

## On Prognostics

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I have been in more than one adult beverage discussion with colleagues like Dr. Chuck Fisher over the factors and concepts that set our specialty apart from others. Risk, risk assessment, human performance, physiological impacts, and other concepts have all appeared in the debates over the years with Chuck and others, like Drs. Paul Young, Dan Shoor, Dave Duval, and Paul Nelson. Dr. Tom Travis has declaratively stated that what sets us apart is "human performance." Of course, who am I to disagree with a USAFSAM commander and Air Force Surgeon General!

I have long postulated (some might say pontificated) that to be a good flight surgeon, clinical medicine as it is practiced today, is not enough. The practice of medicine today is legally defined as the ability to make a diagnosis and develop a treatment plan. Scope of practice issues notwithstanding, this is what all clinicians do. And a good flight surgeon must do this as well. Diagnostic acumen is necessary but not sufficient to do the work of Aerospace Medicine. If a clinician cannot move beyond this (step 5 in the June President's Page),<sup>1</sup> s/he will be ineffective as a flight surgeon in gaining trust and impacting the true outcomes of interest in our business.

That said, I was recently reviewing my medical journals and ran across a short commentary by Drs. John Thomas, Leo Cooney, and Terri Fried.<sup>2</sup> It stimulated some thoughts about our fascinating and unique specialty that I'd like to share. Diagnosis and treatment were not always the "end all and be all" of being a physician. First, a bit of the article:

Many scholars consider prognosis to be the principle scientific achievement of the Hippocratic tradition. The earliest treatise on the subject, *On Prognostics*, defines prognosis broadly as "foreseeing and foretelling, by the side of the sick, the present, the past, and the future." This definition makes clear that prognosis is not simply about predicting the future, but also involves an appreciation for the continuity of the past, present, and future as sequences of connected events, or trajectories, that can be pieced together into a comprehensive story of the patient's health. In modern medicine, prognosis has lagged behind diagnosis and treatment in its establishment as a central component of medical care. An important basis for understanding this lies in the paradigm change that occurred with the discovery of pathogens as agents of disease, shifting attention towards individual diseases and away from diseased individuals. With this shift diagnostics and treatment advanced dramatically and prognosis fell to the background. More recent attempts to advance prognosis have focused on narrower use of the term, such as estimates of life expectancy and mortality risk... patients have indicated the desire for a wide variety of predictive information.<sup>2</sup>

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Now, I'm just a simple flight surgeon, but this strikes me as very, very familiar. This is what flight surgeons do, and it's how we provide the appropriate level of care to our unique populations, be they pilots, air traffic controllers, passengers, patients, or astronauts.

Ponder the position of a squadron flight surgeon. For over a century, the classic method of providing medical support to military aviators has been the "squadron flight doc." The "embedded doc" model puts the physician in a position outside of traditional medical or clinical environments. For a flight doc to get the sense of how a unit functions, s/he must become comfortable in the operational world. Once there, the flight doc gets exposed to a realm that today's clinicians often don't have time for – observation. From the article...

Lacking the diagnostic tools of modern medicine, they used their powers of observation to gain a variety of knowledge about their patients. They looked at broad features, such as the strength of the patient, and cognitive and nutritional status; and they looked at specific features, including signs and symptoms related to the patient's illness. They also noticed how their patients responded to illnesses and injuries.<sup>2</sup>

Being comfortable in the operational world allows for observation of our populations in a more natural environment, not in the "threatening" environment of a clinic. The article goes on to state, "The ancient physicians saw past, present, and future not as a series of data points or individual facts but as consequences of sequential events."<sup>2</sup> Knowledge of the natural "arc" of an individual with a disease allows the physician to prognosticate and seem somewhat clairvoyant when the aviator asks the inevitable "Doc, I have this friend... who has 'X'".

...the physician possesses knowledge pertaining to the patient beyond what is immediately apparent or directly disclosed. Because the patient's health is seen as a trajectory, with past, present, and future linked, the physician, knowing aspects of one, can discern aspects of the others. Thus, the physician has foreknowledge, or "knowledge before," in his or her explanatory abilities pertaining to the past, present, and future circumstances of the patient's health.<sup>2</sup>

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The fullness of medical school training prepares even the general medical officer to perform this “prognostic” magic and predict past events, present condition, and potential futures. This inherent physician ability is what builds trust in the flight doc, the foundation required to provide proper mission support to risky operations – *especially in combat*. And *this* is how Aerospace Medicine provides the “trusted care” that is required for military, aviation, and space operations, not by providing “clinical” access or clinician diagnostics (that is expected) but by building personal and professional trust.

It seems to me that this is the way most of today's aeromedical support systems have been structured – directly in line with the classical Hippocratic tradition of medicine. By embedding flight surgeons into operations, the physician is deprived of modern

diagnostic tools and must use powers of observation and knowledge of health trajectories to care for the individuals under their charge. Physicians are trained in this ancient and classical art of medicine – prognosis. Only when we get physicians out of the current traditional U.S. “clinic” environment will true “trusted care” flourish again for the aviator. And basic “squadron level” flight surgeons do this work, day in and day out. Hats off to you all. Keep ‘em flyin’.

#### REFERENCES

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2. Thomas JM, Cooney LM, Fried TR. Prognosis reconsidered in light of ancient insights--from Hippocrates to modern medicine. *JAMA Intern Med*. 2019; 179(6):820–823.