

## A Tough Assignment

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The holidays are rapidly approaching. There's lots of happenings and goings and comings in your Association. The AsMA staff has worked through the busy abstract season and the November Council and Scientific Program Committee meetings took place just before Thanksgiving. They are prepping schedules for the Annual Meeting, abstracts for publication, and getting ready for the opening of registration in January. In the relative calm (or at least "normalcy") of the annual cycle of AsMA activities and nearing the halfway point of my presidency, I find myself drifting back to my first President's Page [Aerosp Med Hum Perform. 2019; 90(6):505] and the six key jobs of Aerospace Medicine (AM).

1. Select the right people (selection)
2. Keep the participants healthy (prevention)
3. Protect them from risks (sustain)
4. Maximize their performance (optimize)
5. If required, diagnose issues (practice medicine)
6. Return to duty as rapidly as possible (rehab)

AM is such a radical, yet refreshing, departure from traditional clinical medicine the world over. While the vast majority of medical practitioners and staff are providing a "commodity" service, measured by access or relative value units billed for, AM is focused on different outcomes, outcomes of import to those who utilize us, like lost duty time, or staying on a timeline, reducing mishap rates, bombs on target, unit effectiveness, injury rate, long term disability, functional longevity, return on training investment, or getting your certificate, etc. They vary across the spectrum of human operations and performance in aerospace or other unique, hazardous environments. But they are amazingly similar in that they are decidedly "non-medical."

Let's take job #1: Selection. How would you measure the outcomes of selecting the right people? Well, one might want to know about the process of determining medical standards, applying standards or production of physical examinations. But the importance of implementing proper selection would be truly measured in overall reduction in training attrition, reductions in overall training time, maximizing worker availability over a certain time period, better work output or longevity, or even reduced injury rates. It might even include higher job satisfaction and less disability. And if these outcomes were realized, then Aerospace Medicine would have increased the overall productivity of an organization, actually reducing the number of patient visits for job #5 on the list!

So, what outcomes might actually measure how well AM practitioners kept their charges healthy? These would likely overlap with some of the ones that measured selection, like maximizing worker availability, better work output or longevity, or surviving

your microgravity flight, along with lower incidence rates of chronic preventable diseases, or less chronic disease burden. One could argue that reduction of mishap rates and injury rates might ensue from this, also. Effectiveness in this area would lead to further reductions in actual job #5 work, too!

Protection from risks is straight up occupational medicine. Shop visits, risk assessments, advising on engineering controls, administrative controls or personal protective equipment are all well-worn techniques that are used to minimize workplace hazards, thereby reducing occupational injury or illness, reducing longer term disability, maximizing worker longevity and unit effectiveness. Are you seeing any trends here for job #5?

Job #4, Maximizing Performance, is more vexing to ponder for outcomes. The first level is individual optimization, which requires investment at the individual level. That is, making the pilot, astronaut, or flight engineer the best s/he can be with training, knowledge, medication, napping, etc. These issues can be measured using the individual as his own control (like better run times or faster reaction time, etc.). But then on a crew level, the individuals have to maximize their group effectiveness with crew resource management, procedure discipline, good communications, etc. Reductions in errors or better precision of actions (time on target, accuracy, bombs on target, reduced mishap rates) may be measures that work at this level. Then this has to roll up into overall mission or strategic effectiveness or entire campaigns, a systems or strategic level effort that requires understanding of the roles of individuals, crews, tactics, plans, etc. on the main goals of the entire operation. To me, this is the hardest one to consider, but one of the most significant in impact. Unit effectiveness and "mission success" may be the appropriate measures. But a good flight surgeon can do this at all these levels almost instinctively by virtue of his or her immersion into the mission at hand.

Job #5, Practicing Medicine, has its own set of metrics defined by clinical medicine. The Institute of Medicine outlines quality in six domains: safe, effective, patient-centered, timely, efficient, and equitable [<https://www.ahrq.gov/talkingquality/measures/six-domains.html>]. Needless to say, there are gobs of things to measure here, but very few related to outcomes. The most notable of measurements is the Relative Value Unit, or RVU. The Resource-Based Relative Value Scale is a complex system that varies from specialty



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to specialty. The original RBRVS was based on a combination of the physician's work input, the opportunity cost of specialty training, and the relative practice costs. The physician's work input was further estimated along four dimensions: time, mental effort and judgment, technical skill and physical effort, and psychological stress. An RVU consists of a Work component, representing an estimate of the physician skill and time required to carry out the care; a "practice expense" component; and a malpractice component [<https://www.sciencedirect.com/topics/medicine-and-dentistry/relative-value-unit>]. But in the end, this typically boils down to time. The typical measuring place is a clinic or a hospital. The goal of most clinicians is to maximize RVU generation.

The final part (#6), Rehab and Return to Duty, also uses traditional clinical metrics, but other outcome measures could include reduction of disability, longevity, return to duty rates, return on training investment, or even "waiver rates" for return.

Using RVUs to define AM's overall effectiveness or productivity would be like measuring a specific car dealership's worth on how often the service/maintenance department has to work on your car. If you took your car into the dealer every week, the dealer generates 52 "RVUs." What great production, right? Never mind that you could only take your car to work 3 days a week and had to visit the dealer weekly instead of doing other more desired or productive activities. So would you deem this dealer "productive" and worth the money? I think not.

What is the ultimate value of regular oil changes? Oh sure, they cost a certain amount over time, but what are you preventing? Damage to the engine that will cost many orders of magnitude (time and dollars) more to repair. Just like the first four jobs in the AM framework, this works against the dealer's service department's "RVU generation." So...

Why on Earth would anyone measure the effectiveness of the AM framework with traditional civilian medical metrics like RVUs? Just looking at the six AM framework areas and presuming they are equally weighted, you could conclude that 33% of AM's time (jobs 5 and 6) would be spent in the "RVU" world of clinical medicine. But that underestimates the value of "non-medical" outcomes. Plus, if you are super-efficient at jobs 1–4 (prioritizing your work into 1–4), then you should be *reducing* time in jobs 5 and 6 and your own RVU generation! Your own work would be counting against you!! That doesn't seem prudent (or fair).

But no matter what you are graded on, a good AM program doesn't focus on RVUs; it is a preventive specialty. How many patients did your clinic see today? Right answer: "All of them!" Make sure you are using the entire breadth and expertise of Team Aerospace [Aerosp Med Hum Perform. 2019; 90(6):505] as well as jobs 1–4 to maximize the outcomes of importance to your organization. This is the true value of Aerospace Medicine.

Keep 'em flying (and operating)!