Greetings from snowy Peterson AFB! It is an honor to address you again at such a pivotal time in military medicine. This issue of FlightLines is dedicated to the flight surgeon’s role in service and support.

As you know, there are MASSIVE changes coming to military medicine overall, and Air Force medicine specifically. Everyone is aware of the Congressionally mandated changes regarding the Defense Health Agency (DHA) and MTF operations. At the same time, AFMS is being directed to cut a substantial number of medical authorizations, and a sea-change medical squadron reorganization is being discussed at the Secretariat level.

So what does this mean to you, the Air Force flight surgeon? Service and Support. These are encoded in the reptilian brain of the flight surgeon. Since our very inception with the advent of military flight 100 years ago, the flight surgeon has been the ever-present undergirding of the aviation mission. The same holds true today, when flight surgeons serve the warfighter and support the mission, which ranges from the B-2 stealth bomber, to the MQ-9 Reaper RPA, to the space operator controlling satellites, to the EOD Airman defusing an IED on an Afghan route clearance patrol.

So how do we reconcile the flight surgeon’s legacy of valor with the institutional changes coming to Air Force medicine? Well, my friends, we do what we always do – lead. Lead the change. Lead in, through, and out of the swirling chaos. As MTFs begin split operations, providing active duty mission care in parallel with DHA health operations, flight surgeons must take charge of the readiness ship and steer a safe course. No one knows mission support and readiness to “fight tonight” like the flight surgeon. It is a natural fit.

Nature abhors a vacuum; if flight surgeons do not step up to lead in this transition, someone else will. Every flight surgeon, at every level, has a responsibility to the mission and to our corps to volunteer to lead in the chaos. That means volunteering to lead functions within your clinic. That means volunteering for squadron and group command. That means volunteering to be a base-level Chief of Aerospace Medicine (SGP). And most importantly, that means that base-level flight docs, SGPs, squadron commanders, and group commanders step up to lead beyond the strict requirements of your job. Be the “go-to” person. If no one has a good answer for how to do something (Quarterly Performance Plan, Operational Medicine Squadron organization, troop clinic operations), offer a solution and depart the fix. AFMS is looking for leaders at every level – we will cease to exist without them. BE THAT LEADER.

Vol. 32, No. 1, Fall 2018
Welcome to the latest issue of FlightLines! Since our last edition, the Military Health System officially began the transition of management and administration functions to the Defense Health Agency (DHA), with Keesler Medical Center being the first Air Force hospital to lead the way. By 1 Oct 2019, hospitals and clinics in the Eastern U.S. will be under DHA. Subsequent phases will eventually encompass Western U.S. and overseas facilities by 1 Oct 2021. How has the transition been for you?

As we’re adjusting to the changing landscape, one thing remains certain — flight medicine’s commitment to readiness. The Secretary of Defense has mandated a 95% deployability rate across the military. To achieve this, flight surgeons need to maximize access to care, scrutinize processes for inefficiency, and prevent illness by promoting healthy habits.

In this edition, we see how flight surgeons identify and improve upon inefficient processes, take risks to explore options for enlarging the pilot training pipeline, and engage in cutting-edge research for mental health issues. We also have some tips from a USU professor/flight surgeon on interpreting and applying the 2017 ACC/AHA blood pressure guidelines to flyers and a flight surgeon’s take on the importance of interpersonal skills to ensure operational fluidity. Want to improve your own readiness, or are you ready for something new clinically? There are some fantastic training opportunities for flight docs. We hope you find these articles interesting and enjoyable.

Thank you for reading. Share with us your thoughts and the interesting things you are doing.

Volanti Subvenimus! 🚘
The Undersea & Hyperbaric Medicine Fellowship
The best kept secret in GME

Michael F. Richards, Col, USAF, MC, CFS
UHM Service Chief and Fellowship Program Director

As most USAF flight surgeons are aware, the Undersea & Hyperbaric Medicine (UHM) facility in San Antonio has found a new home at Brooke Army Medical Center (BAMC). UHM had been at Wilford Hall Medical Center since March 2008, but when emergency and inpatient services left Wilford Hall, we were forced to find a new home to best serve our beneficiaries. We were afforded the unique opportunity to design a new hyperbaric facility from the ground up, opening our doors at BAMC in 2017. The move to BAMC has created opportunities to treat not only outpatients, but to expand our patient population served to include inpatients who were too challenging to be transported across town to Wilford Hall. This is good not only for our patient population, but it is also a fantastic training opportunity for the UHM fellowship program.

In addition to moving its physical location, the UHM fellowship transitioned sponsoring institutions from USAFSAM to the San Antonio Uniformed Services Health Education Consortium (SAUSHEC). While we were proud of our USAFSAM heritage, the move to SAUSHEC has brought numerous opportunities to interact with a diverse group of nearly 600 residents and fellows training in 36 specialties. Such interaction enhances the education of the UHM fellow while giving the fellow an opportunity to educate others on what hyperbaric medicine is all about.

I would like to address the most common questions about the fellowship that I get in a Q&A format.

Q: Is the UHM program accredited and is there a board certification?
A: The UHM fellowship program is accredited by the Accreditation Council for Graduate Medical Education (ACGME), and we are approved to take up to two fellows for each academic year. While we are approved to train two fellows annually, we typically will not train that many. The number we train is based on the need for hyperbaric physicians. Recently, we have been training one fellow every other year.

Q: How long is the fellowship?
A: The UHM fellowship is 1 year. Graduates incur a 2-year service commitment for the fellowship, and they are expected to spend that time in hyperbaric medicine.

Q: Where does the USAF have hyperbaric medicine?
A: Currently, the USAF has functioning hyperbaric chambers at David Grant Medical Center at Travis AFB and at Brooke Army Medical Center at JBSA – Fort Sam Houston. David Grant has one active duty position while BAMC has two. All three active duty hyperbaric positions are flying billets.

Q: As a hyperbaric physician, will I deploy?
A: While we do not deploy hyperbaric physicians as such, we do and have deployed hyperbaric physicians as flight surgeons.

Q: Is this training useful after my Air Force career?
A: Absolutely! While hyperbaric chambers are very common throughout the country now, very few facilities have the luxury of having a fellowship-trained, board-certified hyperbaric physician. These credentials are highly sought after.

Q: Do I need to be a flight surgeon to apply?
A: Fellows take worldwide calls about altitude- and aviation-related disorders, so all applicants must have completed the Aerospace Medicine Primary course at a minimum. Experience as a flight surgeon is desirable, but not required.

Q: Do I need a residency and board certification to apply?
A: Fellows must have completed an ACGME-accredited residency prior to starting the UHM fellowship. Although not required to begin the fellowship, primary board certification through the American Board of Medical Specialties is required to become board certified in UHM through either the American Board of Preventive Medicine or the American Board of Emergency Medicine. Preference would be given to candidates who are eligible for board certification. Physicians who have completed osteopathic residencies should contact the program director for more guidance.
Q: Can I apply if I’m not a Resident in Aerospace Medicine (RAM)?

A: We have had a number of RAMs graduate the program, but the training is not limited to RAMs by any means. Flight surgeons who have primary residencies and board certifications can all apply.

Q: Is the fellowship limited to Air Force physicians?

A: While most interest in the fellowship comes from the Air Force, we do have physicians from the U.S. Army ask about applying. Since SAUSHEC is a tri-service organization, we are happy to train any qualified physician from the Army, Navy, or Air Force.

Q: Can I apply if I’m a colonel or if I’ve been picked up for colonel?

A: With rare exceptions, colonels or those selected for the rank of colonel are not eligible for GME.

The UHM fellowship is a fantastic prospect to expand your horizons into a rich and rewarding career in the Air Force and beyond. The Air Force UHM specialist enjoys an outstanding mix of patient care in addition to leadership, research, and teaching opportunities both in clinical and operational environments. I encourage all flight surgeons to consider applying for the UHM fellowship, and if you have any questions, please contact me.

For emergency hyperbaric consultation, please call commercial 210-539-8000 or DSN 389-8000 M-F between 0700-1600 Central Time. For after hours, call commercial 210-916-2500 or DSN 429-2500; choose option 2, then option 1. Ask for the hyperbaric physician on call.  

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Brig Gen Johnson giving remarks outside the new UHM facility at BAMC. Courtesy of Robert T. Shields.
The views expressed in this newsletter are those of the individual authors and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

Ribbon cutting ceremony on 16 Jun 2017. Holding the ribbon are SSgts Maribel V. Cortez (left) and Betty L. Dumas (right). Cutting the ribbon are Brig Gen Jeffrey J. Johnson (left), Commanding General, Brooke Army Medical Center, I’m in the center. To the right of me is Brig Gen John J. DeGoes, 59th Medical Wing Vice Commander. Of note, Brig Gen Johnson is now at MEDCOM and Brig Gen DeGoes is now Maj Gen DeGoes and he is the Commander of the 59th Medical Wing. Courtesy of Robert T. Shields.

The chamber room with the monoplace (single patient) chamber in the center. To the right, is the door to the multiplace (up to six patients) chamber. The console for operating the multiplace is in the foreground. Courtesy of Robert T. Shields.
Making the Most of Your Deployment through Process Improvement

Jeffrey “Woody” Kinard, Maj, USAF, MC, FS
Chief of Aerospace Medicine, 375 MDG, Scott AFB

When deployed, the majority of meetings that compose a typical SGP day disappear. What is a doc to do with newfound white space on his or her Outlook calendar, aside from seeing more sick call? I pondered this question while recently deployed to Afghanistan. However, my deep thoughts on the meaning of life were interrupted 48 hours in-theater. An overzealous aerial porter, and his 9,000-pound pallet, ran over a loadmaster’s leg, pinning him to the aircraft floor. The downed Airman went unnoticed until someone walked around the pallet, in large part due to noisy running aircraft engines. These ground procedures, known as an engine running onload/offload (ERO), are standard practice to minimize ground time at more austere airfields, but can lead to communication difficulties that impact safety and crew resource management.

The aforementioned loadmaster sustained relatively minor injuries, but the damage was unfortunately enough to require aeromedical evacuation back to the United States. Revisiting the incident, I discovered that loadmasters frequently unplug their communication cords from the aircraft during an ERO to better navigate around bulky cargo. After asking among the squadron, members reported that unplugging during an ERO means that pilots cannot easily warn loadmasters about incoming fires or sudden changes in weather (and vice versa for warning the pilots). Similarly, loadmasters have difficulty getting each other’s attention or directing oversized cargo off a forklift when unplugged. During interviews, a few loadmasters noted the existence of approved wireless devices as an unplugging alternative. However, these products, which are identical to those used by aeromedical evacuation crews, have not gained much traction within the loadmaster community. Fortunately for us, our squadron brought several sets of these devices to Afghanistan.

Having completed Green Belt training just prior to deployment, I offered to take a look at the ERO processes, and our commander enthusiastically agreed. First, I met with a team of three senior loadmasters to map out the ERO process. We recorded ground times and flew along with crews to map real-time loadmaster ERO movements at one of our more frequented bases. With the recent injury fresh in our minds, our primary measurement in the project was comparing ground times with and without using the wireless devices.

In C-130Js, loadmasters rely heavily on a computer known as the multifunction control display (MFCD) to manage cargo weight and balance. Using our initial loadmaster movement charts—also known in process improvement lingo as spaghetti diagrams—we discovered upwards of seven trips to enter or verify data on the MFCD. Most of these steps were not accounted for on our process map, signifying potential excess loadmaster movement. Comparing the number of MFCD trips on missions with and without wireless devices was our second measurement of the project. Admittedly this variable was limited to the handful of flights we flew to document spaghetti diagrams.

After monitoring 53 sorties at our chosen airfield over almost 4 months, the average ground time was 29 minutes on wireless headsets versus 43 without their use – a 32% reduction. Additionally, the average number of MFCD trips decreased from six to fewer than two with the wireless devices. Extrapolating to operations throughout Afghanistan, our budding math wizzes at the operations desk calculated over $481,000 in fuel savings and 790 hours less ground time annually. The numbers were encouraging enough at the end of the study that our commander strongly encouraged all crews to use the devices.

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<tr>
<th>Time</th>
<th>Sorties</th>
<th>Average Ground Time (min)</th>
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<tr>
<td>With devices</td>
<td>24</td>
<td>29</td>
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<tr>
<td>Without devices</td>
<td>29</td>
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<tr>
<td>Overall</td>
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<table>
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<tr>
<th>MFCD Trips</th>
<th>Sorties</th>
<th>Average Trips</th>
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<td>6</td>
</tr>
<tr>
<td>Overall</td>
<td>6</td>
<td>3</td>
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Continued on page 7
As excited as we all are by the data, these wireless devices are not a magic bullet. Throughout our interviews and surveys, loadmasters reported issues with the devices, ranging from poor battery life and a perceived lower volume on intercom transmissions to the most concerning issue—interference with the onboard microwave. The devices also require a free hand to push a button while speaking. Regardless of any concerns with these devices, or the data we collected, our efforts ignited a larger dialogue about the efficacy of wireless communications during an ERO.

We hope our findings make a positive impact on future crew communication and flight safety. On a tactical Flight Medicine level, this project also built trust with my patients and further connected me to our deployed mission. Flight surgeons have a unique role within the Air Force Medical Service (AFMS) as the link between medical and operational forces. During deployments, take advantage of this position and continually look for ways to improve operations and occupational safety, both at home and wherever Uncle Sam sends you.

Based on my experience, here are a few tips to make process improvements in the operational environment:

1. **Identify a problem that people are interested in fixing, but may not have the time or resources to better evaluate.** After our Airman’s injury, people agreed that there were some concerns with crewmembers being unable to freely communicate on the ground during an ERO. However, nearly everyone in the squadron was flying every other day, leaving little opportunity to seriously consider alternatives.

2. **Act early.** Deploying as a squadron medical element in a new unit and with a new airframe gave the squadron the advantage of having a fresh set of eyes. Additionally, as flight surgeons, we should view issues through an Occupational Medicine filter, preventing or mitigating problems before they blossom. Starting early in the deployment allowed us to collect more data and see if our interventions made a difference.

3. **Build rapport with your team or squadron.** This is why we fly. I made a concerted effort to fly with each of our crews at least once early in the deployment. This greatly enhanced trust in later clinical care and also demonstrated a commitment to the mission and the team.

4. **Get dirty.** Deploying with the C-130 community was fantastic. When moving cargo, everyone helps out. Pushing pallets gave me a newfound appreciation for the physicality required of loadmasters. It also emphasized teamwork – often, I was pushing pallets alongside the copilot.

5. **Seek out process improvement training.** The AFMS and MAJCOMs make a concerted effort to get everyone thinking about process improvement. If you are interested in the topic, consider going a step further by taking Green Belt training through your base Continuous Process Improvement Office. The added familiarity in terminology and the Eight Step Problem Solving Method gained in the weeklong Green Belt training program gave me the confidence to get this project off the ground.
A C-130J taking off from Bagram Airfield.

Working on our process map for a C-130J loadmaster ERO.
Greetings again from Detachment 21 and the Pilot Training Next (PTN) operations at FOB Austin-Bergstrom. It’s nearly November, but don’t worry – it’s still hot outside and the mosquitoes are thriving. Given the response to my initial article (thank you guys for reading it!), I wanted to provide an update as to what’s been going on with PTN. In case you haven’t heard much about PTN until now, Pilot Training Next is a program to modernize Air Force pilot training. Through the use of modern teaching methods, modern technologies, and leveraging advanced biometrics, we intend to improve the quality of the training experience for both student and instructor, maximize student learning, and decrease the time (and maybe even cost) it takes to produce an Air Force pilot, all while maintaining the high standard expected of a combat aviator.

PTN v1 Synopsis

As you may recall, we graduated our first class back in August. Thirteen of the original 20 students graduated with wings on their chests and headed out the door to waiting follow-on training units (FTUs). The FTU selection was varied; we sent students on to be “tested” and hopefully continue their training in the F-16, F-35, C-17, MC-130J, KC-10, U-28, and C-146 airframes. One (officer) student was returned to traditional UPT training, and two others were sent for top-off with T-1/T-38s. Due to timeline, resource, and program limitations, none of the enlisted students were among the graduates. Because it’s one of the commonest questions I’ve been asked, of the enlisted, two returned to their prior AFSCs, two were tracked toward USAFA prep and/or commission, and one became an experimental test case for a first-term airman in cyber. They’re all happy and doing well. We are getting more and more feedback from the FTUs about the quality of the “product” from version 1 and are avidly making adjustments and plans as to how to better mitigate for v2.

Lessons Learned (from doing things the hard/wrong way the first time)

As many of you have heard me talk about before, the enlisted students are providing us vital data for future selection criteria. The talent selection methodology had a strong bias toward IQ and failed to take into account some other motivation and fitness factors. This resulted in two enlisted leaving earlier in training than the others. However, we assessed that the remaining three would have been able to complete PTN in 7-8 months and would have certainly completed legacy UPT. They completely fulfilled the purpose for including them in the cohort, which was to both evaluate a new selection methodology and provide insight into how we must adapt our approach to training if we broaden the talent pool.

When it came to human performance optimization in PTN v1, we just plain didn’t get a heck of a lot accomplished. The Zephyr band wear and associated biometric data download were significantly affected due to use of the devices outside of normal intended use parameters. To make matters even more unfruitful, we did not provide adequate feedback to the students about the data we were managing to get from them, so the tracking and pupillometry data that were collected in the VR headsets.

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I would love to tell you that as an awesome “Aerospace-Medicine-Enterprise-of-One,” all of my people were educated and healthy and were performing like rock stars by the end of the summer. (I would also love to not need help closing my T-38 canopy, but to no avail!) Despite education, encouragement, and even a guided trip to HEB, by June folks were scarfing down energy drinks and candy bars between flights because there wasn’t time for “real food.” Everyone (instructors included) looked ragged and, when prompted, admitted to sleeping less and less. Nobody was hitting the gym much anymore – there was too much to catch up on and we always felt the pressure of being behind. It was rough to watch.

PTN v2 and Beyond

To me, one of the most powerful components of the PTN “experiment” is the data collection and analysis for selection. Lt Gen Kwast’s “moonshot” dream was to take a high school graduate and have him or her an F-35 wingman in a year. We’re not there yet, but what we are getting is information that can help us identify certain traits and characteristics in a person that can tell us if he or she will make an excellent pilot. Furthermore, if we can push the technology out further to the left (think ROTC, JROTC, etc.), these immersive training devices can feed more data into the process and better hone how we find, select, and train world-class aviators.

After having to openly admit that human performance was a bust in v1, the only way to go is up. After all, we were told to break things at PTN (preferably not human or airplanes). For v2, we have more aggressive plans for human performance optimization. I am coordinating with performance dieticians, sport and performance psychologists, strength and conditioning experts, and of course our PTN cadre to design a program that helps maintain an optimized performance environment and the well-being of both our students and cadre. We are sharing ideas with AFRL, the 711th HPW, the TITAN team out at Luke, and many other government, academic, and industry partners. I’m thrilled to help build this program and hope that if we can fundamentally structure the way that we start growing pilots that eventually we can create a healthier and higher performing culture of aviators.

PTN v2 officially starts in January 2019. The new instructor cadre have been here in Austin for a month now for training and indoctrination. The enlisted candidates have been screened and chosen and, most importantly, are headed to IFT in November. The officer candidates will have been selected and notified by the time this article hits the press. For v2 we have partnerships and will train students from the USN and RAF. We have added a distance learning partnership with USAFA. There are a lot of changes in how we collect and manage the data, our biometric monitoring strategies, and performance feedback to the students and cadre. We have learned from v1 and are posturing to aggressively learn more and hone our product for v2. A continued spiral of the PTN training construct is in the works, but will likely be at a JBSA location (Austin ops will officially fold in summer 2019). The plans are still malleable, but expect us to keep pushing the edge of the envelope and transforming the way we train warfighters in the information age. I can’t wait to share the next batch of stories with y’all as we blaze onward – Cheers! BOOSTER 🚀
PTN student execution of the traditional post-solo dunking. Students in v1 soloed on average around ride 7 in the T-6.

PTN v1 students engaging in group learning from formation flight debrief recordings. A major win for the PTN project has been increased capabilities for a useful and efficient debrief.

The views expressed in this newsletter are those of the individual authors and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.
A member of the PTN cadre tests the capability to integrate the ROBD device with the virtual reality headset.

On 3 Aug 2018, 13 students received their wings and graduated from PTN.

The Secretary of the Air Force visited PTN in June 2018.
Mind Altering PTSD Treatment

Jianzhong “FINES” Zhang, Col, USAF, MC, FS, MD, PhD
RAM XIX

As operational health care providers, we have a unique connection with our service members. We deploy with them, fly and fight alongside them, and we redeploy and often see them in their post-deployment screening. We know and understand them well and must be ready to care for their well-being, physically and mentally.

Post-traumatic stress disorder (PTSD) is pervasive in these warfighters. Over the past decade, 2.6 million U.S. service members served in Iraq and Afghanistan. Of these, 13-20% were likely to experience PTSD in their career, which is significantly higher than the civilian population. Current treatments for PTSD include exposure therapy, cognitive therapy, and group therapy. Combinations of cognitive behavioral therapy and pharmacotherapies for PTSD are mostly used with limited success and are not free from medication side effects. Are there any other options?

At my previous assignment, I attended a symposium at the University of Southern California and came across transcranial magnetic stimulation as a possible alternative treatment. This technology has been FDA approved to treat patients with severe medication-resistant depression and I wondered if this could be applied to PTSD. A brief literature review revealed that other researchers had promising results using this new modality for PTSD treatment. I wanted to get on board and potentially expand our armament against PTSD. While stationed at Tinker AFB, I formed a team and obtained IRB approval to conduct a study to investigate the effects of transcranial magnetic e-resonance therapy (MeRT) on veterans suffering with PTSD. So far, we have been able to enroll 8 subjects with a plan for 25 total. The MeRT treatment is guided by baseline EEG, and treatment groups are compared to a sham placebo group in a crossover study design. The PTSD Checklist Military Version (PCL-M) and Cognitive and Physical Functioning Questionnaire (CPFQ) were used to measure clinical response to treatment.

Preliminary results have been encouraging. After 4 weeks of treatment, MeRT improved PCL-M scores by 42.7% at the 6-week assessment point. CPFQ also showed a 15-33% improvement in areas of motivation, alertness, energy level, focus, recall, ability to find words and mental acuity. We did not observe any side effects except for brief minimal discomfort in the local stimulating area.

These results are exciting. In an effort to increase our sample size, we are expanding this study to other bases. The protocol is established and IRB approved. I'm inviting all interested readers to join this effort and hopefully validate another tool that can be used to combat PTSD. References and the protocol are available for anyone interested. A short description can be found at https://clinicaltrials.gov/ct2/show/NCT02824445. Feel free to reach out at Jianzhong.j.zhang.mil@mail.mil.

Flight Surgeon Oath

I accept the sacred charge to assist in the healing of the mind as well as of the body.

I will at all times remember my responsibility as a pioneer in the new and important field of aviation medicine.

I will bear in mind that my studies are unending; my efforts ceaseless; that in the understanding and performance of my daily tasks may lie the future usefulness of countless airmen whose training has been difficult and whose value is immeasurable.

My obligation as a physician is to practice the medical art with uprightness and honor; my pledge as a soldier is devoted to Duty, Honor, Country.

I will be ingenious. I will find cures where there are none; I will call upon all the knowledge and skill at my command. I will be resourceful; I will, in the face of the direst emergency, strive to do the impossible.

What I learn by my experiences may influence the world, not only of today, but the air world of tomorrow which belongs to aviation. What I learn and practice may turn the tide of battle.

I may send back to a peacetime world the future leaders of this country.

I will regard disease as the enemy; I will combat fatigue and discouragement as foes; I will keep the faith of the men entrusted in my care; I will keep the faith with the country which has singled me out, and with my God.

I do solemnly swear these things by the heavens in which men fly.
The past several years have produced a dizzying array of practice management guidelines with the 2017 American College of Cardiology (ACC) / American Heart Association (AHA) Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults (JNC 8) guidelines released in 2014 and should be considered their spiritual successor, as the National Heart, Lung and Blood Institute, the previous sponsor of JNC, announced it would no longer develop clinical guidelines. The 2017 ACC/AHA guidelines are extensive, stretching 481 pages; therefore, this short article cannot even begin to cover all of the topics addressed there. However, the 2017 ACC/AHA guideline’s focus on clear evidence-based recommendations targeted to distinct clinical scenarios should be considered prerequisite reading for any flight surgeons involved in the management of blood pressure (BP). This article will try to concentrate on the potential implications of this guideline to the active duty aeromedical population.

The first caveat is the method of BP measurement prescribed by the guidelines. Honestly, this is one of the most important issues addressed in the 2017 ACC/AHA guideline, which is reinforced by the substantial amount of space the guideline authors spent addressing it. The BP levels in the guidelines are based on either office measurements taken on at least two occasions using very strict measurement protocols or by employing data from either ambulatory or home BP monitoring systems. Clinicians should carefully heed Table 8 of the guidelines that stipulates proper technique for BP measurement in the office and ensure that their support staff are employing them correctly before utilizing any of the 2017 ACC/AHA guidelines into their practice. Failure to do so incurs substantial risk that inaccurate BP measurement could result in overdiagnosis of hypertension and inappropriate treatment with BP lowering medications.

The next caveat that should be carefully examined is the statistical data that were used to support the lowering of the BP targets. Substantial weight was given by the authors to the Systolic Blood Pressure Intervention Trial (SPRINT), which studied intensive control (SBP < 130 mmHg) versus routine control (SBP goal < 140 mmHg) in nearly 10,000 patients. This study was exceptionally well conducted and, in fact, was stopped early because it was felt unethical to continue with quickly mounting evidence that the intensive control group had significantly decreased incidence of their primary end point (acute coronary syndrome, stroke, heart failure, and cardiovascular death). However, there is one important point that must be considered when attempting to apply SPRINT data to the typical flight medicine population: trial inclusion criteria required patients to be over the age of 50. While multiple studies have shown a linear relationship between increasing BP and cardiovascular disease (CVD) risk at all ages, the level of CVD prevention benefit for BP lowering medications in younger populations is unclear at this time.

While there is valid concern about labeling more people at a younger age with hypertension, this must be weighed against the recommendations that the 2017 guidelines make for management of Stage I hypertension (SBP 130-139 mmHg or DBP 80-89 mmHg). In Stage I the ACC and AHA divide patients into two categories based on their individual atherosclerotic cardiovascular disease (ASCVD) risk. Stage I patients with a 10-year event risk of < 10% are prescribed lifestyle changes alone and those with > 10% are prescribed lifestyle changes plus a BP lowering medication. The ASCVD risk calculator used by the 2017 ACC/AHA guidelines is the same pooled cohort risk calculator originally recommended in the 2013 lipid management guidelines from the ACC/AHA. This calculator has several known limitations, especially when applied to the typical flight medicine population. First, it only applies to patients between the ages of 40-79 years old. Second, it relies heavily on data from the Framingham studies and other studies of the civilian population at large, making it susceptible to overestimation of CVD risk even in the civilian population and therefore likely to an even larger magnitude among military members. However, there is hope on the horizon as follow-up population studies are beginning to propose modifications to the ASCVD risk calculator that may better model CVD risk, especially at the lower end of the spectrum.

The one component of the 2017 ACC/AHA guidelines that does not need any customization for the aeromedical community is the lifestyle modification measures recommended for those with elevated BP and Stage I hypertension with < 10% ASCVD risk. Specific lifestyle recommendations based on the strongest level of evidence include the following: weight loss (through a combination of calorie intake reduction and increased physical activity), the Dietary Approaches to Stop Hypertension (DASH) diet, reduced dietary sodium, increased dietary potassium, and limiting alcohol intake (less than two drinks for men and less than one for women). One side benefit of increasing the population at risk for or diagnosed with hypertension may include more clinician counseling on these lifestyle changes. Clearly given the limitations of medications available to active duty aviators and the substantially increased physiologic demands of the flying environment, lifestyle changes will remain the bedrock of hypertension management in the flight medicine clinic.

Medication management is recommended for Stage I hypertension with > 10% ASCVD risk and Stage II hypertension (SBP > 140 mmHg or DBP > 90 mmHg). The 2017 guidelines continue to recommend thiazide diuretics, angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB), and calcium channel blockers (CCB) as first line agents for hypertension. Thiazide diuretics continue to have the best long-term CVD reduction data; unfortunately, this is based largely on the use of chlorthalidone, which is not included on the U.S. Air Force Aerospace Medicine Approved Medication list. While other thiazide diuretics are included on that list, they are not as well studied or did not show nearly as substantial CVD risk reduction compared to chlorthalidone.
much CVD risk reduction as chlorthalidone (although they still exhibited benefit when compared to placebo). The guidelines also address initial medications in several subsets of the hypertensive population; however, they mostly address conditions that would normally preclude active duty flying. However, the guidelines do recommend that clinicians prefer either thiazides or CCBs in African Americans due to evidence of limited effectiveness of ACE inhibitors and ARBs in reducing heart failure and stroke in that population.

Another potential pitfall in hypertension medication management in the flying community is data showing that patients diagnosed with Stage II hypertension usually require two medications for adequate BP control. In fact, in this group, the 2017 guidelines recommend considering initial therapy with two different BP lowering medications from separate classes. In the U.S. Air Force this will drive a need for an aeromedical waiver and may have negative implications for G-force tolerance for aircrew in high-performance aircraft.8 These recommendations further emphasize the need for proper BP measurement for accurate clinical diagnosis and staging of hypertension coupled with a strong flight surgeon/aviator partnership to implement aggressive lifestyle interventions.

While the 2017 ACC/AHA guidelines tend to skew toward older and sicker populations, the section that discusses the consideration of secondary causes is of importance to the younger cohort of patients that tends to be heavily represented in the flight medicine clinic. Specifically there are three secondary causes of hypertension that are of increased concern in the military population: primary aldosteronism, obstructive sleep apnea (OSA), and drug/substance-induced hypertension.

Screening for primary aldosteronism should be strongly considered in patients diagnosed with hypertension under the age of 30 or in those with resistant hypertension. Primary aldosteronism is the etiology for hypertension in 8% of all patients diagnosed with hypertension and 20% of patients with resistant hypertension; therefore, it is likely underdiagnosed in our flight medicine clinics. Appropriate patients should be selected for primary aldosteronism with a plasma aldosterone/renin ratio and their diagnosis confirmed with an oral sodium loading test, IV saline infusion test, furosemide suppression test, or captopril challenge test. If confirmed, these patients will require referral to nephrology for further workup and will require an aeromedical waiver regardless of the treatment modality used.9

OSA is widely prevalent in military populations and should be screened for using the Epworth Sleepiness Score (ESS) with a diagnosis established via polysomnogram for any patients scoring > 11 on the ESS.10 However, it should be noted that treatment of OSA with continuous positive airway pressure does not always result in normalized BP in patients with OSA as a secondary cause of hypertension; therefore, medication therapy and lifestyle modification are likely to remain necessary to achieve BP targets.

There is a long list of drugs and other substances that can cause hypertension including alcohol, amphetamines, antidepressants (MAOIs, SNRIs, TCAs), atypical anti-psychotics, caffeine, decongestants, herbs (Ma Huang, ephedra, St. John’s wart, yohimbine, and others), combined oral contraceptives (OCP), chronic NSAID use, recreational drugs, systemic corticosteroids, and immunosuppressives. This article will stick to addressing the substances most likely to be encountered in the flight medicine clinic. Alcohol should be limited to one drink per day for women and two per day for men. Caffeine use needs to be limited to < 300 mg/day (about 3 cups of coffee). Decongestants ought to be restricted to the shortest duration possible and clinicians should consider alternative medications for longer duration therapy. Patients need to be thoroughly screened for herbal and illicit substance use so that these compounds can be excluded as a cause of their BP problems. Clinicians should consider moving women to the lowest effective OCP dose or changing to an alternative method that does not utilize estrogen analogs. Patients relying on chronic NSAIDs should be counseled on alternative pain treatment strategies such as physical therapy, acetaminophen, or other non-pharmacologic interventions.

In summary, the 2017 ACC/AHA blood pressure guidelines offer a wealth of practical information to allow the flight surgeon to leverage contemporary evidence for optimal management of this common problem and represents a must read for any physicians practicing in the realm of primary care. However, care must be taken in applying the overall recommendations to any patient population, especially active duty aircrew, who are not well represented in the studies underlying the guidelines. Furthermore, clinical practices (particularly the measurement of BP) need to be carefully scrutinized to ensure that the data we are obtaining align with the collection methods employed by the guideline authors. Finally, chiefly in our younger and healthier population, secondary causes of hypertension need to be strongly considered and ruled out before assigning the diagnosis of primary hypertension.

References

Greasing the Skids

Michael “SCAR” Lang, Capt, USAF, MC, FS
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Flight surgeons appreciate the importance of squadron integration, but those who have attempted to maximize integration often have a story or two about an unanticipated negotiation regarding their relationship with medical support. Being close to the Operations Group leads to a much better understanding of that population’s needs; however, it’s important to recognize the dangers of entirely removing yourself from the Med Group. In the worst cases, a flight doc can become downright antagonistic toward the medical support structure. The pitfalls of the Squadron Medical Element’s (SME) familiarity with operations are hard to appreciate unless they’re experienced firsthand, and it has the potential to become a top frustration. I don’t claim to have seen it all, but I can give an example of a tough situation—and how a bad relationship was overcome with gratitude, respect, and dignity.

During my first deployment, I took over a two-man shop on a large installation. At the time, the relationship between my squadron and the Medical Group was between poor and awful. The organizational quirks that come with the trade asserted themselves time and time again as I became engrossed in a dilemma of who to build a good relationship with versus who to guard myself against. I was quite naïve to the needed nuance in Med-Ops relations, and I’m sure that I made a mistake or two in the first few encounters with commanders and the executive medical staff. Because this was my first deployment, it was hard to fully comprehend (although I had a fair idea) how much of a nuisance my shop had become for my squadron commander. He was routinely meeting with the executive staff members and answering daily emails demanding justifications for having his SMEs around. When the problem escalated to the Operations Group commander, how we did business needed to change.

We were at risk of being pulled away from our squadron completely. More importantly, this was an atrocious relationship that could have hindered operations in theater. Recognizing this bad relationship came a bit late, but not too late. Perhaps the most difficult lesson learned was the recognition that a change needed to be made in the first place, and that it’s such a foul to forget about the medical side of the house. I used to think that I required no training in interpersonal relationships, but the mere fact that people train on this subject constantly should have awoken me to the reality that I wasn’t just underprepared; I was outclassed and my people were paying for it.

The solution was beyond procedural skill or diagnostic competence. What was needed was practical advice in the principles of negotiation. I can’t speak for everyone, but I imagine that new flight docs are not thinking about interorganizational negotiations and the need for building relationships with those wearing the same uniform. Once they head out the door, they may not yet understand that it’s just as important as knowing the standards. This topic is often discussed within workshops, book clubs, and feedback sessions among those in the line: to get what I want, and ultimately what my people want, I eventually will have to learn about influence and power. To take others’ feelings into consideration, and know how to make others feel good about working with me— that’s the kind of skill that will spare headaches and save time.

It didn’t take an earth-shattering discovery to remedy my problem. It was a question of gratitude and showing some respect to those who make my job possible. I made it a point to not only meet, but to build a relationship with everyone in the Medical Group. Not only did I gain an appreciation and respect for the capabilities that the MSC brings to the fight, but I was able to intelligently approach future problems in subsequent deployments because of what I learned from logistics, pharmacy, and dental. I needed their help to become a better SME—especially when I was going solo in a one-deep shop not much later in my career. Spending time getting to know the Medical Group had the added benefit of fostering trust between our organizations. I owed it to my commander to keep things extremely smooth between Medical and Operations. It ended up benefiting the two of us immensely.

I now know better than to expect an escape from organizational matters. Although complaining about having to tend to organizational matters like relationship building, trust development, familiarity, and likeability can feel good and righteous, this issue of interpersonal relationships is older than medicine. It will certainly outlast medicine as we know it. These obstacles are extremely important for professional and personal development. Not only is it useful for our long careers in medicine to learn how to perform well within an organization, there are untapped opportunities for those flight docs who put the mission first by building great relationships. As far as skills go, organizational leadership is one that will always set you and yours up for lasting success. It certainly made a better flight surgeon out of me, and it’s a lot of fun to learn!

Call for Patch Design

Attention artists! SoUSAFFS is looking for a patch and coin design. If you have an idea that captures the spirit of SoUSAFFS, please send your draft design or idea to VADER (christopher.mclaughlin.11@us.af.mil) and Candyman (michael.brough.1@us.af.mil). Drafts will be evaluated by the SoUSAFFS Board of Governors. We are looking forward to your submissions.
Advanced Clinical Concepts in Aeromedical Evacuation

Mitch Radigan, Capt, USAF, MC, FS
RAM XX

What do a shipping container, a bus, and a C-5 have in common? Other than frequently being broken, they can be used to move ill or injured patients. Despite our best efforts to screen individuals and prevent illness and injury, our service members and their families sometimes find themselves geographically separated from the medical resources, skills, and knowledge they need to heal. It is our great privilege to assist and care for these individuals.

Perhaps you have been, or soon will be, the clearing flight surgeon at Middle-of-Nowhere FOB. Do you know how to get patients from point A to point B? Do you understand how to make decisions that will give them their best shot at recovery, all while being transported in abnormal environments across great distances? Do you know how to coordinate and communicate with each team the patient will interact with along the way? If not, you are not alone.

Aeromedical evacuation missions can be very complex. However, knowing what considerations to make for your patient and how to get the process started quickly can make the difference, especially when it means life, limb, or eyesight. To prepare yourself before your next deployment or overseas assignment, consider taking the Advanced Clinical Concepts in Aeromedical Evacuation course at the U.S. Air Force School of Aerospace Medicine to learn more. This course teaches you about the logistics behind moving patients, what patients can expect throughout the process, and how to communicate and coordinate care. You get hands-on experience with equipment and the aeromedical evacuation flight environment. Additionally, you will receive training in aeromedical decision-making for various conditions and learn about the various specialty teams, such as the Critical Care Air Transport Team and Burn Team, available to provide expert care.

When you better understand the mechanics of patient movement, you will be able to set your patients up for success. They will thank you (at least quietly to themselves) when you are not only able to get them where they need to be, but sharp enough to order them a “litter for comfort” so that they actually have a place to lay down on their 12-hour flight, rather than being cramped on a webbed cargo chair, which may also be broken, for the entire flight. 🍃

If I’d Known Then What I Know Now – Military Tropical Medicine

Scott “FAC(B)” Dillard, Maj, USAF, MC, FS
RAM XIX

Let’s be honest—medical training in the U.S. is understandably North America centric. At my small Alabama medical school, we may have spent a few days discussing malaria, but I never saw it diagnosed or even suspected in our patients. We may have touched on leishmaniasis, but I certainly never saw a case. We covered nematodes, cestodes, and filaria, but it never was part of the differential during rounds. Yet, from my first day as a flight surgeon, diseases from beyond the border became a concern.

Go to any USAF base and you will encounter Airmen who have lived/worked/played all over the world. Prescribing malaria prophylaxis and educating deployers on vector-borne disease countermeasures become bread and butter practice. Within my first year as a flight surgeon, I was deployed to East Asia. I liked it so much that I went back for my next assignment. Between my patients’ personal travel and deployments, there aren’t many countries in the region that I haven’t had someone preparing to go to or return from with some new ailment acquired while traveling. Although I know of no specific instances where I missed the diagnosis of a tropical disease, you don’t know what you don’t know.

I was lucky enough to attend the Uniformed Services University Military Tropical Medicine (MTM) course. It’s held once per year in the summer and attendees are very diverse. There were foreign military physicians, civilians, and U.S. military officers, enlisted, and cadets. Specialties included infectious diseases, aerospace, family medicine, pediatrics, emergency medicine, critical care, and gastroenterology – just to name a few. There were nurses, techs, PAs, and even a few premeds. Aside from the great networking, I got a glimpse of what a purple force medical corps might look like.

The course was an intensive 1-month didactic program complete with lectures from world experts and hands-on lab exercises. The location was great—Bethesda, MD—right outside Washington, DC. A select number then went on a 2-week field mission to some pretty exotic locations. My team went to Honduras. Others went to Ghana, Liberia, and Peru.

Being up to 1.5 months long, MTM packs in a lot of content. I learned very practical approaches for many unfamiliar conditions. If needed, I can use a microscope to find ova and parasites, interpret rapid diagnostic tests for malaria in an austere environment and, most importantly, refold a pop-up mosquito bed net back into its case. We covered nematodes, cestodes, and filaria, but it never was part of the differential during rounds. Yet, from my first day as a flight surgeon, diseases from beyond the border became a concern.

MTM was one of the most valuable courses I’ve taken in my military career. I only wish that I had taken it prior to spending 2.5 years working/playing abroad. Prescribing malaria prophylaxis and educating deployers on vector-borne disease countermeasures become bread and butter practice. Within my first year as a flight surgeon, I was deployed to East Asia. I liked it so much that I went back for my next assignment. Between my patients’ personal travel and deployments, there aren’t many countries in the region that I haven’t had someone preparing to go to or return from with some new ailment acquired while traveling. Although I know of no specific instances where I missed the diagnosis of a tropical disease, you don’t know what you don’t know.

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If you’re interested, visit https://www.med.navy.mil/sites/nmpdc/courses/Pages/Military%20Tropical%20Medicine.aspx for more information. 🍃