HOLD UNTIL RELEASED BY THE

SENATE SUBCOMMITTEE ON

AVIATION OPERATIONS, SAFETY AND SECURITY

TESTIMONY OF

GREGORY BELENKY, M.D.

RESEARCH PROFESSOR AND DIRECTOR

SLEEP AND PERFORMANCE RESEARCH CENTER

WASHINGTON STATE UNIVERSITY, SPOKANE

BEFORE THE UNITED STATES SENATE

COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION

SUBCOMMITTEE ON

AVIATION OPERATIONS, SAFETY AND SECURITY

March 20th, 2012

HOLD UNTIL RELEASED BY THE

SENATE SUBCOMMITTEE ON

AVIATION OPERATIONS, SAFETY AND SECURITY

Chairman Cantwell, Ranking Member Thune, and distinguished members of the Subcommittee: thank you for the invitation to comment on the FAA rule on Flightcrew Member Duty and Rest Requirements. I am Gregory Belenky, Research Professor and Director, Sleep and Performance Research Center, Washington State University.

In the new rule, the FAA has effectively combined science and operational experience. They introduce the maximum flight duty period as the basis for the prescriptive rule, and, fatigue risk management systems as an alternative to the prescriptive rule. The maximum flight duty period takes into account the effects of time on duty, the circadian rhythm, and segments flown. The maximum flight duty period neatly captures and mitigates the three major components of fatigue – time awake, circadian rhythm, and workload. Fatigue risk management systems offer a flexible alternative to the prescriptive rule.

With respect to the maximum flight duty period and its modulation by flight crew circadian rhythms and workload, the latter represented by segments flown, the rule is clear and unambiguous. With respect to fatigue risk management, what constitutes an acceptable demonstration of an equivalent level of safety and hence an alternative means of compliance awaits the issuance of the relevant FAA advisory circular.

In the yet to be released advisory circular, it seems reasonable that the FAA would consider the use of biomathematical models to predict performance on the basis of sleep wake history and circadian rhythm phase. As the first step in a process of demonstrating an equivalent level of safety, it could use a model to make relative comparisons between schedules generated by the prescriptive rule and schedules generated by a proposed fatigue risk management system. To make such comparisons, the model must be known to accurately predict human performance. Models must be verified as to their internal workings, validated in terms of their predictions, and certified for use in aviation in a manner similar to the mathematical models used to predict mean time before failure of an aircraft component.

In the new rule, the FAA introduced flight time limits that are well within the temporal boundaries of the maximum flight duty period. In support of this, the FAA cites studies suggesting "that after a person has worked for about eight or nine hours, the risk of an accident increases exponentially for each additional hour worked." The scientific evidence supporting this assertion is weak. Risk is calculated by dividing the number of accidents by the number of people exposed to the accident risk. In the studies cited, the number of persons exposed had to be estimated as exposure data were not available in the accident databases. While there may be a rationale for flight time limits, the studies cited do not provide it. In

this instance, a major policy decision was made on the basis of questionable evidence.

To conclude, the FAA has made important advances in integrating scientific findings in sleep and performance into the new rule. Uncertainty remains in biomathematical performance prediction model validation and in the rationale for flight time limits.

Thank you, Chairman Cantwell for the opportunity to testify before the Sub-committee. I would be happy to take any questions that you and the Members of the Committee may have.