

**UNITED STATES AIR FORCE**  
**GROUND ACCIDENT INVESTIGATION**  
**BOARD REPORT**



**20th COMPONENT MAINTENANCE SQUADRON**  
**20th FIGHTER WING**  
**SHAW AIR FORCE BASE, SOUTH CAROLINA**

**TYPE OF ACCIDENT: Fitness Assessment Fatality**

**LOCATION: Shaw Air Force Base, South Carolina**

**DATE OF ACCIDENT: 24 May 2019**

**BOARD PRESIDENT: Brig Gen John M. Breazeale, USAF**

**Conducted in accordance with Air Force Instruction 51-307**



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR COMBAT COMMAND  
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15 OCT 2019

**ACTION OF THE CONVENING AUTHORITY**

**The report of the ground accident investigation board, conducted under the provisions of AFI 51-307, that investigated the 24 May 2019 mishap at Shaw Air Force Base, SC, involving the fatality of an Airman assigned to the 20th Component Maintenance Squadron following a fitness assessment, complies with applicable regulatory and statutory guidance and on that basis is approved.**

- **JAMES M. HOLMES**  
**General, USAF**  
**Commander**

**EXECUTIVE SUMMARY  
UNITED STATES AIR FORCE  
GROUND ACCIDENT INVESTIGATION**

**FITNESS ASSESSMENT FATALITY  
SHAW AIR FORCE BASE, SOUTH CAROLINA  
24 MAY 2019**

On 24 May 2019, at approximately 0734 hours local (L), at Shaw Air Force Base (AFB), South Carolina (SC), a 32-year-old Senior Airman, hereinafter referred to as the Mishap Airman (MA), lost consciousness approximately three minutes after crossing the finish line for the 1.5 mile timed-run component of her Air Force fitness assessment. After being treated by the Physical Training Leaders (PTLs), Security Forces (SF) personnel, and Emergency Medical Services (EMS) personnel, she was transported to a local hospital where she later passed away at 0307L on 26 May 2019. The MA was assigned to the 20th Component Maintenance Squadron, 20th Fighter Wing, Shaw AFB, SC.

On the day of the mishap, the MA passed the waist measurement, push-up, sit-up, and 1.5 mile timed-run components of her assessment prior to losing consciousness. When the MA lost consciousness at approximately 0734L, the PTLs sought assistance from Shaw Fitness Annex personnel and initiated calls for emergency response. The PTLs provided initial cardiopulmonary resuscitation until two Shaw AFB SF personnel arrived at 0738L and began caring for the MA. The Shaw AFB EMS ambulance arrived on scene with two Emergency Medical Technicians at 0741L and took control of the medical treatment. The ambulance departed for Prisma Health Tuomey Hospital (PHTH) Emergency Room at 0748L and arrived at 0805L.

The MA was admitted to PHTH with an initial diagnosis of cardiac arrest and severe metabolic acidosis. At 1056L, the MA was transferred to the Intensive Care Unit (ICU) for further evaluation and treatment. While in the ICU, the MA was diagnosed with rhabdomyolysis. She also developed other medical problems associated with rhabdomyolysis, including metabolic acidosis, electrolyte abnormalities, kidney failure, liver failure, and Disseminated Intravascular Coagulopathy. She had two more cardiac arrests in the ICU, with the final cardiac arrest occurring at 0300L on 26 May 2019. The MA passed away at 0307L on 26 May 2019, with her family present.

PHTH listed the diagnosis at the time of death as multi-organ failure due to exercise induced rhabdomyolysis from excessive dehydration. The autopsy report determined the manner of death to be of natural causes.

**Fitness Assessment Fatality  
24 May 2019**

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## ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command	G6PD	Glucose-6-PhosphateDehydrogenase
ACLS	Advanced Cardiac Life Support		Deficiency
AED	Automated External Defibrillator	HgbS	Hemoglobin S
AF	Air Force	ICU	Intensive Care Unit
ALS	Airman Leadership School	IAW	In Accordance With
AFB	Air Force Base	L	Local
AFI	Air Force Instruction	l	Liters
ATLS	Advanced Trauma Life Support	Lt Col	Lieutenant Colonel
BLS	Basic Life Support	LV	Left Ventricle
BMT	Basic Military Training	MA	Mishap Airman
BVM	Bag Valve Mask	MDG	Medical Group
CATM	Combat Arms Training and Maintenance	MFR	Memorandum for Record
CBT	Computer Based Training	Mmol/l	Millimoles Per Litre
CK	Creatine Kinase	MPH	Miles Per Hour
CMS	Component Maintenance Squadron	NCO	Non-commissioned officer
CPR	Cardiopulmonary Resuscitation	NS	Normal Saline
DIC	Disseminated Intravascular Coagulopathy	PEA	Pulseless Electrical Activity
DoDI	Department of Defense Instruction	pH	Potential Hydrogen
EPR	Enlisted Performance Report	PHTH	Prisma Heath Toumey Hospital
ER	Emergency Responder	PT	Physical Training
EMS	Emergency Medical Services	PTL	Physical Training Leader
EMT	Emergency Medical Technician	R&R	Rest and Recuperation
EWS	Electronic Warfare Systems	RIP	Record of Individual Performance
F	Fahrenheit	SC	South Carolina
FA	Fitness Assessment	SCT	Sickle Cell Trait
FSQ	Fitness Screening Questionnaire	SecAF	Secretary of the Air Force
FW	Fighter Wing	SF	Security Forces
GAIB	Ground Accident Investigation Board	SIB	Safety Investigation Board
		SrA	Senior Airman
		UFPM	Unit Fitness Program Manager
		USAF	United States Air Force
		WBGT	Wet Bulb Globe Temperature

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

# SUMMARY OF FACTS

## 1. AUTHORITY AND PURPOSE

### a. Authority

On 11 June 2019, General James M. Holmes, Commander, Air Combat Command (ACC), appointed Brigadier General John Breazeale as Board President of a Ground Accident Investigation Board (GAIB) to investigate the death of the Mishap Airman (MA) who died following an Air Force physical fitness assessment (FA) at Shaw Air Force Base (AFB), South Carolina (SC) (Tabs Y-3 to Y-6 and DD-15). The GAIB investigated the mishap from 25 June 2019 through 12 July 2019, and the investigation was conducted in accordance with (IAW) Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigations*, dated 18 March 2019 (Tabs Y-3 to Y-7 and BB-4). Additional members of the GAIB included a Colonel Legal Advisor, a Lieutenant Colonel Medical Member, and a Technical Sergeant (TSgt) Recorder (Tab Y-5). A meteorologist (TSgt) and a bioenvironmental engineer (TSgt) were appointed as subject matter experts (Tab Y-7 and Y-10).

### b. Purpose

IAW AFI 51-307, this GAIB conducted a legal investigation to inquire into all the facts and circumstances surrounding an Air Force ground accident, to prepare a publicly releasable report, and to obtain and preserve all available evidence for use in litigation, claims, disciplinary action, and adverse administrative action (Tabs Y-3 to Y-6 and BB-4).

## 2. ACCIDENT SUMMARY

On 24 May 2019, at approximately 0731 hours local (L), the MA, a 32-year-old Senior Airman assigned to the 20th Component Maintenance Squadron, 20th Fighter Wing, Shaw AFB, SC, completed the 1.5 mile timed-run component of her FA (Tabs T-4, V-5.3, CC-9, CC-12 to CC-13, and DD-3). Following completion of the run, the MA was not feeling well and sat down at the edge of the track with a Physical Training Leader's (PTL) assistance (Tabs V-6.8, V-7.3, V-8.11 and V- 11.2). The MA lost consciousness at approximately 0734L (Tab V-5.3 and V-6.9). The PTLs sought assistance from Shaw Fitness Annex personnel and initiated calls for emergency response (Tab V-6.9). The PTLs provided initial cardiopulmonary resuscitation (CPR) until two Shaw AFB Security Forces (SF) personnel arrived at 0738L and began caring for the MA (Tab V-5.2, V-9.4, and V-10.4). An Emergency Medical Services (EMS) ambulance with Emergency Medical Technicians (EMTs) arrived on scene at 0741L (Tab DD-5 to DD-6). The EMTs continued treating the MA and departed the scene at 0748L for the nearest emergency medical facility, Prisma Health Tuomey Hospital (PHTH) Emergency Room, in Sumter, SC (Tab DD-5 to DD-9).

Upon arrival at PHTH at 0805L, the MA's initial diagnosis was cardiac arrest and severe metabolic acidosis (Tabs X-4 and DD-7). At 1056L, she was transferred to the Intensive Care Unit (ICU) for further evaluation and treatment (Tab X-5). While in the ICU, she was

diagnosed with rhabdomyolysis (Tab X-5). She also developed additional medical problems associated with the rhabdomyolysis, including metabolic acidosis, kidney failure, and Disseminated Intravascular Coagulopathy (DIC) (Tab X-5). The MA had two additional cardiac arrests in the ICU, with the final cardiac arrest occurring at 0300L on 26 May 2019 (Tab X-5). The MA passed away at 0307L on 26 May 2019, with her family present (Tab X-5).

### **3. BACKGROUND**

#### **a. Air Combat Command (ACC)**

Headquartered at Joint Base Langley-Eustis, Virginia, ACC is one of ten major commands in the United States Air Force (Tab CC-3). ACC is the primary provider of air combat forces to America's warfighting commanders and is the direct successor to Tactical Air Command. (Tab CC-3). To support global implementation of national security strategy, ACC operates fighter, reconnaissance, battle-management and electronic-combat aircraft (Tab CC-3). It also provides command, control, communications and intelligence systems, and conducts global information operations (Tab CC-3). As the Combat Air Forces lead agent, ACC develops strategy, doctrine, concepts, tactics, and procedures for air-, space-, and cyber-power employment (Tab CC-3). The command provides conventional and information warfare forces to all combatant commands to ensure air, space, cyber, and information superiority for warfighters and national decision makers (Tab CC-3). The command can also be called upon to assist national agencies with intelligence, surveillance and crisis response capabilities (Tab CC-3).



#### **b. Ninth Air Force (9 AF)**

9 AF is a numbered air force (NAF) that falls under ACC (Tab CC-4 and CC-6). The NAF organizes, trains and equips its headquarters to be a deployable, operational-level Joint Task Force and its subordinate commands to prepare for and execute expeditionary taskings (Tab CC-6). Additionally, the NAF commands eight wings and three direct reporting units in the Southeastern United States, ensuring the operational readiness of more than 400 aircraft and 26,000 active duty and civilian members (Tab CC-6).



#### **c. 20th Fighter Wing (20 FW)**

20 FW is a fighter wing that falls under 9 AF (Tab CC-6). The wing of approximately 80 F-16 Viper fighter aircraft and equipment provides combat ready airpower and Airmen to meet any challenge, anytime, anywhere (Tab CC-9 and CC-12). The wing is capable of meeting all operational requirements worldwide, maintains a state of combat readiness and operates as the host unit at Shaw AFB by providing facilities, personnel and material (Tab CC-9).



#### **d. 20th Component Maintenance Squadron (20 CMS)**

20 CMS is a squadron that falls under 20 FW (Tab CC-12). The squadron maintains jet engines; accessory and avionics components and systems; and a test, measurement, and diagnostic equipment laboratory in support of three fighter squadrons (Tab CC-13).

**e. Prisma Health Tuomey Hospital (PHTH), Sumter, SC**

PHTH advertises itself as a civilian, “301-bed, Joint Commission-accredited medical center with an active medical staff of more than 150 physicians representing more than 25 medical specialties” (Tab CC-14). They list facilities including “a 36-bed nursery, an expanded ICU, 10 operating suites, an outpatient surgery center, an award-winning day surgery unit, a women & infants pavilion and a satellite medical park” (Tab CC-14).

**f. Air Force Physical Fitness Program**

Air Force members are required to remain physically fit (Tab BB-6). The Air Force assesses physical fitness using an age and gender specific FA (Tab BB-8). The Air Force FA is comprised of 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-7). Each component is scored based upon the Airman’s performance for that component (e.g., faster run time/more push-ups receives higher score) (Tab BB-8). Each component also has minimum, target (score necessary in each component to achieve an overall passing FA score), and maximum scores (Tab BB-8). To pass the FA, Airmen must achieve a total of 75 points in addition to scoring at least the minimum required score for each component (Tab BB-8).

**g. Acute Rhabdomyolysis**

Rhabdomyolysis is defined as muscle tissue necrosis/death with resulting release of toxins into the bloodstream causing further organ damage (Tab X-3). There are many causes of rhabdomyolysis, but they all follow a common pathway once the muscle tissue dies (necrosis) (Tab X-3). There is a cascading series of events that if not treated and reversed will lead to death (Tab X-3). The kidney failure is a result of the rhabdomyolysis as the toxins and dead muscle tissue (myoglobin) enters the kidney to be cleared from the body (Tab X-3). As more muscle tissue dies, the kidney is overwhelmed and fails (Tab X-3). This leads to concurrent and sequential failure of the other organ system, and eventually DIC and death (Tab X-3).

**h. Sickle Cell Trait (SCT)**

Sickle cell trait (SCT) is usually a benign carrier condition, generally with none of the symptoms of sickle cell anemia or other sickle cell diseases (Tab X-3). However, knowledge of SCT is important in many settings such as preconception counseling and evaluation of rare complications (Tab X-3).

**4. SEQUENCE OF EVENTS**

The MA reported to the Shaw Fitness Annex prior to 0630L on 24 May 2019 (Tab V-7.2). At 0630L, one of her squadron PTLs, PTL2, arrived at the Fitness Annex to meet the MA prior to the FA scheduled for 0700L (Tab V-7.2). PTL1, the PTL who administered the test, arrived at approximately 0700L (Tab V-6.4). At that time there were no warning flag weather conditions at the Shaw Fitness Annex track (Figure 1) (Tab W-7).





- A - Shaw AFB Fitness Center Annex
- B - 1.5 Mile Start/Finish Line
- C - Grassy Area
- D - Parking Lot

**Figure 1. Satellite View of 1.5 Mile Shaw AFB Annex Fitness Assessment Route (Tab Z-3)**

After reviewing the MA’s Fitness Screening Questionnaire (FSQ) and determining that the MA was ready to take her FA, PTL1 coordinated for a female Airman from the Shaw Fitness Annex to accomplish the height, weight, and abdominal circumference measurements for the assessment (Tab V-6.4 and V-7.2). The MA then completed the push-up and sit-up portions of the FA (Tabs T-4, V-6.4, and V-7.2). Upon completion of these events, the MA took a restroom break and drank water prior to proceeding across the street from the Fitness Annex to the 1.5 mile “out and back” track (Tab V-6.4 to V-6.5, V-6.6, V-7.2, and V-8.8). The MA relayed that she was nervous at the beginning of her FA and again prior to the run component (Tab V-7.2, V-8.7 and V-8.8).

The MA began her timed run with her pacing companion, PTL2, at approximately 0716L (Tabs T-4, V-5.3 and V-7.2). The MA planned to complete the timed-run component as she had practiced previously with PTL2 in an “interval” fashion by running the first quarter mile fast, slowing for the next mile, and finishing with a sprint for the last quarter mile (Tab V-8.4 to V-8.6). The MA and PTL2 crossed the 0.25 mile marker one minute thirty seconds into the timed-run (Tab V-7.2). At this point, the MA told PTL2 to slow down (Tab V-7.2 and V-8.9). The MA and PTL2 reached the 0.75 mile turnaround five minutes fifty-one seconds after starting the run (Tab V-5.2 and V-7.2). The MA and PTL2 kept the pace through the turnaround (Tab V-7.2). Approaching the 1.25 mile point, the MA asked PTL2 to slow down instead of sprinting as planned (Tab V-7.2, V-8.4 to V-8.5, and V-8.9). Approximately 200 yards from the finish, the MA slowed to a walk and began to weave back and forth across the width of the track as she continued toward the finish line (Tab V-5.2, V-7.2 to V-7.3). PTL2 reached for MA’s hand and asked if she wanted help and to terminate the test (Tab V-7.3 and V-8.10). She pulled away and said “I don’t want to terminate” despite her inability to walk straight (Tab V-7.3 and V-8.10). The MA continued, finishing the timed-run component at 0731L (Tabs T-4 and V-5.3).



**Figure 2. Photo of 1.5 Mile Start/Finish Line (Tab Z-6)**

The MA was feeling poorly at the completion of the run and was assisted by PTL1 and PTL2 to sit on the ground near the finish line (Figure 2) on the south side of the track (Tab V-5.2, V-6.8, V-6.10, and V-7.3). Approximately three minutes later at 0734L, the MA lost consciousness (Tab V-5.2 to V-5.3 and V-6.5). PTL1 directed PTL2 to seek assistance from Shaw Fitness Annex personnel and he began to place the MA into the shock recovery position, with her knees up and flat on the ground, so he could begin to perform CPR (Tab V-5.2, V-6.9, and V-7.3). After PTL2 returned, the PTLs began CPR when they determined the MA was not breathing and they could not find a pulse (Tab V-5.2 and V-7.3).

Shaw AFB SF and EMS personnel were dispatched at 0734L (Tab DD-6). A SF detail arrived first on scene at 0738L (Tab V-9.4 and V-10.4). Upon arrival one of the SF responders, SF2 determined that the MA had a weak pulse and PTL1 discontinued CPR (Tab V-5.2, V-7.3, V-9.4, and V-10.4). SF2 repositioned the MA to ensure a clear airway and resumed CPR shortly thereafter (Tab V-5.2, V-7.3, V-9.4, and V-10.4). The EMS ambulance arrived at 0741L with two EMTs, EMT1 and EMT2 (Tab DD-6). After assessing the condition of the MA, the EMTs loaded the MA on a stretcher with the assistance of Fire Department emergency responders (ER), ER7 and ER8 (Tabs V-5.2, V-12.7 and DD-8). The EMTs resumed CPR as the MA was loaded on the ambulance (Tabs V-5.2, V-12.7 and DD-8). The ambulance departed for the PHTH Emergency Room at 0748L, with ER7 driving and ER8 assisting EMT1 and EMT2 with the MA (Tab V-11.3). The EMS team continued CPR and life-saving efforts enroute to the emergency room, arriving at 0805L (Tabs V-11.3 and DD-6 to DD-9).

Upon arrival at PHTH emergency room, the MA was admitted with an initial diagnosis of cardiac arrest and severe metabolic acidosis (Tab X-4). At 1010L, an echocardiogram was accomplished to rule out heart abnormalities or injuries as the cause of her cardiac arrest and collapse (Tab X-4).

At 1056L, the MA was transferred to the ICU for further evaluation and treatment (Tab X-5). In the ICU, multiple labs were done and medical specialists were consulted to evaluate and treat her condition (Tab X-5). At an unspecified time, the MA's diagnosis was updated to include rhabdomyolysis (Tab X-5). Emergency hemodialysis was started as she developed kidney failure from the exercise-induced rhabdomyolysis (Tab X-5). Furthermore, she developed other medical problems associated with the rhabdomyolysis including metabolic acidosis, electrolyte abnormalities, liver failure, and DIC (Tab X-5). The MA had two more cardiac arrests in the ICU (Tab X-5). The final cardiac arrest occurred at 0300L on 26 May 2019, from which she did not recover (Tab X-5). At 0307L on 26 May 2019, the MA was pronounced dead at PHTH, with her family present (Tab X-5).

The diagnosis at the time of death was listed by PHTH as multi-organ failure due to exercise induced rhabdomyolysis from excessive dehydration (Tab X-6). The autopsy report determined the manner of death to be of natural causes (Tab X-5).

## **5. MAINTENANCE**

Not applicable.

## **6. EQUIPMENT, VEHICLES, FACILITIES, AND SYSTEMS**

The 1.5 mile FA timed-run component was conducted outdoors along a running trail (Figure 1) located north of the Shaw AFB Fitness Annex on an approved course identified as the "Annex Fitness Assessment Route" (Tabs V-6.6, V-12.4, Z-3 to Z-6 and BB-33).

The course was validated IAW AFI 36-2905, Attachment 6 (Tab BB-33). Post-mishap, a Shaw AFB ambulance was used to transport the MA to PHTH (Tab DD-6 to DD-9). There is no evidence that equipment, vehicles, facilities, or systems were a factor in this mishap (Tab DD-3 to DD-12).

## **7. ENVIRONMENTAL CONDITIONS**

### **a. Forecast Weather**

The weather forecast for 24 May 2019 called for clear skies, ten knot winds, and a Heat Index of 75 degrees (°) Fahrenheit (F) by 0800L (Tab W-3).

### **b. Observed Weather**

At 0700L, approximately 15 minutes before the MA began her timed run, the observed weather on 24 May 2019 was 72° F, clear skies, winds southwest at 9 miles per hour (MPH), 64° F dew

point, and 78% humidity based on temperature and dew point (Tab W-3 and W-5). By 0800L, approximately 45 minutes after the MA began her run, the observed weather was clear skies, winds southwest at 12 MPH, temperature 73° F, dew point 64° F, with humidity 74% (Tab W-3 and W-5). The first Wet Bulb Globe Temperature (WBGT) measurement was taken after the mishap, at 0800L, at which time the WBGT was 80° F, with no flag weather warning conditions (Tab W-7).

**c. Other Environmental Conditions**

None relevant to this mishap.

**d. Restrictions, Warnings, and Procedures**

IAW AFI 36-2905, paragraphs A6.2.13 and A6.2.15, the WBGT must be less than or equal to 86° F at the start of the run, and wind speed cannot exceed 15 MPH sustained or 20 MPH gusting (Tab BB-12). However, at the start of the MA's run, a WBGT was not available (Tab W-7). At Shaw AFB, the first WBGT reading is taken between 0745L and 0800L (Tab W-7).

## **8. PERSONNEL QUALIFICATIONS**

**a. Mishap Airman (MA)**

The MA was described as a high performing Airman in the 20th CMS, with a superior work ethic (Tab V-2.3, V-4.4, and V-6.2). The MA arrived at Shaw AFB, SC, in May 2016 and by the time of the mishap had been selected for promotion to Staff Sergeant (Tabs X-4 and T-10). Her frontline supervisor described her as very dedicated and although she was still a Senior Airman, was already taking on supervisory responsibilities (Tab V-4.3). In addition, several members of the 20 CMS commented that she was a mentor and role-model due to her work ethic and job knowledge (Tab V-2.3, V-4.4, and V-6.2). The MA recently completed a detail on the Shaw AFB Honor Guard, followed by Airman Leadership School (Tab V-4.3 and V-4.6). She also recently completed her bachelor's degree in accounting, with a goal to become a commissioned officer (Tabs T-9 and V-14.7). Off duty, she was described as kind and caring with an active family and social life (Tab V-2.6, V-6.4 and V-14.7).

The MA routinely set aside time for personal fitness during both squadron physical fitness time and personal time (Tab V-2.4 to V-2.5 and V-2.6). Prior to taking her official test, the MA was provided a one-hour, twice-a-week time period at the Fitness Center for individual training (Tab V-2.3, V-2.6 and V-4.5). Additionally, the MA conducted two practice runs at the Shaw Fitness Annex track with her pacer, PTL2, prior to her official FA (Tab V-8.4 and V-8.5). During both of her practice sessions, she completed the 1.5 mile timed run without incident (Tab V-8.4 and V-8.5). The Monday before her FA, the MA completed the timed run in less than 13 minutes (Tab V-8.5).

**b. Fitness Assessment (FA) Personnel**

The 20 CMS was authorized to oversee and administer the MA's FA conducted on 24 May

2019 (Tab BB-26 and BB-29 to BB-30). A review of the training records indicate that the PTL was appropriately trained (Tab AA-24 to AA-26). The MA's pacer was also a qualified PTL (Tab AA-27 to AA-29).

### **c. Emergency Responders**

Shaw AFB SF and EMTs provided the initial response (Tabs V-9.4, V-10.4, and DD-5). In addition to the two PTLs, SFs, EMTs, and Fire Department personnel responded to the scene (Tab DD-5). All six personnel who provided life saving measures to the MA were current in all appropriate training requirements (Tab AA-3 to AA-4, AA-17 to AA-29, and AA-32 to AA-33).

### **d. Treating Physicians**

According to the PHTH's Chief Operating Officer, all treating physicians are credentialed and privileged as required by the Joint Commission and Center for Medicare and Medicaid Services (Tab AA-34). Additionally, all employee work duties are supervised (Tab AA-34).

## **9. MEDICAL FACTORS**

### **a. Pre-Mishap Medical Conditions**

The MA was SCT positive and was aware of her condition (Tab T-3). During basic military training (BMT), the MA screened positive for SCT and was counseled at a face-to-face visit on the increased potential for severe complications, up to and including death, related to over exertion and dehydration (Tab T-3). She signed an acknowledgment of the SCT risk at BMT (Tab T-3).

The MA was stationed at Shaw Air Force Base in 2016 and tested in 2018 under similar conditions without incident (Tab X-4). The MA exercised every other day, was provided one-hour exercise sessions two times a week by her unit, and ran track in high school (Tab V-2.3, V-2.4, and V-4.5). On her 2015 and 2018 FAs, the MA scored "excellent" (Tab T-8).

Question 1.d. on the approved FSQ addresses "other medical problems" that would prevent the Airman from safely participating in the test if not "evaluated, optimally treated, or already addressed in an Air Force Form 469," which describes medical conditions such as injury or illness and medical restrictions during the injury or illness period (Tabs X-4 and BB-9). If the Airman answers "yes" to question 1.d. he/she is to be evaluated by a medical professional before taking the FA (Tabs X-4 and BB-9). When the MA completed her FSQ for the 24 May 2019 FA, a previous version of the FSQ was used that did not include the amplifying examples of "other medical problems" such as heart disease, asthma and SCT in question 1.d. (Tabs T-5, X-4 and BB-9). Although the FSQ was outdated, had the MA answered "yes" on the correct form, the 20th Medical Group would have reviewed the SCT briefing with the MA, and subsequently cleared her to test since she was asymptomatic (Tab X-4).

A review of the MA's pre-mishap medical records indicate no other underlying medical conditions related to this mishap (Tab X-4).

## **b. Injuries and Pathology**

Based on a review of all available documents, the MA suffered a respiratory and cardiac arrest following her FA run that resulted from overexertion and excessive dehydration (Tab X-4). The call to the EMTs was for respiratory distress/arrest and this same information was provided to the PHTH Emergency Room staff during the handoff of the patient (Tab X-4). Before her transport to the hospital, she had an episode of Pulseless Electrical Activity (PEA), indicated by an active waveform on the heart monitor but no corresponding palpable pulse or blood pressure (Tabs V-15.7 and X-4). Her PEA was successfully treated with Epinephrine (Tab X-4). Her PEA can be attributed to hypovolemia from her dehydration (Tab X-4).

An echocardiogram ruled out heart abnormalities or injury as the cause of MA's working diagnosis of cardiac arrest (Tab X-4). Her initial laboratory test showed a low pH of 6.8 and a high lactic acid level of 34.6, indicating a severe metabolic acidosis condition that was incompatible with survival (Tab X-5). The metabolic acidosis due to her lactic acidosis was the result of her dehydration and overexertion leading to a muscle tissue breakdown condition known as rhabdomyolysis (Tab X-5). The lab test also showed a rising Creatine Kinase level confirming rhabdomyolysis (Tab X-5). In the ICU, as the rhabdomyolysis progressed, the increasing amount of toxins and myoglobin overloaded the MA's kidneys leading to acute kidney failure (Tab X-5). The progressing rhabdomyolysis set off a cascading series of medical events resulting in her death, to include: electrolyte abnormalities; the above mentioned metabolic acidosis and kidney failure, resulting in multiple organ failure; and eventually DIC. (Tab X-5). The autopsy report showed a natural cause of death (Tab X-5).

## **c. Lifestyle**

The MA was in the process of preparing for a remote assignment to the Republic of Korea (Tab V-2.3, V-14.4, and V-14.6). The upcoming assignment was identified as a source of stress (Tab V-2.3 and V-14.4). The MA was also feeling stress about the waist measurement of the FA and had been using some type of wrap around her waist at night to help decrease her waist size (Tab V-14.4 and V-14.7). Additionally, she had been taking a "detox tea" regimen which can be used to cleanse the colon and decrease bloating; however, it is unclear why the MA was using the tea (Tab X-5). The toxicology of the detox tea identified it as benign and not contributing to the MA's death (Tab X-5). The MA's spouse indicated she wasn't feeling well the morning of the FA; however, she told the PTLs she was fit to test prior to the FA (Tabs V-6.4, V-7.2 and X-5).

Off duty, the MA had an active family and social life, but she still found time to train (Tab V-2.3 to V-2.6). She would jog around the neighborhood every other day and then daily two weeks prior to the FA (Tab V-2.3 to V-2.4). She was focused and knew what she needed to do for the FA (Tab V-5.2, V-6.4 and V-8.7). She recruited PTL2 to pace her for the timed-run since she knew she would not have problems with the push-up and sit-up components of the FA (Tab V-8.3, V-8.7 and V-14.6).

## 10. OPERATIONS AND SUPERVISION

### a. Operations

The 20 CMS conducted unit FAs, as authorized by the Secretary of the Air Force and Chief of Staff of the Air Force's memorandum, "Squadron Revitalization Implementation Plan," dated 1 June 2018 (Tab BB-21 to BB-28). The 20 CMS authorized its Airmen two one-hour periods each week for personal fitness on Tuesday/Thursday or Monday/Wednesday (Tab V-2.3 and V-2.5). In addition, the squadron required its Airmen who scored less than "excellent" to accomplish a mock fitness assessment prior to their official test (Tab BB-31). Unit members scheduled their FA using PTLs from the same section (Tab V-4.6).

### b. Supervision

A single PTL supervised the MA's fitness assessment since the MA was the only Airman taking an official FA at the time of the mishap (Tab V-6.3). In addition, the pacer was a certified PTL and provided continuous monitoring during the FA (Tabs V-5.2 and V-7.2, and AA-27 to AA-29).

## 11. GOVERNING DIRECTIVES AND PUBLICATIONS

### a. Publicly Available Directives and Publications Relevant to the Mishap

- (1) AFI 51-307, *Aerospace and Ground Accident Investigations*, dated 18 March 2019
- (2) Department of Defense Instruction 6465.01, *Erythrocyte Glucose-6-Phosphate Dehydrogenase Deficiency (G6PD) and Sickle Cell Trait Screening Program*, dated 17 July 2015
- (3) AFI 36-2905, *Fitness Program*, dated 21 October 2013, incorporating change 1, dated 27 August 2015

**NOTICE:** The publications listed above are available digitally on the Department of Defense Executive Services Directorate website at: <http://www.esd.whs.mil/Directives/issuances/dodi/> and the Air Force Departmental Publishing Office website at: <http://www.e-publishing.af.mil> respectively.

### b. Other Directives and Publications Relevant to the Mishap

- (1) SecAF Memorandum "Squadron Revitalization Implementation Plan," dated 1 June 2018 (Tab BB-1 to BB-28)
- (2) Headquarters Air Force A1 Memorandum "Administering Unit Fitness Assessments," dated 9 August 2018 (Tab BB-29-30)

Digitally signed by



18 September 2019

JOHN M. BREAZEALE, Brigadier General, USAF  
President, Ground Accident Investigation Board

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\* Tabs A through S of the GAIB report are to be identical to Part 1 of the Safety Investigation Board (SIB) report's Tabs A through S; however, ACC did not complete a SIB on this medical mishap.