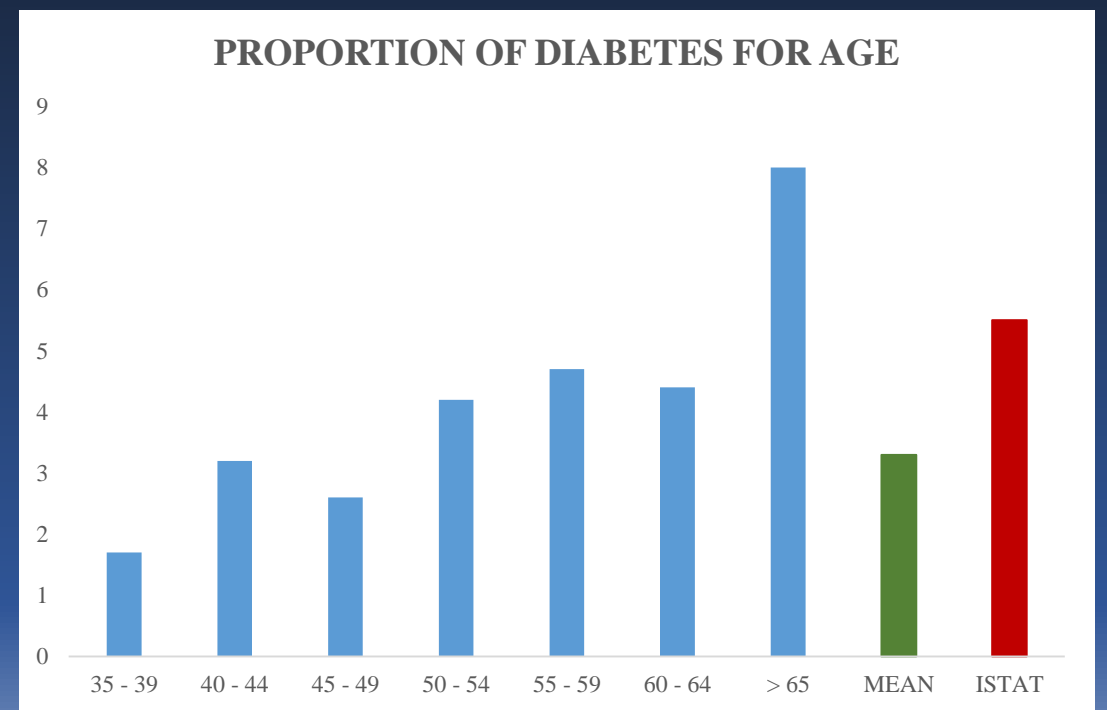
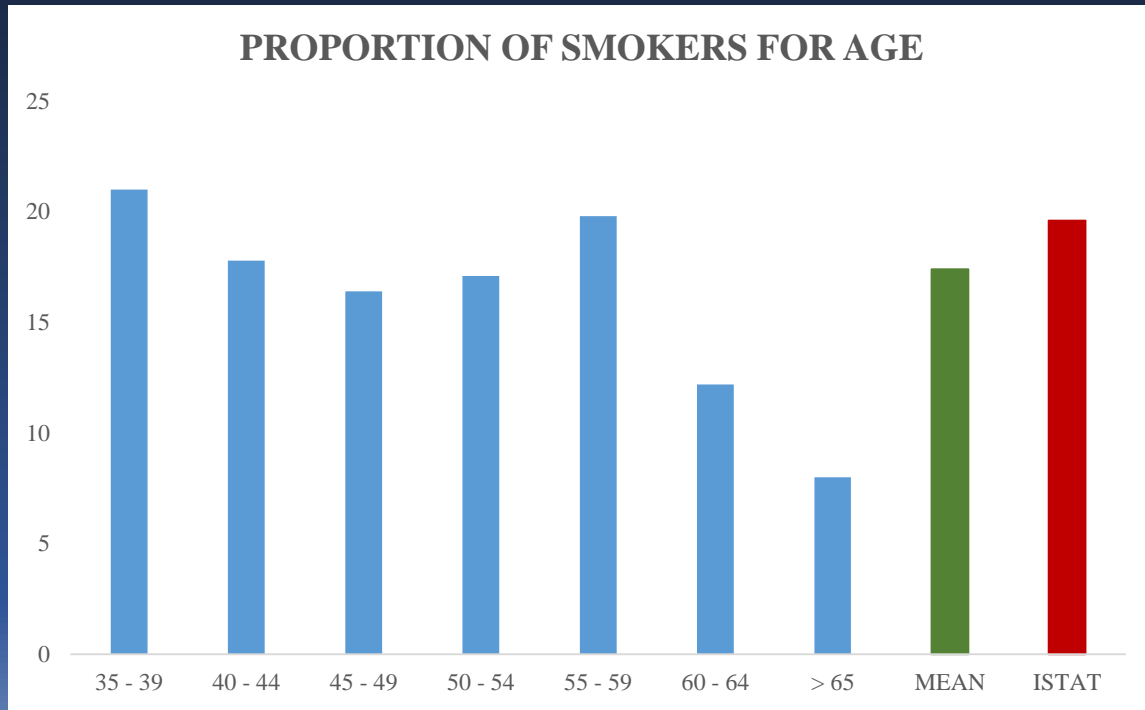
PROPORTION OF SUBJECTS WITH RISK > 10





# RESULTS

# SMOKING AND DIABETES

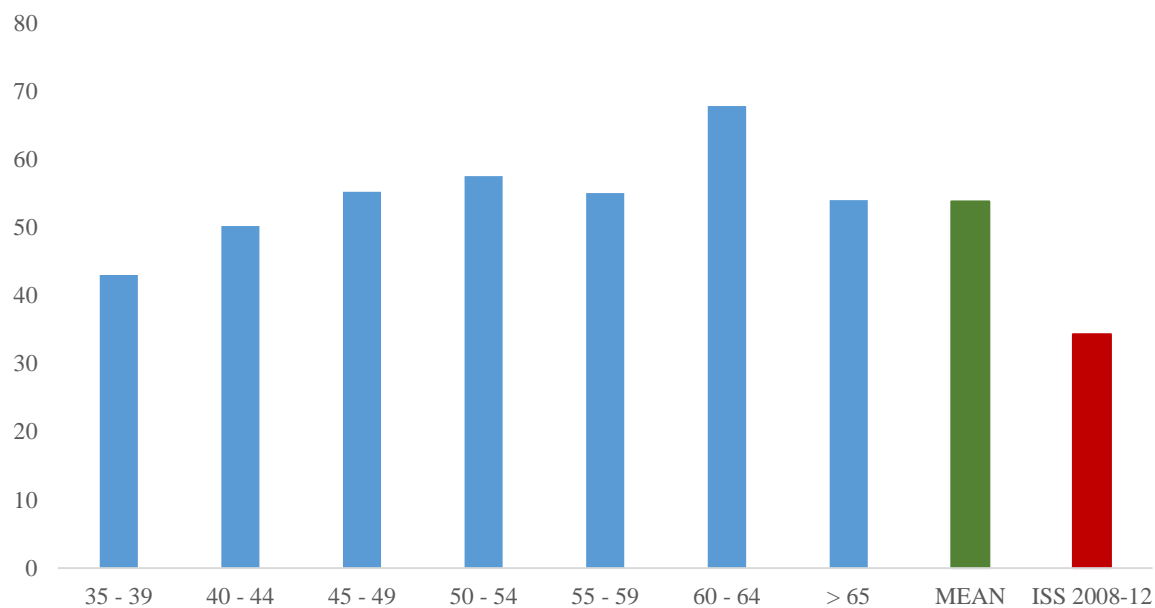


# RESULTS

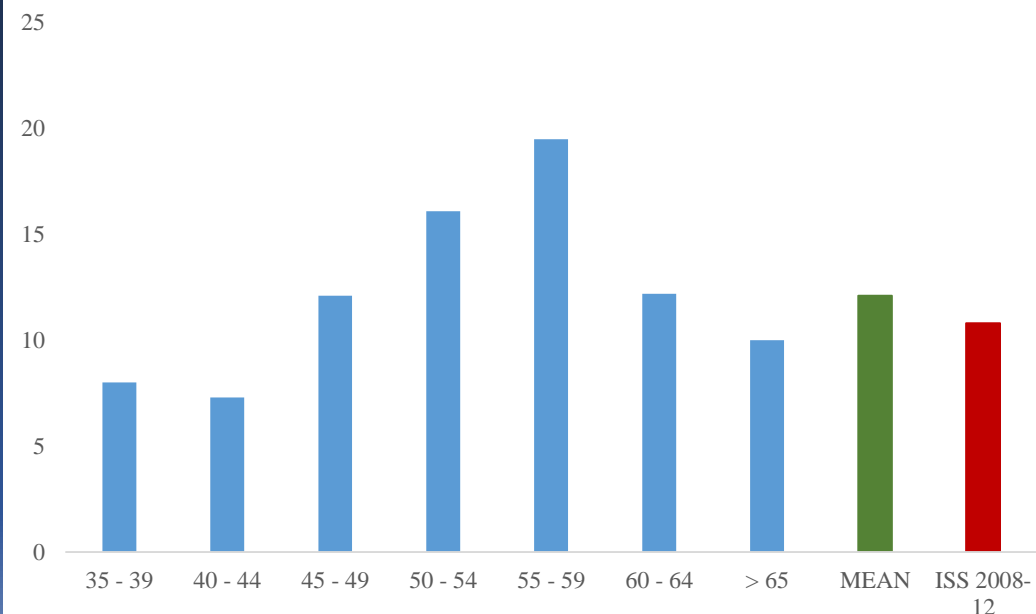
# CHOLESTEROL AND GLUCOSE



PROPORTION OF SUBJECTS WITH ABNORMAL CHOLESTEROL FOR AGE



PROPORTION OF SUBJECTS WITH ABNORMAL BLOOD GLUCOSE FOR AGE



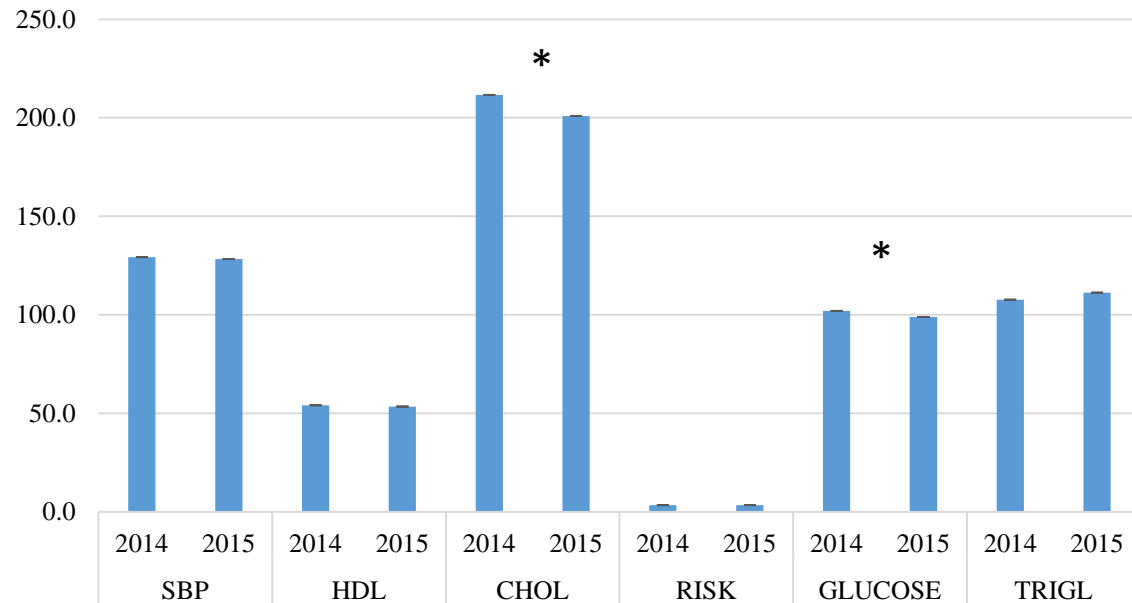
# STUDY PART #2

- Subjects: 399 male aircrew civilian & military, visited twice between October 2014 and December 2015.
- Methods: database revision & analysis.
- Inclusion criteria: flight personnel undergone two or more visits in 2014 and 2015.
- Statistical analysis: ANOVA, 2x2 contingency table.

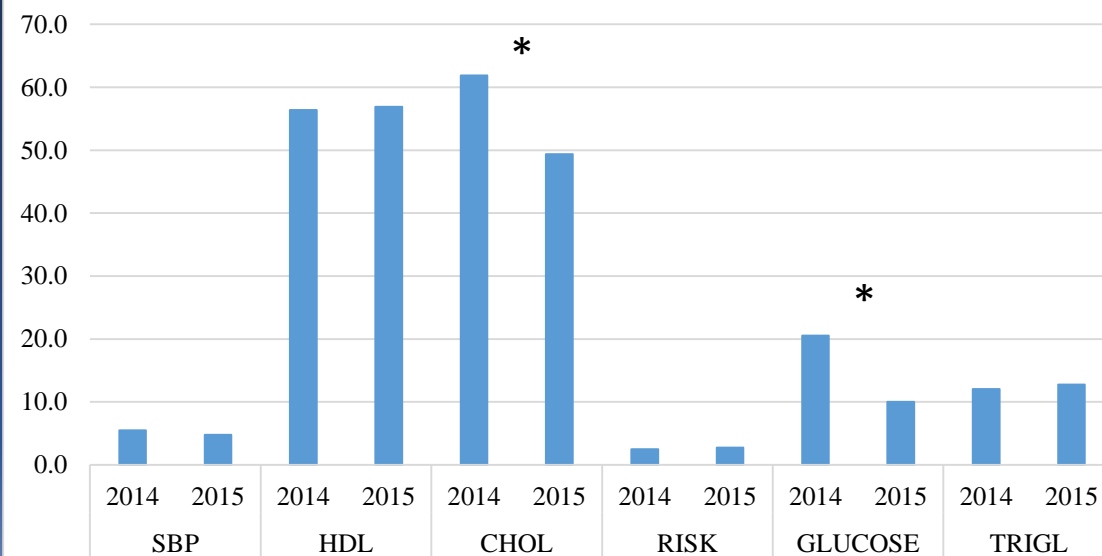
# RESULTS



## CHANGES IN VARIABLES BETWEEN TWO VISITS



## PROPORTION OF SUBJECTS WITH ABNORMAL VALUES BETWEEN TWO VISITS



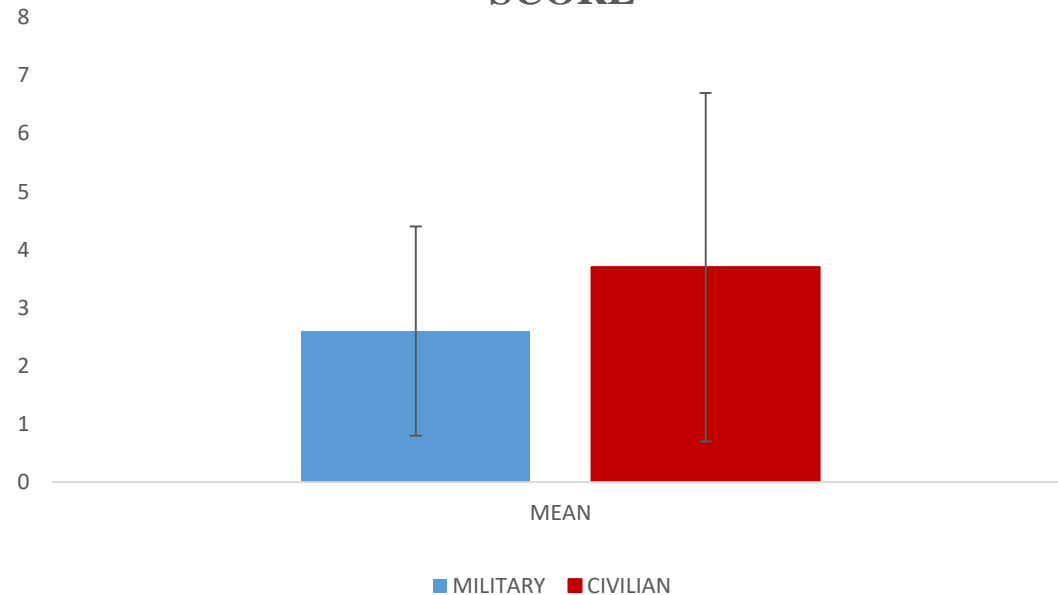
# STUDY PART #3

- Subjects: 2930 military vs. 1044 civilian airmen, visited between October 2014 and December 2015.
- Methods: database revision & analysis.
- Inclusion criteria: flight personnel visited in 2014 and 2015.
- Statistical analysis: ANOVA, 2x2 contingency table.

# RESULTS

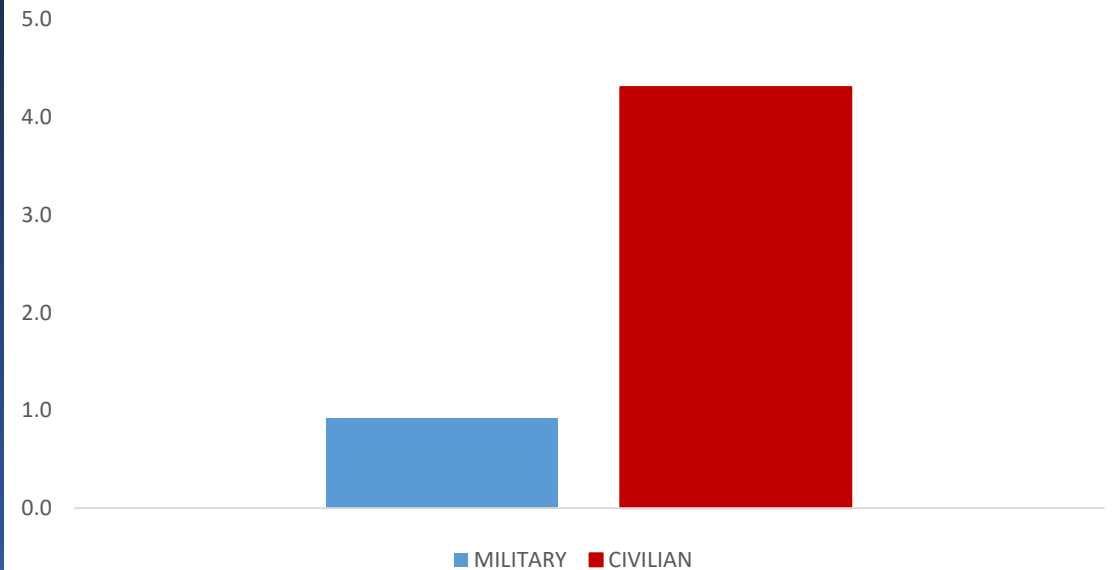


**MILITARY vs. CIVILIAN MEAN RISK SCORE \***



**\* ANOVA  $p < 0,0001$**

**MILITARY vs. CIVILIAN PROPORTION OF SUBJECTS WITH RISK SCORE > 10\*\***



**\*\* Pearson's  $p < 0,0001$**

**Age: Military  $45.7 \pm 5.3$  vs. Civilian  $50.4 \pm 6.7$   $F = 3.848, p < 0.0001$**

# CONCLUSIONS

- The assessment of cardiovascular risk is part of the aeromedical decision making process supporting flight safety.
- Computing the individual CVS Risk Score and release it to flight personnel can be helpful in improving the motivation to change the lifestyle when necessary.
- First data collected in the IMAS of Rome show no substantial difference with other observations made in comparable samples of subjects, encouraging more investigation on this topic.



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# QUESTIONS?

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