UNITED STATES AIR FORCE GROUND ACCIDENT INVESTIGATION BOARD REPORT

81st Aerospace Medicine Squadron
81st Training Wing
Keesler Air Force Base, Mississippi

TYPE OF ACCIDENT: Fitness Assessment Fatality

LOCATION: Keesler Air Force Base, Mississippi

DATE OF ACCIDENT: 20 August 2018

BOARD PRESIDENT: Colonel David J. Duval, USAF

Conducted IAW Air Force Instruction 51-307

EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
GROUND ACCIDENT INVESTIGATION

Fitness Assessment Fatality
Keesler Air Force Base, Mississippi
20 August 2018

On 20 August 2018, at approximately 0740 hours local time, Mishap Airman (MA), a 29-year old Air Force First Lieutenant assigned to the 81st Aerospace Medicine Squadron, Keesler Air Force Base, Mississippi, collapsed during the final lap of the 1.5 mile run during an Air Force Fitness Assessment on Keesler Air Force Base's outdoor Triangle Track.

When Fitness Assessment Cell (FAC) members came to the aid of MA, he was responsive and answered questions, but had difficulty breathing and complained of back and leg pain. Shortly after the FAC members contacted emergency services, MA became confused and combative. Within minutes, emergency responders from the Keesler Air Force Base Fire Department arrived on scene, followed quickly by an 81st Medical Group ambulance crew. Emergency responders rapidly moved MA to the ambulance and transported him to the 81st Medical Group Emergency Department.

Medical staff diagnosed severe exertional overheating and muscle breakdown (rhabdomyolysis). The staff established that MA had a previous diagnosis of sickle cell trait. Upon MA's arrival, his heart began beating erratically and was not providing enough oxygen to his body. Medical staff restored normal heart function, and when MA was stable, they transferred him to the intensive care unit. He continued to deteriorate as effects of severe rhabdomyolysis, to include significant electrolyte and blood acid abnormalities, resulted in multisystem organ failure. MA had three more cardiac arrests throughout the night. On his fourth cardiac arrest, the medical team was unable to revive MA and he died at 0842 hours on 21 August 2018, his wife at his side.

Medical experts concluded MA overexerted himself during his run and began to overheat, triggering red blood cells to sickle, and a number of complex, interwoven, simultaneous, self-sustaining destructive cycles to occur in MA's body. The combination of these cycles led to explosive, irreparable organ damage and created a physiologic catastrophe that led to multisystem organ failure and death in just over 24 hours.

SUMMARY OF FACTS
FITNESS ASSESSMENT FATALITY, KEESLER AIR FORCE BASE, MISSISSIPPI
20 AUGUST 2018

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS ii
SUMMARY OF FACTS 1
1. AUTHORITY and PURPOSE 1
a. Authority 1
b. Purpose 1
2. ACCIDENT SUMMARY 1
3. BACKGROUND 2
a. Air Education and Training Command (AETC) 2
b. Second Air Force (2 AF) 2
c. 81st Training Wing (81 TRW) 2
d. 81st Medical Group 3
e. Air Force Fitness Program 3
f. Keesler AFB Triangle Track 4
g. Acclimatization to Climate and Hydration 5
h. Sickle Cell Trait (SCT) 5
i. Rhabdomyolysis 6
4. SEQUENCE OF EVENTS 7
a. Summary of Accident 7
b. Medical Response and Treatment 9
5. Mishap physiology 12
6. MAINTENANCE 13
7. EQUIPMENT, VEHICLES, FACILITIES, AND SYSTEMS 13
8. ENVIRONMENTAL CONDITIONS 14
a. Observed Weather 14
b. Other Environmental Conditions 14
c. Restrictions, Warnings, and Procedures 14
9. PERSONNEL QUALIFICATIONS 15
10. MEDICAL 15
a. Injuries and Pathology 15
b. Lifestyle and Behavior 16
11. OPERATIONS AND SUPERVISION 17
a. Operations 17
b. Supervision 17
12. GOVERNING DIRECTIVES AND PUBLICATIONS 17
a. Publically Available Directives and Publications Relevant to the Mishap 17
b. Other Directives and Publications Relevant to the Mishap 18
INDEX OF TABS 19

ACRONYMS AND ABBREVIATIONS

2 AF	Second Air Force
81 TRW	81st Training Wing
81 MDG	81st Medical Group
ABG	Arterial Blood Gas
ABU	Airman Battle Uniform
AC	Abdominal Circumference
ACEP	American College of Emergency Physicians
ACLS	Advanced Cardiovascular Life Support
ADLS	Advanced Distributed Learning Service
AED	Automated External Defibrillator
AETC	Air Education and Training Command
AFB	Air Force Base
AFI	Air Force Instruction
AHLTA	Armed Forces Health Longitudinal Technology Application
A.M.	Ante Meridiem
AMDS	Aerospace Medicine Squadron
Amn	Airman
BECC	Bioenvironmental Flight Commander
BEFC	Bioenvironmental Flight Chief
BET2	Bioenvironmental 2
bio	Bioenvironmental Engineering
BLS	Basic Life Support
CBC	Complete Blood Count
CBT	Computer-Based Training
CK	Creatine Kinase
CO_2	Carbon Dioxide
COT	Commissioned Officers Training
CPR	Cardiopulmonary Resuscitation
CT, (CAT)	Computerized (Axial) Tomography
DIC	Disseminated Intravascular Coagulation
DoDI	Department Of Defense Instruction
ED	Emergency Department
EFSS	Expeditionary Force Support Squadron
EKG	Electrocardiogram
EMR	Emergency Medical Responder
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
ER	Emergency Room
F	Fahrenheit
FA	Fitness Assessment
FAC	Fitness Assessment Cell
FACA	Fitness Assessment Cell Augmentee
FACM	Fitness Assessment Cell Manager
FAP1	Fitness Assessment Participant 1
GAIB	Ground Accident Investigation Board
GS	General Schedule
HAZCOM	Hazmat Communication
IC	Incident Command
ICU	Intensive Care Unit
ID	Identification
IDMT	Independent Duty Medical Technician
INR	International Normalized Ratio
IPTS	Inpatient Operations Squadron
IV	Intravenous Therapy
L	Liter
LRS	Logistics Readiness Squadron
Lt	Lieutenant
Lt Col	Lieutenant Colonel
M&M	Morbidity and Mortality
MA	Mishap Airman
Maj	Major
MDOS	Medical Operations Squadron
mmHg	Millimeter of Mercury
MS	Mississippi
MTF	Medical Treatment Facility
NCO	Non Commissioned Officer
NIMS	National Incident Management System
O_2	Oxygen
OPQRST	Onset, Provokes/Palliates, Quality, Severity, Time
Ops	Operations
OTS	Officer Training School
pCO_2	Partial Pressure of Carbon Dioxide
PALS	Pediatric Advanced Life Support
PCS	Permanent Change of Station
PD	Position Description
PEA	Pulseless Electrical Activity
pH	Potential Hydrogen
PT	Physical Training
PTL	Physical Training Leader
PTL-A	Physical Training Leader-Advanced
PTL-B	Physical Training Leader-Basic
ROSC	Return of Spontaneous Circulation
RT	Respiratory Therapy
SAMPLE	Signs and Symptoms, Allergies, Medication, Past History, Last Oral Intake, Events Leading to Injury or Illness
SGB	Chief of Biomedical Services Corps
SNIT	Student Awaiting Training
SpO_2	Saturation of Hemoglobin with Oxygen As Measured by Pulse Oximetry
SrA	Senior Airman
SSgt	Staff Sergeant
TDY	Temporary Duty
UFPM	Unit Fitness Program Manager

USAF	United States Air Force	VTC	Video Teleconference
VBG	Venous Blood Gas	WIT	Witness
VCO	Vehicle Control Officer		

The above list was compiled from the Summary of Facts, the Index of Tabs, and Witness Testimony (Tab R and Tab V).

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 19 October 2018, Major General Mark E. Weatherington, Deputy Commander, Air Education and Training Command (AETC), appointed Colonel David J. Duval, United States Air Force, (USAF), as Board President of a Ground Accident Investigation Board (GAIB) to investigate the on-duty fatality of a United States Air Force member under Air Force Instruction (AFI) 51-503, *Aerospace and Ground Accident Investigations*. (Tab Y-2 and Y-3) AFI 51-503 was superseded by AFI 51-307, under the same title, on 18 March 2019. The investigation was subsequently conducted under AFI 51-307 at Keesler Air Force Base (AFB), Mississippi (MS), from 13 May 2019 to 8 June 2019. The following Board Members were appointed: a Lieutenant Colonel Medical Member, a Major Legal Advisor, and a Technical Sergeant Recorder. (Tab Y-4 and Y-5)

b. Purpose

In accordance with AFI 51-503, *Aerospace and Ground Accident Investigations*, and 51-307, same title, this Accident Investigation Board conducted a legal investigation to inquire into all the facts and circumstances surrounding this Air Force ground accident, prepare a publicly releasable report, and obtain and preserve all available evidence for use in litigation, claims, disciplinary action, and adverse administrative action.

2. ACCIDENT SUMMARY

On 20 August 2018, at approximately 0740 hours local time, Mishap Airman (MA), a 29-year old Air Force First Lieutenant assigned to the 81st Aerospace Medicine Squadron, Keesler Air Force Base, Mississippi, collapsed during the final lap of the 1.5 mile run during an Air Force Fitness Assessment on Keesler Air Force Base's outdoor Triangle Track. (Tabs G-3, G-8, R-22, V-6.3, V-6.12, and Z-2) When Fitness Assessment Cell (FAC) members initially came to the aid of MA, he was responsive and answered questions, but had difficulty breathing and complained of back and leg pain. (Tabs R-22, and V-13.5 and V-13.6) Shortly after the FAC members contacted emergency services, MA became confused and combative. (Tab V-6.5) Within minutes, emergency responders from the Keesler Air Force Base Fire Department arrived on scene, followed quickly by an 81st Medical Group ambulance crew. (Tab CC-6 and CC-7) Emergency responders rapidly moved MA to the ambulance and transported him to the 81st Medical Group Emergency Department. (Tab V-12.4) Medical staff diagnosed severe exertional overheating and muscle breakdown (rhabdomyolysis). (Tab V-10.2 and V-10.3) The staff established that MA had a previous diagnosis of sickle cell trait. (Tab V-4.4) Upon MA's arrival, his heart began beating erratically and was not providing enough oxygen to his body. (Tab X-5) Medical staff restored normal heart function, and when MA was stable, they transferred him to the intensive care unit. (Tab X-5 and X-6) He continued to deteriorate as effects of severe rhabdomyolysis, to include significant electrolyte and blood acid abnormalities, resulted in multisystem organ failure. (Tabs V-1.2 and X-6 to X-8) MA required mechanical ventilation and had three more cardiac arrests. (Tabs X-5, X-7 to X-9, and V-1.2) On his fourth cardiac arrest, the medical team was unable to revive MA and he died at 0842 hours on 21 August 2018, his wife at his side. (Tabs V-5.5 and X-7 to X-9)

3. BACKGROUND

a. Air Education and Training Command (AETC)

AETC's mission is to recruit, train and educate Airmen to deliver 21st Century airpower, with the vision to inspire and develop MACH-21 Airmen. (Tab CC-2) AETC headquarters is located at Joint Base San Antonio-Randolph near San Antonio, Texas. (Tab CC-2) The command is composed of more than 61,000 personnel. (Tab CC-2) The command oversees the Air Force Recruiting Service, two Numbered Air Forces, and Air University. (Tab CC-2)

b. Second Air Force (2 AF)

2 AF's mission is to train, develop, and inspire the world's premier Airmen to power the world's greatest Air Force, with the vision to be the premier training and development center in the Department of Defense. (Tab CC-3) 2 AF, with headquarters at Keesler AFB, MS, is responsible for conducting basic military and technical training for Air Force, Joint and Coalition partners. (Tab CC-3) 2 AF also trains and provides oversight of Airmen completing Army training prior to Joint Expeditionary Tasking missions. (Tab CC-3)

c. 81st Training Wing (81 TRW)

Keesler AFB is the "Electronics Training Center of Excellence" for the USAF. (Tab CC-4) Located on the Mississippi Gulf Coast, the 81st Training Wing is host to 2d Air Force, the 403d Wing (AF Reserve) and is the single largest employer on the Mississippi Gulf Coast. (Tab CC-4) Keesler trains more than 20,000 students annually in 500 courses, with an average daily student load of more than 3,500. (Tab CC-4) 81 TRW is a lead Joint Training Installation, instructing not only Air Force, but Army, Navy, Marine Corps, Coast Guard and civilian federal agency personnel. (Tab CC-4) 81 TRW's mission is to train, develop and inspire premier warfighters for the Air Force! (Tab CC-4) 81 TRW executes the AETC mission, "Develop America's Airmen today... For tomorrow," with the vision: "The preeminent enterprise delivering innovation and mission-ready warfighters!" (Tab CC-4)

d. 81st Medical Group

The 81st Medical Group operates one of the largest Air Force medical facilities in the Air Force. (Tab CC-5) Its primary mission is to maintain medical readiness for worldwide contingencies by providing quality, cost-effective health care for more than 25,000 enrollees, including almost 8,500 active-duty members. (Tab CC-5) The 81st Medical Group provides the most comprehensive array and quality of services available in the Gulf Coast area. (Tab CC-5)

The hospital offers almost 60 services and education programs with a staff of more than 1,700 military and civilian members. (Tab CC-5) The hospital has 66 training affiliations with 35 different institutions/organizations to train medical physicians, technicians and nurses. (Tab CC-5) The General Surgery residency program is integrated with the Naval Hospital Pensacola, Fla., and the 96th Medical Group at Eglin AFB, Fla., and has a long-standing integration program with the Biloxi Veterans Administration. (Tab CC-5) Furthermore, the medical group operates the only medical genetics center in the Department of Defense. (Tab CC-5) The USAF Medical Genetics Center provides laboratory and consultative support to military medical facilities around the world. (Tab CC-5)

e. Air Force Fitness Program

Air Force members must remain physically fit. (Tab BB-3) The Air Force assesses physical fitness by requiring Airmen to complete an age and gender specific fitness assessment. (Tab BB-27) The Keesler AFB Fitness Assessment Cell administers the Air Force Fitness Assessment for members assigned or attached to Keesler AFB. (Tab BB-11) The Air Force fitness assessment comprises three components: 1) aerobic fitness (1.5-mile run or 2.0-kilometer walk), 2) body composition (abdominal circumference measurement), and 3) muscular fitness (push-ups and sit-ups). (Tab BB-18) Each component is scored based upon the Airman's performance for that component (e.g., faster run times are awarded more points). (Tab BB-31 and BB-32) A total score of 75 points out of the maximum 100 points is necessary to pass the fitness assessment. (Tab BB-31 and BB-32) Airmen test biannually if their last fitness assessment score was 75-89.99 points and test annually if their score equals or exceeds 90 points (scoring over 90 points is called an "excellent" score). (Tab BB-28) If an Airman has documented medical reasons exempting them from completing certain portions of the test (e.g., not run, not perform sit-ups, etc.), the Airman tests on a medical profile (a description of temporary or permanent limitations) and he or she must take their next fitness assessment within six months of the expiration of the medical profile. (Tab BB-28)

A number of different personnel oversee and implement the fitness program. (Tab BB-11 to BB-13) With respect to the mishap fitness assessment, the relevant positions are:

(1) A Fitness Assessment Cell Manager (FACM) provides Physical Training Leader Basic (PTL-B) training to all FAC Augmentees (FACAs) prior to administering any fitness assessments; provides refresher training on proper fitness assessment procedures, to include instructions pertinent to local administration; and trains Unit Fitness Program Managers (UFPMs) on their responsibilities. (Tab BB-12 and BB-13) The FACM also provides UFPMs, or designated unit representatives, blocks of testing dates and times for fitness assessments; procures, maintains, and

replaces fitness assessment equipment as needed; and ensures the FAC administers all portions of the fitness assessment in accordance with Air Force instructions, among other responsibilities. (Tab BB-13)

(2) Fitness Assessment Cell (FAC) Augmentees are military UFPMs or unit PTLs selected to augment the FAC in the administration of fitness assessments. (Tab BB-11) FAC Augmentees must possess a minimum PTL-Basic certification and complete FAC-provided refresher training on fitness assessment procedures at the beginning of their FAC rotation. (Tab BB-11) In addition, FAC Augmentees review Fitness Screening Questionnaires (FSQs) completed the day of a fitness assessment and notify an Airman's UFPM if responses on the FSQ indicate a higher risk and the need for referral to a health care provider. (Tab BB-12)

f. Keesler AFB Triangle Track

The Keesler AFB Triangle Track (Figure 2) consists of an inner (0.25 mile) loop and an outer (0.75 mile) loop located on the southwest side of Keesler AFB and is a short walk from Vandenberg Hall. (Tabs Z-5 and BB-58) Using a combination of the loops, a 0.5 mile track is created (Figures 1 and 2), making a 1.5-mile run of 3 laps. (Tab Z-2) The track is free from traffic and does not have a continuous incline or decline, rolling hills, or slopes exceeding two degrees. (Tab BB-29 and BB-58) At an elevation near sea level, the Keesler AFB track requires no adjustment to the run times. (Tab BB-29 and BB-58)

Figure 1 – Track Loop Distances (Tab Z-2)

Figure 2 – Keesler AFB Triangle Track (Tab Z-2)

g. Acclimatization to Climate and Hydration

High humidity and high temperature environments increase the risk of heat injury. (Tab CC-30) Acclimatization is the body's ability to improve its response to, and tolerance of, heat stress over time. (Tab BB-48) The major adjustments that occur during heat and humidity acclimatization include plasma volume expansion, improved blood flow to the skin, lower threshold for initiation of sweating with increased sweat output, lower salt concentration in sweat, and lower skin and core temperatures for a standard exercise. (Tab BB-49) This process requires one to two weeks; any improved tolerance of heat stress generally dissipates within two to three weeks of returning to a more temperate environment. (Tab BB-48) The Wet Bulb Globe Temperature (WBGT) is a method of approximating heat stress in direct sunlight, which takes into account temperature, humidity, wind speed, sun angle, and cloud cover (solar radiation). (Tab BB-47) The Air Force uses universal precautions to reduce the risks of dehydration and heat-induced illness among all members based on the WBGT and amount of work performed. (Tab BB-51) These universal measures have been effective in reducing the rates of exercise-related death, regardless of an individual's Sickle Cell Trait status. (Tab X-12)

h. Sickle Cell Trait (SCT)

Sickle Cell Trait is an inherited condition in which an individual possesses both normal and abnormal hemoglobin, a molecule within red blood cells that carries oxygen to the body. (Tab BB-34 and BB-35) SCT does not decrease life expectancy as compared to individuals without SCT. (Tab BB-41) However, in some conditions, such as high altitude and overexertion, individuals with SCT can experience sickling of their red blood cells. (Tab BB-55) Unlike normal red blood cells that are round and flexible and can easily pass through blood vessels, sickled red blood cells are crescent-shaped and rigid and can block blood vessels, thus reducing the oxygen supply to organs. (Figure 3 and Tab BB-34) Because there are usually no symptoms of SCT, most people find out they have SCT only through a blood test. (Tab BB-42) SCT is more common among people whose ancestors come from Africa, the Mediterranean region, Middle East, and South Asia, but anyone can have SCT; 1 in 12 blacks or African Americans in the United States has SCT. (Tab BB-41) The Air Force universally screens for SCT upon entry into the service. (Tab BB-53) SCT does not preclude military service. (Tab BB-44 and BB-45)

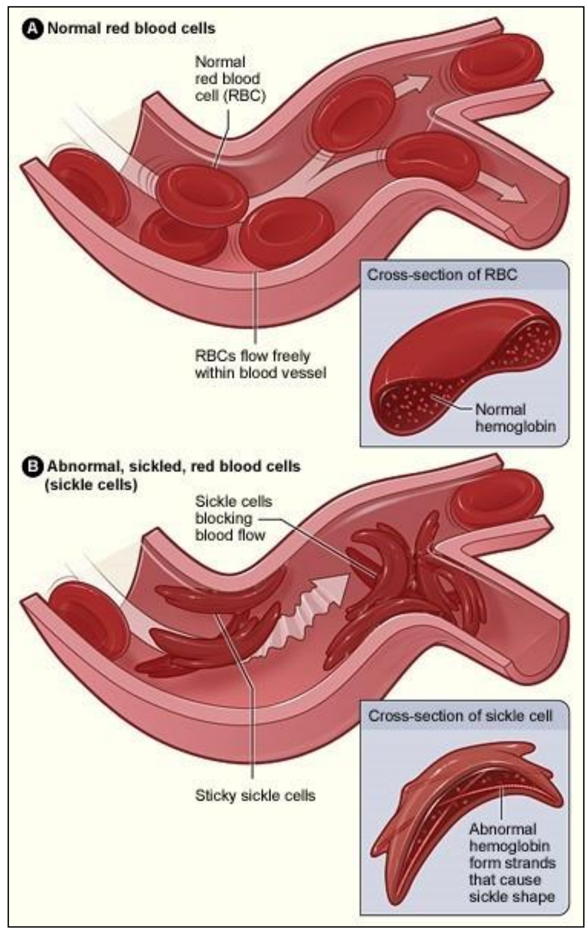

Figure 3 – Healthy and Sickled Red Blood Cells (Tab Z-4)

Sickling may lead to multiple severe medical complications (Tab BB-35) Known triggers of red blood cell sickling include severe tissue hypoxia (low oxygen in tissues), increased blood viscosity (blood thickness), academia (lowering of blood pH), and hyperthermia (overheating). (Tab X-11) High temperature and humidity, high altitude, an individual's poor conditioning, poor hydration, age, and high-intensity exercise are all considered risk factors for red blood cell sickling. (Tab X-11)

i. Rhabdomyolysis

Muscles in the human body are composed of cells called myocytes. (Tab CC-9) Rhabdomyolysis is a condition wherein damaged myocytes release their contents into the surrounding tissue and blood circulation, resulting in a potentially life-threatening condition. (Tab CC-32) Common causes include muscle trauma, hyperthermia, extreme exertion, low blood flow to the muscle causing decreased oxygen supply, medications, infection, dehydration, genetic muscle disorders, and autoimmune diseases. (Tab C-11) Clinical signs and symptoms may include severe muscle pain, cola-colored urine, muscle swelling, weakness, and significant limitation in motion. (Tab CC-30)

Muscle cells are bathed in a fluid that has a high concentration of calcium, much higher than what is inside the cell. (Tab CC-9) Muscle cells use a lot of energy to maintain this difference. (Tab CC-9) Overexertion of the muscle leads to depletion of energy needed to maintain the difference in concentrations inside and outside the cell, and this, in turn, leads to a massive influx of calcium into the myocyte. (Tab CC-9) Eventually, this leads to rupture of the cell membrane, spilling the cellular components such as proteins and electrolytes into the space surrounding the cells. (Tab CC-9) This causes capillary damage, leading to swelling, increased pressure, and poor tissue oxygenation. (Tab CC-15) The high concentration of calcium in the cell causes the muscle to continuously contract, resulting in further depletion of energy reserves and causing severe muscle pain. (Tab CC-9) The rupturing of myocytes also releases excess potassium into the bloodstream, which can cause life threatening arrhythmias (abnormal heart rhythm), cardiac arrest (heart stops beating), and muscle paralysis. (Tab CC-40 and CC-41)

As the damaged muscle cells release their contents into the surrounding space, fluid is drawn from the blood, and two things happen. (Tab CC-15) First, the fluid goes into the damaged muscle, creating further swelling, which can lead to compartment syndrome. (Tab CC-15) Compartment syndrome occurs when the muscle swells more than allowed by the tight connective tissue and other structures surrounding it, thus increasing the pressure and restricting blood flow. (Tab CC-15) Second, total blood volume decreases (hypovolemia), lowering blood pressure (hypotension) and triggering multiple, independent systems to release hormones that constrict small blood vessels in an attempt to raise blood pressure. (Tab X-11) These processes led to further muscle damage. (Tab X-11)

Myoglobin, a protein contained in the myocyte, is released into the blood circulation and can induce kidney failure, for which a patient may require emergency dialysis (a medical procedure to remove toxins from the blood). (Tab CC-15 and CC-39) This occurs in approximately 30 percent of patients with rhabdomyolysis. (Tab CC-15)

Disseminated intravascular coagulopathy (DIC) is associated with severe rhabdomyolysis and is due to the release of inflammatory and clotting substances from the damaged muscle. (Tab X-11)

DIC causes blood clots to form throughout the body, blocking small blood vessels. (Tab X-11) Because it consumes clotting factors so rapidly, it paradoxically causes bleeding. (Tab X-11)

These complex processes create multiple, self-reinforcing feedback loops that can be catastrophic. (Tab CC-17)

4. SEQUENCE OF EVENTS

a. Summary of Accident

MA filled out a Fitness Screening Questionnaire (FSQ) on 16 August 2018, four days prior to the mishap. (Tab G-9 to G-11) Question #1 on the FSQ asks "Have you experienced any of the symptoms/problems listed below and not been medically evaluated and cleared for unrestricted participation in a physical training program?" and lists: unexplained chest discomfort with or without exertion; unusual or unexplained shortness of breath; dizziness, fainting, or blackouts associated with exertion; other medical problems, not already addressed in an AF Form 469, that may prevent you from safely participating in this test or achieving a satisfactory score. (Tab G-9) MA answered "no" to all of these statements. (Tab G-9) Question #2 on the FSQ asks "Are you 35 years of age or older?" MA answered "no." (Tab G-9) At this point, the FSQ directs the member is cleared to take the fitness assessment. (Tabs G-9 and BB-19) There is no evidence to suggest that MA had any change in health prior to reporting for his fitness assessment. (Tab X-4)

At approximately 0630 hours (all times local) on 20 August 2018, MA reported for a fitness assessment test which was scheduled to begin at 0700 at Vandenberg Hall (Bldg 7503). (Tab V-2.2 and V-6.2) FAC staff briefed the fitness assessment participants regarding an opportunity to postpone the fitness assessment in the case of injury or illness. (Tabs V-2.2, BB-19 and BB-20)

MA received maximum points for the abdominal circumference measurement, near maximum points for the push-ups, and maximum points for sit-ups. (Tabs G-8 and BB-31) After each fitness assessment component, and immediately before the run portion of the fitness assessment, MA did not appear ill. (Tab V-16.2)

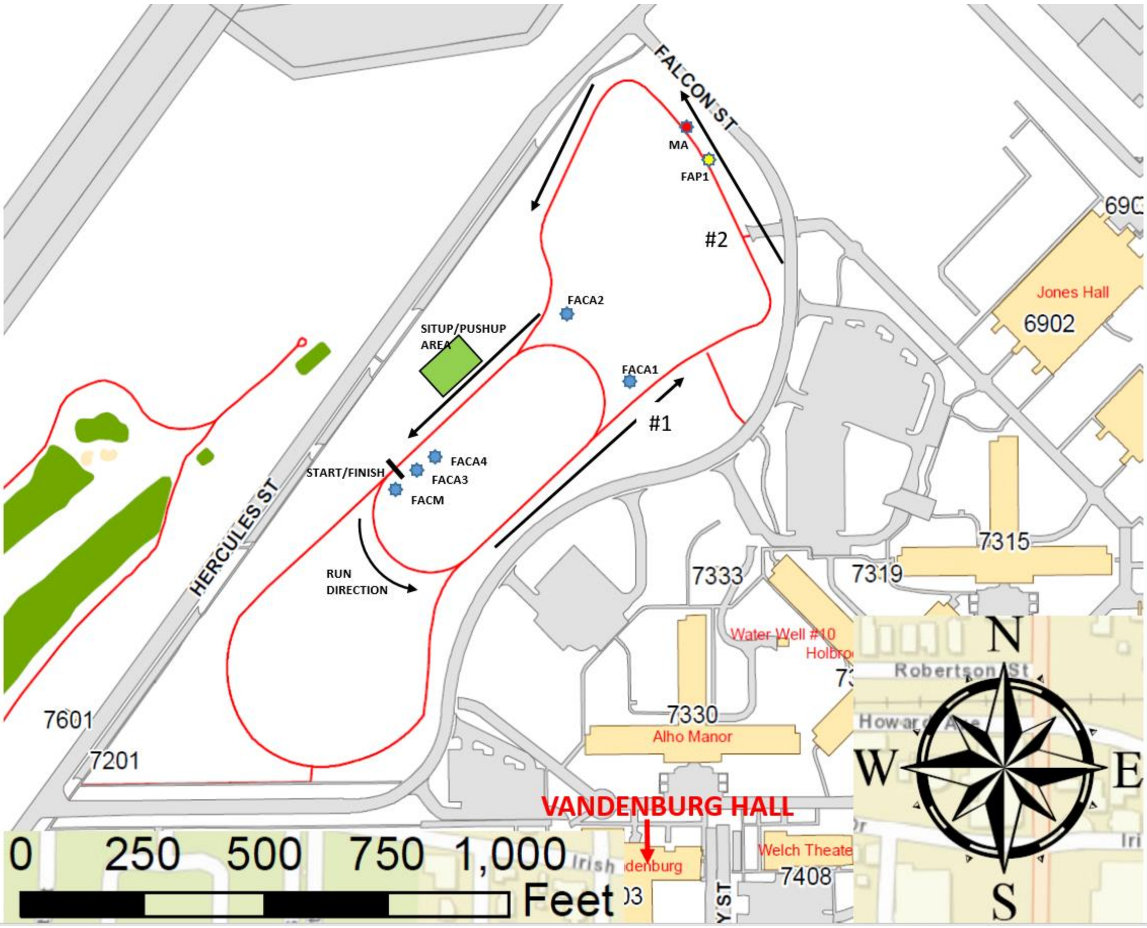

Figure 4 – FAC Positions During Run Test and Location of MA's Collapse (Tab Z-5)

The FAC staff and participants then proceeded to the Triangle Track for the aerobic fitness portion of the test (three laps on this particular track). (Tabs R-22, T-2, V-6.3, V-16.3 and Z-2) MA started his run at a fast pace, completing the first lap at 3 minutes and 25 seconds, which was the fastest time for the group. (Tab T-2) He completed his second lap at the 7-minute and 58 seconds mark. (Tab T-2)

Now into the third and final lap, as MA approached FACA1's position at 0740 hours, FACA1 saw MA take off his headphones and toss them to the ground, marked as position #1 on Figure 4. (Tabs R-22, V-6.3 and V-6.12) FACA1 thought this to be unusual behavior, alerted FACA2 to the situation, and focused his attention on MA after MA had rounded the next turn, marked as location #2 on Figure 4. (Tabs R-22, V-6.3 and V-6.12) FACA1 then saw MA put his arms up "as if trying to grab onto something to hold him up," and FACA1 and FACA2, who had an Automated External Defibrillator (AED), began to move toward MA. (Tabs R-22 and V-6.5) MA slowed down, went to his knees, and supported himself with his left hand. (Tab V-6.5) When FACA1 and FACA2 reached MA, MA was breathing, moving around, and responsive to their questions. (Tab R-22) FACM was made aware of MA's condition and called 911 at 0741 hours. (Tabs CC-6 and V-6.5) Around this time, FACA1 noticed another runner (FAP1) began to fall out and he ran to attend to her. (Tab V-6.5) FACA1 stated the AED pads were not attached to MA because he was conscious and breathing. (Tab R-22) FACM noted that when he arrived, MA was conscious and was rolling side to side on the ground. (Tab R-20)

b. Medical Response and Treatment

Fire-Rescue team was dispatched at 0743 hours, and arrived at the Triangle Track at 0744 hours. (Tab CC-6) The Emergency Medical Service (EMS) ambulance was dispatched from the Keesler Medical Center at 0743 hours and arrived at the Triangle Track at 0749 hours. (Tab CC-6)

MA was experiencing shortness of breath, and back and leg pain. (Tab V-13.5 and V-13.6) Initial medical assessment at the track revealed that MA was alert and responsive, but seemed confused. (Tabs V-12.2 and X-4) Vital signs taken at the track at approximately 0745 hours were notable for an oxygen saturation of 88%—critically low. (Tabs V-15.2 and X-4) First Responders treated MA with portable oxygen flowing at 15 liters per minute via non-rebreather mask, which improved his oxygen saturation to normal. (Tabs V-12.3 and X-4) MA had become agitated and somewhat aggressive, continually removing the oxygen mask. (Tabs V-6.5, V-12.2 and X-3) EMS departed the scene at 0754 and transported MA to the Emergency Department at Keesler Medical Center. (Tabs X-4 and CC-6) A Fire-Rescue member and a Security Forces member rode in the back of the ambulance to assist due to MA's combativeness. (Tab V-15.8)

The ambulance arrived in the Emergency Department (ED) at Keesler Medical Center at 0759 hours. (Tabs X-5 and CC-7) The initial vital signs obtained at 0800 showed MA's pulse was 110 beats per minute, breathing at 28 breaths per minute, and oxygen saturation was 88%. (Tab X-5) At around 0801 hours, MA appeared to be gazing around the room, but without purposeful movement. (Tabs V-5.2 and X-5) MA began gasping as he was transferred from the EMS stretcher to the ED bed. (Tabs V-10.2 and X-5)

At 0803, MA did not have a pulse and cardiopulmonary resuscitation (CPR, chest compressions) was initiated. (Tabs V-10.2 and X-5) During CPR, his heart monitor showed electrical activity without a detectable pulse. (Tabs V-10.3 and X-5) MA was given medication to stimulate his heart. (Tabs V-10.3 and X-5) Because his blood was found to be acidic with a pH of 6.5, (normal pH is 7.4) another medication to neutralize the excess acid was given. (Tabs V-10.4 and X-5) MA had a tube placed to assist his breathing, connected to a bag-valve, and was manually ventilated. (Tabs V-10.3 and X-5)

After eight minutes of CPR, MA's pulse was detectable, CPR was discontinued, and he was placed on a mechanical ventilator. (Tabs V-5.3 and X-5) His EKG after the cardiac arrest showed no evidence of electrical abnormalities and no evidence of heart damage. (Tab X-5) After the completion of CPR, his blood pressure was normal, his pulse was slightly elevated, and his body temperature was 103.4˚F, so ED staff placed ice packs to lower MA's temperature. (Tabs V-10.3 and X-5) A catheter was placed and only a small amount of urine was collected, indicating MA's kidneys had shut down. (Tabs V-4.2, V-10.2 and X-5) At 0912, MA's temperature had normalized. (Tabs V-5.3 and X-5)

Blood samples obtained after CPR showed MA's liver, kidney, and blood clotting functions were abnormal. (Tabs V-10.2 and X-5) His blood tested negative for drugs of abuse and ethanol. (Tab X-6) A heart enzyme level was slightly elevated, suggesting some heart muscle damage (but also consistent with the effects of CPR). (Tab X-5) Despite intervention, MA's blood pH was still very low at 6.5. (Tab X-5)

Sedation medication was temporarily discontinued to see if MA would regain consciousness; no response was observed, and sedation was resumed. (Tabs V-5.3 and X-6) His urine output about three hours after arrival in the ED was still minimal. (Tabs V-10.2 and X-6) Radiology studies, including a CT scan and chest x-ray, did not show any significant abnormalities. (Tabs V-15.4 and X-6)

MA was transferred to the intensive care unit (ICU) at 1250 hours, 20 August 2018, and was personally received by the ICU physician and primary medical team who assumed responsibility for MA's care at that time. (Tab X-6) Initial evaluation at the ICU showed his blood pressure was slightly low, body temperature was below normal and his oxygen saturation was normal while on a mechanical ventilator. (Tab X-6) MA's eyes opened spontaneously but non-purposefully and he extended his extremities in response to pain, indicating a markedly decreased level of consciousness. (Tab X-6) Examination was notable for mild swelling of his right arm and right thigh. (Tab X-7)

Labs obtained before his transfer to the ICU showed that his white blood cell level had increased, indicating a possible infection, but could also be due to a normal stress response. (Tab X-6) Coagulation tests indicated an ongoing process of disseminated intravascular coagulopathy (DIC), which is a bleeding and clotting disorder. (Tabs V-1.4 and X-6) His kidney function continued to decline, and markedly elevated liver enzymes indicated liver damage. (Tab X-6) His blood potassium was critically elevated, and his blood pH and bicarbonate levels showed excess acid. (Tab X-6) Heart enzyme levels indicated worsening heart strain in light of his critical illness. (Tab X-6)

Aggressive fluid resuscitation and medications were administered in an attempt to maintain MA's blood pressure at an acceptable level. (Tab X-7) Mechanical ventilation was continued. (Tab X-7) Dialysis was begun at approximately 1800 hours, in an attempt to eliminate toxins and correct his electrolyte imbalances. (Tab X-7) The team started broad-spectrum antibiotics to cover for a possible infectious process, and concern for possible compartment syndrome in the extremities led to close monitoring of peripheral pulses. (Tab X-7) Several subspecialties (Pulmonary/Critical Care, Nephrology, Hematology-Oncology, and Cardiology) were consulted to assist in the medical care of MA. (Tab X-7)

The primary team contacted command and coworkers to obtain more information on MA's recent activity; they reported that MA exercised routinely and had no known medical problems. (Tab X-7) MA's wife, who lived in a different state, was contacted and informed of his guarded status. (Tab X-7) When asked about MA's recent habits, she was unaware of any workout supplements, recent weight loss, or diuretic use. (Tab X-7)

At approximately 2300 hours, the primary internal medicine team, the 81st Aerospace Medicine Squadron Commander and First Sergeant met with MA's wife (who had just arrived), informing her that he was in critical condition. (Tab X-7)

At 2330 hours, MA was hypotensive with mean arterial pressure of 56-59 mmHg (MAP – another method of measuring blood pressure). (Tab X-8) A MAP of at least 60 mmHg is required to provide enough blood to the heart, kidneys, and brain; normal MAP range is between 70 and 100 mmHg. (Tab X-8) At 0110 hours on 21 August 2018, the on-call physician was notified that MA's pulse was intermittently palpable in the left foot and stronger in the right foot. (Tabs V-1.3 and X-8)

Throughout the night, MA's blood pressure continued to decline despite giving intravenous fluid and additional medications. (Tab X-8) Labs showed worsening heart stress, worsening rhabdomyolysis, worsening DIC, and worsening blood flow to tissues. (Tab X-8) MA continued to have worsening swelling of his body and his urine output remained minimal. (Tab X) The medical team noted increasing concern for extremity compartment and abdominal compartment syndrome (increasing abdominal pressure, which further restricts blood flow to organs). (Tab X-8)

At 0423 hours, heart monitor telemetry showed no heart activity (asystole) and MA underwent CPR, and received medications to stimulate his heart and correct abnormal electrolyte levels. (Tab X-8) After 12 minutes of CPR, MA's pulse was again detectable, with a MAP greater than 65 mmHg. (Tab X-8) EKG showed a normal heart rhythm. (Tab X-8) At this time, MA was given blood products to counteract the effects of DIC. (Tab X-8)

On the morning of 21 August 2018, the medical team consulted Vascular Surgery and General Surgery Departments due to concern for extremity and abdominal compartment syndromes. (Tab X-8) The vascular surgeon noted MA's extremities were showing signs consistent with compartment syndrome, but determined that MA would not benefit from a fasciotomy (surgical method requiring incision in the muscle tissues to relieve pressure). (Tabs V-4.2 to V-4.4, X-8 and X-9) General Surgery noted MA was very unstable, his abdomen was rigid, and all extremities exhibited rigor. (Tab X-9) They planned for possible emergent surgery at the bedside to determine if MA's condition was recoverable by examining the viability of the abdominal organs. (Tab X-9)

At 0712 hours, while the medical team was evaluating MA, his heart rhythm went into asystole, and CPR was initiated. (Tab X-9) MA was again given medications to stimulate his heart and correct the electrolyte abnormalities. (Tab X-9) After 18 minutes of CPR, MA's pulse was detectable, MAP was 59 mmHg, and oxygen saturation was 94% while on mechanical ventilation. (Tab X-9) His heart rhythm returned to normal. (Tab X-9) MA was given more blood products for DIC. (Tab X-9)

At 0740 hours, MA became pulseless and CPR was initiated. (Tab X-9) Despite 62 minutes of resuscitative effort, his pulse did not return, and the heart rhythm was absent. (Tab X-9) Time of death was called by the ICU attending physician at 0842 hours. (Tab X-9) An autopsy was recommended according to Department of Defense and hospital policy, and was performed on 22 August 2018. (Tab X-9)

5. MISHAP PHYSIOLOGY

The witness statements, combined with MA's medical records and a review of medical literature, support the following physiological sequence of events. (Tab X-12) These complex cycles, previously discussed in the sequence of events, are best illustrated through the diagram below:

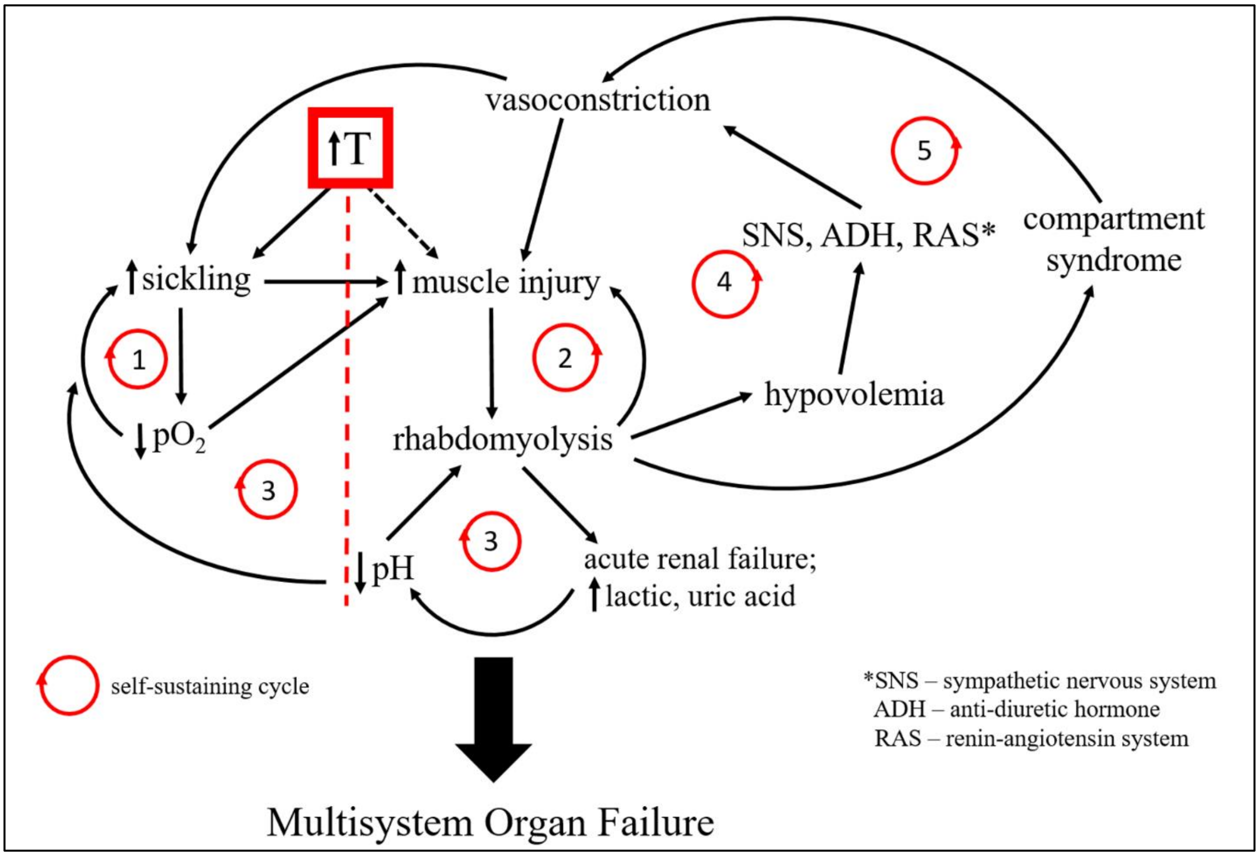

Figure 5 – Physiologic Cycles (Tab Z-3)

1 ↑T MA overexerted himself throughout the run and began to severely overheat. (Tab X-12) As his core temperature rose, blood cells began to sickle and decrease the amount of oxygen available in his blood. (Tab X-12) The decrease in oxygen content led to progression of sickling, and created a self-sustaining cycle. (Tab X-12)

2 His increasing temperature also had a direct, damaging effect on muscle cells (although at first this was probably less than the effect of sickling). (Tab X-12) Muscle cells began to rupture, spilling their contents, causing more muscle cells to rupture, creating another self-sustaining cycle. (Tab X-12) Cell contents including electrolytes such as potassium and phosphate, needed for normal cell function, can have a damaging effect, particularly on the heart muscle, when released into the blood stream in large amounts. (Tab X-12)

3 The combination of these two processes lowered the oxygen content in MA's blood, worsening his sickling, and increasing muscle damage. (Tab X-12) Muscle proteins poured into MA's circulation, causing damage to his kidneys, leading to a failure of the kidneys. (Tab X-12) One of the immediate effects of kidney failure is the increase in the acidity of the blood (lowering of pH). (Tab X-12) This, in combination with the release of uric and lactic acid from damaged muscle, rapidly lowered blood PH. (Tab X-12) The increased acidity further damaged muscle tissue, dumping more kidney-damaging proteins that resulted in yet another self-sustaining cycle. (Tab X-12)

The evidence shows that the lowering of oxygen, increased acidity, and combination of toxins from damaged cells occurred within the first 20 minutes and caused the first cardiac arrest. (Tab X-4, X-5 and X-12)

4 Severe muscle damage led to lower blood volume as fluids were drawn out of the blood vessels into the damaged surrounding tissues. (Tab X-12). This lower volume triggered multiple, independent hormonal responses that resulted in constriction of small blood vessels. (Tab X-12) This constriction further increased muscle damage, as well as sickling, and created a fourth self-sustaining cycle. (Tab X-12)

5 The fluid drawn from blood vessels into the damaged muscle tissue created swelling. (Tab X-12) Muscles are contained in rigid compartments composed of connective tissues that do not readily expand. (Tab X-12) As more fluid entered the space, it increased the pressure within the compartment, to the point that blood vessels were further constricted and tissue damage increased. (Tab X-12) This created a fifth self-sustaining cycle. (Tab X-12)

The combination of these cycles created a physiologic catastrophe that led to multisystem organ failure and death in just over 24 hours. (Tab X-13)

6. MAINTENANCE

Not applicable.

7. EQUIPMENT, VEHICLES, FACILITIES, AND SYSTEMS

FAC personnel used a QUESTemp 46 Thermal Environment Monitor to ensure the WBGT was within testing parameters prior to the fitness assessment (FA), as required. (Tabs S-2, V-2.5 and BB-30) It was calibrated and approved for official use. (Tabs S-2 and V-2.5) An AED and cell phone were also on-hand and functioning properly. (Tab V-2.3 and V-6.5)

Personnel from the Keesler AFB Fire Department were the first medical responders to the Triangle Track. (Tab CC-6). Security Forces also responded. (Tab V-15.8). The equipment used by the Fire-Rescue crew at the scene was a portable vital sign monitor, and a portable oxygen and non-rebreather mask. (Tab V-12.3 and V-14.3) This equipment was serviceable and functioned as designed. (Tabs V-12.3, V-12.5 and CC-48)

EMS personnel from the Keesler Medical Center arrived at the Triangle Track in an ambulance operated by 81st Medical Group. (Tabs V-15.2, V-15.3 and X-11) A stretcher was used to place MA in the ambulance, and MA was transported to the ED at Keesler Medical Center. (Tabs V-15.3 and X-11) MA was placed in a trauma room where the ED medical team used a vital sign monitor, oxygen from a central source, a ventilator, peripheral intravenous catheters, and a crash cart containing an AED, medications, and devices used in conjunction with CPR. (Tab X-11) The medical team also used a portable chest x-ray machine and Computed Tomography (CT) scanner before transporting MA to the ICU on the same hospital bed. (Tabs V-15.4 and X-11)

The medical team in the ICU used a vital sign monitor, oxygen from a central source, a ventilator, peripheral and central intravenous catheters, arterial catheters, and a crash cart containing an AED, medications, and devices used in conjunction with CPR. (Tab X-11) Additionally, they used dialysis, transthoracic echocardiogram, and Doppler equipment. (Tab X-11) Throughout this time, blood and other fluid samples were tested at the Keesler Medical Center Laboratory on various lab analyzers, maintained in accordance with The Joint Commission standards for accreditation, along with the other hospital equipment, facilities and systems. (Tabs X-11 and BB-59) There is no evidence to suggest emergency fire, medical, or hospital service equipment, vehicles, facilities, or systems were a factor in this fatality. (Tab X-11)

8. ENVIRONMENTAL CONDITIONS

a. Observed Weather

The observed weather at Keesler AFB at 0658 hours, on the morning of 20 Aug 18, was: few clouds at 1500 feet; scattered clouds at 3000 feet, broken clouds at 10,000 feet. Temperature 84˚F (29˚C), dew point 77˚F (25˚C), humidity 79%, winds from the southwest at 8 knots. (Tab F-3) Wet Bulb Globe Temperature before the FA began was less than or equal to 86˚F, and at 0800 was 83.4˚F. (Tabs F-6 and V-2.5)

b. Other Environmental Conditions

Not applicable.

c. Restrictions, Warnings, and Procedures

There were no relevant restrictions (including weather restrictions), warnings, or procedures for 20 Aug 18. (Tabs F-3, V-2.5, BB-29 and BB-30) According to the Air Force fitness program instruction (AFI 36-2905), an outdoor track may be used for a fitness assessment if the wind speed is less than or equal to 15 mph sustained or less than or equal to 20 mph gusting, the air temperature is greater than or equal to 20˚F, and the Wet Bulb Globe Temperature is less than or equal to 86˚F at the start of the walk or run. (Tab BB-30)

9. PERSONNEL QUALIFICATIONS

All people involved in this mishap were experienced, appropriately credentialed, and maintained proficiency in their area of practice, in accordance with applicable Air Force Instructions and accreditations standards. (Tabs BB-59, X-10 and X-11). There is no evidence to suggest that the training, performance, experience level or qualifications of any personnel involved contributed to this fatality. (Tabs V-1.2, V-2.6, V-3.6, V-4.3, V-5.5, V-6.7, V-10.5, V-12.4, V-13.4, V-14.3, V-16.7 and X-11).

10. MEDICAL

MA attended Officer Training School in January 2018. (Tab X-2). While there, medical staff collected a blood sample from MA and tested for SCT, among other standard screenings. (Tab X-2). From this test, MA was diagnosed as SCT-positive. (Tab X-2). On 9 Jan 18, MA was provided information about the condition, specifically that he was at risk for complications related to heat stress. (Tab X-3). He was further informed that the risk associated with SCT could be minimized by maintaining good hydration, and seeking medical care if he experienced symptoms of sickling. (Tabs X-3, BB-61 and B-62). MA was offered an individual medical appointment to discuss SCT and he declined. (Tab X-3). MA graduated from OTS and proceeded with his military career without apparent medical complications until 20 Aug 18. (Tab X-4).

On 28 Feb 18, MA’s first annual Mental Health Assessment/Periodic Health Assessment (MHA/PHA) was conducted at Keesler AFB. (Tab X-3). MA had no concerns and described his health as excellent. (Tab X-3). He stated he often did strengthening exercises but did not do vigorous, light, or moderate aerobic activity. (Tab X-3).

There are no further medical records until 20 August 2018. (Tab X-4).

a. Injuries and Pathology

The autopsy was performed by a medical examiner from the Armed Forces Medical Examiner Office, Defense Health Agency, Dover AFB, Delaware, in accordance with 10 USC §1471. (Tab X-9). The autopsy was performed at Keesler Medical Center, Keesler AFB, MS, at 1300 hours, 22 Aug 18. (Tab X-9).

Positive identification was obtained using fingerprint, dental and DNA comparisons. (Tab X-9) There was no evidence of external injuries except for a superficial abrasion in the mid-chest, which was consistent with CPR. (Tab X-9). Post-mortem CT scan of the head, neck, chest, abdomen, pelvis, and extremities were obtained and did not show evidence of traumatic injury. (Tab X-9) Visual and microscopic examination of the body and tissues was performed. (Tab X-9) Internal organs of the torso and abdomen showed evidence consistent with DIC. (Tab X-9) There was evidence of red blood cell sickling and blood congestion in the lungs, liver, kidneys, and spleen. (Tab X-9) Sections of the coronary arteries showed significant narrowing in the main left and right coronary arteries but no ulceration or clotting. (Tab X-9) There was no evidence of heart muscle damage. (Tab X-9) Toxicology was unremarkable. (Tab X-10) Post-mortem genetic testing of muscle samples confirmed the SCT mutation but ruled out other known genetic mutations associated with sudden death. (Tab X-10)

The medical examiner determined exertional hyperthermia was the probable cause of death. (Tab X-10) Rhabdomyolysis and acute liver failure were secondary to the heat insult. (Tab X-10) Other diagnoses that contributed to the cause of death were SCT and atherosclerotic cardiovascular disease (narrowing of the arteries of the heart). (Tab X-10) The manner of death was accidental. (Tab X-10)

b. Lifestyle and Behavior

There is nothing in the evidence to suggest MA committed unsafe acts, errors, or violations of rules or instructions. (Tab V-7.5) However, from a medical perspective, because of his drive to excel in his first FA, MA may have misjudged his physical capacity and over-exerted himself during the first lap beyond what he had typically performed in the past. (Tab V-7.4 and V-11.3)

There is no evidence that MA abused drugs or alcohol. (Tab X-6) There is no evidence that MA took any supplements (legal or illegal) that contributed to MA's health decline. (Tab X-10) MA engaged in physical activities in preparation for his first FA. (Tab V-11.2 and V-11.3)

There is no evidence to suggest that MA's mental health was a factor in this fatality. (Tab X-3 and X-4) MA was a well-educated Airman who was eager to excel in his new career in the Air Force. (Tab V-11.8) He appeared to be well prepared to perform his job as a bioenvironmental engineer in the Air Force. (Tab V-7.2) By all accounts, he was otherwise healthy and based on Air Force standards, he had been deemed qualified to perform his job in the Air Force. (Tab X-2 and X-3) He did not have any apparent physical limitations to perform in the FA. (Tab G-8 to G-10)

A medical factor that contributed to the rhabdomyolysis is the sickle cell trait which was known to MA and for which he had been appropriately counseled on the risk of adverse outcomes associated with SCT. (Tabs X-3, X-12, BB-61 and BB-62) The autopsy finding of coronary artery disease was incidental and would not have been discovered prior to the autopsy. (Tab X-10) This heart disease did not directly contribute to the multisystem organ failure. (Tab X-10). This condition was unknown to MA and would not have been discovered based on standard medical practice. (Tabs G-9 and X-10) MA did not report nor exhibit any symptoms consistent with coronary artery disease and was unaware of having family members who have heart disease or died from heart attacks, which would have precipitated further work-up looking for heart disease. (Tab X-10)

MA had only joined the Air Force about eight months prior to his death, but he was highly respected and described by coworkers as: "very, very humble," "goal-driven," "no doubt in my mind that he was going to be one of the most phenomenal officers." (Tab V-11.8) "Really one of the best people I've ever met. A really great guy. Very energetic, positive just all-around stand up person." (Tab V-8.2)

11. OPERATIONS AND SUPERVISION

a. Operations

The operations tempo within the member's unit was typical for their unit. (Tab V-9.5 and V-11.5) MA was one of two officers in the unit supervising seven enlisted members. (Tab V-11.6) While the bioenvironmental flight is typically busy due to their hospital and base-wide responsibilities, the ops tempo at that time was manageable and MA invested time to train for the FA. (Tabs R-8, R-16, V-8.2 to V-8.5, and V-11.5) Whether he did the appropriate training for the level of performance he wanted to achieve is unclear. (Tab R-16, V-11.2 to V-11.5 and V-11.7)

The ops tempo experienced by individuals who administered the FA and healthcare providers who cared for MA was typical. (Tab V-2.7, V-5.9 and V-9.5) The evidence shows the individuals who rendered aid to MA, to include the FAC members, the EMS, Fire and Rescue, SFS, and the medical team, performed their duties with utmost professionalism. (Tab X-10 and X-11)

b. Supervision

There is no evidence to suggest that organizational influences (resource management, organizational climate, and organizational process) may have contributed to the fatality. (Tab V-7.2 and V-11.5) There was adequate and supportive supervision within the member's unit. (Tab V-7.2 and V-11.7) Unit members felt they had adequate time to engage in PT activities. (Tab V-7.3 and V-11.5) The organization climate was suitable for the growth of a newly accessioned bioenvironmental engineering officer. (Tab V-7.2)

With respect to the personnel who participated in helping MA, the PTLs had appropriate supervision and were led by a very qualified FAC manager. (Tab V-2.6) There was appropriate supervision within the Fire Rescue and EMS teams. (Tab V-10.5 and V-12.4) There was appropriate supervision within the medical teams who cared for MA—from the ED staff to the Internal Medicine and ICU staff. (Tab V-1.4, V-4.3 and V-10.5)

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publically Available Directives and Publications Relevant to the Mishap

(1) AFI 36-2905, *Fitness Program*, 27 August 2015
(2) AFI 48-123, *Medical Examinations and Standards*, 5 November 2013
(3) AFI 48-151, *Thermal Injury Prevention Program*, 7 April 2016
(3) AFI 51-307, *Aerospace and Ground Accident Investigations*, 18 March 2019
(4) AFI 51-503, *Aerospace and Ground Accident Investigations*, 14 April 2015

NOTICE: All directives and publications listed above are available digitally on the Air Force Departmental Publishing Office website at: http://www.e-publishing.af.mil.

b. Other Directives and Publications Relevant to the Mishap

Not applicable.

1 AUGUST 2019

DAVID J. DUVAL, Colonel, USAF
President, Ground Accident Investigation Board

INDEX OF TABS

Safety Investigator Information .... A

Not Used .... B

Not Used C

Not Used .... D

Not Used .... E

Weather and Environmental Records And Data .... F

Personnel Records .... G

Not Used .... H

Not Used I

Not Used .... J

Not Used .... K

Not Used L

Not Used .... M

Not Used .... N

Any Additional Substantiating Data and Reports .... O

Not Used .... P

GAIB Transfer Documents .... Q

Releasable Witness Testimony .... R

Releasable Photographs, Videos, and Diagrams .... S

Personnel Records Not Included In Tab G .... T

Not Used .... U

Witness Testimony and Statements V

Not Used ....W

Statements of Injury and Death.. X

Legal Board Appointment Documents .... Y

Photographs, Videos, Diagrams, and Animations Not Included In Tab S ....Z

Not Used ....AA

Applicable Regulations, Directives, and Other Government Documents .... BB

Additional Data and Reports... CC

Safety Investigation Board Attachment To Tab O ....DD