

COVID-19 Issues in Sports

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Ascension Via Christi
KAOM Mid Year CME Conference
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Objectives

- Explain the cardiopulmonary concerns for COVID-19 in sports.
- List the most common causes of sudden cardiac death in sports.
- Properly risk stratify your patients for return to play after COVID-19.
- Be able to access and follow the KSHSAA return to play progression after COVID-19 for Kansas High School athletes.

SARS-CoV-2

- Novel coronavirus that causes COVID-19
- Highly infectious
- Vast majority of young people that contract coronavirus have mild symptoms or have no symptoms
- Health issues need to be considered in student-athletes prior to a return to sports and exercise
- Infection can cause direct injury or inflammation to the heart and lungs, especially in hospitalized patients

SARS-CoV-2

- 2020
 - Cardiopulmonary concerns from COVID-19 arise from data in severely ill adult patients, where approximately 1 in 5 hospitalized patients suffers from cardiac or thromboembolic (clotting) complications
 - Development of COVID-19-related acute myocardial injury is possible
 - Myocardial edema, fibrosis, & impaired function have been documented following recovery from infection

SARS-CoV-2

- Evidence on the prevalence & risks of cardiopulmonary complications in younger patients (college aged & adolescents) & in individuals who have had a milder form of the illness was limited in 2020
 - Degrees of lethality based on age & underlying medical conditions
 - People with asymptomatic or mild clinical COVID-19
 - Unrecognized cardiac complications following COVID-19 infection have the potential to impact the safe resumption of sports & exercise
 - TBD in 2020
 - Will gather a lot of data
 - Personal experience
 - 2021 = We have 1+ year of data

2020 Sports

BIG TEN

Penn State doctor says 30-35% of Big Ten athletes positive for COVID-19 had myocarditis symptoms

Paul Myerberg USA TODAY

Published 1:32 p.m. ET Sep. 3, 2020 | Updated 2:55 p.m. ET Sep. 3, 2020



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PSU Clarifies Doctor's Comments on Big Ten and COVID-19-Related Heart Condition

TIMOTHY RAPP

SEPTEMBER 3, 2020



2020 Sports

Big Ten cancels college football season for fall 2020, hopes to play in spring 2021

Big Ten presidents met to discuss the fate of the 2020 season on Tuesday morning

 By [Dennis Dodd](#) & [Adam Silverstein](#) Aug 11, 2020 at 3:25 pm ET • 4 min read



Pac-12 Conference cancels fall football season, all sports through end of 2020

BY LAUREN KIRSCHMAN

AUGUST 11, 2020 12:55 PM, UPDATED AUGUST 11, 2020 06:01 PM



The PAC-12 canceled the 2020-21 fall sports season. The conference hopes to play some of the sports in the spring. BY JOSHUA BESSEY

2021 Sports

COLLEGE FOOTBALL



Big Ten Cancels Fall Football Season, Will Explore Playing in Spring

SCOTT POLACEK

AUGUST 11, 2020



Ohio State

Ohio State football plans to play national championship Monday despite potential COVID-19 issues

Updated: Jan. 05, 2021, 9:33 p.m. | Published: Jan. 05, 2021, 4:28 p.m.

Big Ten Football Season to Resume October 23-24, 2020



The Big Ten Council of Presidents and Chancellors (COPIC) adopted significant medical protocols including daily antigen testing, enhanced cardiac screening and an enhanced data-driven approach when making decisions about practice/competition. The COPIC voted unanimously to resume the football season starting the weekend of October 23-24, 2020. The

8:25 AM · Sep 16, 2020



Sports 2021

- Fall 2021
 - High School & College Sports are on-going & are not canceled

Outcomes Registry for Cardiac Conditions in Athletes Investigators. SARS-CoV-2 Cardiac Involvement in Young Competitive Athletes. Circulation. 2021

- **Athletes Unlikely to Develop Cardiac Complications from COVID, Study Shows**
- “While the lasting impact of COVID-19 on hospitalized patients in the general population is common and associated with adverse cardiac outcomes, evaluations of cardiac involvement of more than 3,000 college-aged, competitive athletes revealed no adverse cardiac events following COVID-19 infections and indicate a safe return-to-play for asymptomatic and mildly symptomatic athletes without additional cardiac testing, according to a study published today in the American Heart Association’s flagship journal Circulation.”
 - Moulson N, Petek BJ, Drezner JA, Harmon KG, Kliethermes SA, Patel MR, Baggish AL; Outcomes Registry for Cardiac Conditions in Athletes Investigators. SARS-CoV-2 Cardiac Involvement in Young Competitive Athletes. Circulation. 2021 Jul 27;144(4):256-266. doi: 10.1161/CIRCULATIONAHA.121.054824. Epub 2021 Apr 17. PMID: 33866822; PMCID: PMC8300154.

Circulation 2021

- Prospective, multicenter, observational cohort study with data collected from September 1 to December 31, 2020, from 42 colleges and universities in the U.S.
- Assessed the prevalence, clinical characteristics and outcomes of SARS-CoV-2 cardiac involvement among collegiate athletes using the Outcomes Registry for Cardiac Conditions in Athletes.
- Collaborative data registry will aid research on COVID-19, and, long-term, develop a deep knowledge base on cardiac disease in athletes beyond the pandemic.

Circulation 2021

- >19,000 athletes tested for SARS-CoV-2 infection
 - 3,018 tested positive & underwent cardiac evaluation
 - 2,820 athletes underwent at least one element of cardiac testing
 - ECG, Transthoracic Echocardiography, followed by Cardiac Magnetic Resonance Imaging if indicated
 - 198 athletes underwent primary screening Cardiac Magnetic Resonance Imaging

Circulation 2021

- Prevalence of probable or definite cardiac involvement from SARS-CoV-2 infection was 0.4%-1.5%
- Diagnostic yield for probable or definite cardiac involvement was 6.7 times higher for a CMR obtained for clinical reasons (10.1%) versus a primary screening CMR (1.5%).
- Odds of having cardiac involvement was also 3.1 times higher in athletes with cardiopulmonary symptoms.
- “Most athletes with no symptoms or mild illness from SARS-CoV-2 can return to sports safely without additional cardiac testing as long as they feel good on return to exercise and don’t have cardiopulmonary symptoms like chest pain.”

Circulation 2021

CONCLUSIONS: SARS-CoV-2 infection among young competitive athletes is associated with a low prevalence of cardiac involvement and a low risk of clinical events in short-term follow-up.

ORIGINAL RESEARCH ARTICLE

SARS-CoV-2 Cardiac Involvement in Young Competitive Athletes

Editorial, see p 267

Nathaniel Moulson, MD^{*}, Bradley J. Petek, MD ^{*}, Jonathan A. Drezner, MD, Kimberly G. Harmon, MD, Stephanie A. Kliethermes, PhD , Manesh R. Patel, MD, Aaron L. Baggish, MD , for the Outcomes Registry for Cardiac Conditions in Athletes Investigators, Irfan M. Asif, James Borchers, Katherine M. Edenfield, Michael S. Emery, Kyle Goerl, Brian Hainline, Jonathan H. Kim, William E. Kraus, Rachel Lampert, Matthew Leiszler, Benjamin D. Levine, Matthew W. Martinez, Francis G. O'Connor, Dermot Phelan, Lawrence D. Rink, Herman A. Taylor, Carl Ade, Aryan Aiyer, Jarrah Alfadhli, Chloe Amaradio, Scott Anderson, Stephanie Arlis-Mayor, Jonathan S. Aubry, Andrea Austin, Timothy Beaver, Nicolas Benitez, Brant Berkstresser, Thomas M. Best, Tiffany Bohon, Jonathan P. Bonnet, Elizabeth Boyington, James Bray, Jenna Bryant, Sean Carnahan, Rachel Chamberlain, Samantha Charters, Timothy W. Churchill, Douglas Comeau, Laura E. Cook, Deanna Corey, Amy Costa, Marshall Crowther, Tarun Dalia, Craig Davidson, Kaitlin Davitt, Annabelle De St Maurice, Peter N. Dean, Katelyn DeZenzo, Courtney Dimitris, Jeanne Doperak, Calvin Duffaut, Craig Fafara, Katherine Fahy, Jason Ferderber, Megan Finn, Angelo Galante, Todd Gerlt, Amy Gest, Carla Gilson, Jeffrey Goldberger, Joshua Goldman, Erich Groezinger, Jonathan R. Guin, Heather Halseth, Joshua Hare, Beth Harness, Nicolas Hatamiya, Julie Haylett, Neal Hazen, Yeun Hiroi, Amy Hockenbrock, Amanda Honsvall, Jennifer Hopp, Julia Howard, Samantha Huba, Mustafa Husaini, Lindsay Huston, Calvin Hwang, Laura Irvin, Val Gene Iven, Robert Jones, Donald Joyce, Kristine Karlson, Christian Klein, Chris Klenck, Michele Kirk, Jordan Knight, Laura Knippa, Madeleine Knutson, Louis E. Kovacs, Yumi Kuscher, Andrea Kussman, Chrissy Landreth, Amy Leu, Dylan Lothian, Maureen Lowery, Andrew Lukjanczuk, John M. MacKnight, Lawrence M. Magee, Marja-Liisa Magnuson, Aaron V. Mars, Anne Marquez, Grant McKinley, Megan Meier, Christopher

Cardiac Testing as part of all Post COVID testing?

- Different Discussion than ECG's as part of PPE

ECG as part of Screening in PPE's?

ECG ROUTINE SCREENING

- IOC/ESC (European Society of Cardiology) recommends EKG on all athletes (2004)
 - largely related to Italian data (Corrado) of death rate 1/28,000 in 1981 to 1/250,000 in 2004 (79% reduction)

ECG ROUTINE SCREENING

- AHA – response was that ECG is not recommended in the US
- Different population (less ARVD/more HCM) – 1/100,000-300,000 in U.S. (discrepancy as no national registry)
 - \$330,000 per life saved (2 billion overall) due to many false-positives (40% of trained athletes have EKG abnormalities) & follow-up in addition to screening cost
 - Too many athletes in US & not enough trained physicians to read the EKG's (Italy screens 3-5 million annually age 12-35 & 5-10.5 million in U.S.)
 - Will not identify all conditions that cause sudden death – Marfan's, anomalous coronaries, catecholamine-induced VT
 - Lack of randomized studies – fear that screening may actually increase death rate from treatment-related procedural failures

ROUTINE SCREENING

- ECG proponents
 - 134 sudden deaths – H & P only raised a suspicion in 3% & an accurate diagnosis was only made in <1%.
 - More is being done for the college/pro athlete (double-standard)
 - H & P being done by many inexperienced providers

ROUTINE SCREENING

- ECG Proponents

- 60% - 70% of athletes with cardiac disease can be found by EKG
 - HCM
 - ARVD (inverted T-waves in leads V1-V3 with epsilon wave at ST segment)
 - Short or long QT
 - WPW (pre-excitation)
 - Dilated cardiomyopathy
 - Brugada Syndrome (RBBB & coved ST elevation in V1/V2)
 - Myocarditis
 - Congenital heart block
 - Rarely MVP

ROUTINE SCREENING

- ECG Proponents
 - Those at most risk (young black males) are the least likely to be able to get screened unless mandatory system
 - Should be extended to all adolescents as many die during sleep (long QT & Brugada)

MEDICOLEGAL ISSUES

- The appropriate H & P is the current standard of care despite a low sensitivity & specificity for detecting CV abnormalities
- A physician who clears an athlete to play is not necessarily liable for an injury or death caused by an undiscovered cardiovascular condition unless they have deviated from the established standard of care in examining or working up the athlete

SCA

- SCA during sport due to underlying heart disease is well-recognized & screening for the commonly responsible genetic and congenital diseases is widely recommended
- Differing opinions about how best to perform preparticipation cardiovascular screening
 - I gave talk at KAOM in 2018 on this topic

Sudden Cardiac Death

- Sudden Cardiac Death (SCD)
- Leading medical cause of death in young athletes
- New research suggests incidence
 - 1 in 50,000 athlete-years in college athletes
 - 1 in 80,000 athlete-years in high school athletes
- Males & African Americans are at higher risk
 - Men's basketball: 1 in 9,000 athlete-years

Sudden Cardiac Death

- Some data suggests that athletes may be at higher risk to experience SCD because of their increased level of physical activity that can lead to arrhythmias
- Other data suggests SCD is more common in young non-athletes vs young athletes
 - Maron, BJ. AM J Cardiol. 2016;117(8):1339-1341.

SCD

- SCD is the presenting symptom of underlying cardiovascular pathology in 50-90% of athletes
 - Significantly limits usefulness of history-based screen

SCD

- Warning symptoms
 - Exertional chest pain
 - Exertional syncope
 - Exertional near-syncope
 - Dyspnea or fatigue disproportionate to level of exertion
 - Palpitations
 - Irregular heart beats
- Family History of sudden un-explained death or SCD < 50 y/o
- Family history of cardiac disease known to cause SCD

SCD

- SCD in athletes < 35 Y/O
 - In most cases, structural heart disease was present
 - Hypertrophic Cardiomyopathy (HCM), anomalous origin of a coronary artery, arrhythmogenic right ventricular cardiomyopathy (ARVC), myocarditis, & coronary atherosclerosis
 - Similar findings in US, UK, and US Military
 - Maron BJ. Circulation 2007; 115:1643
 - Eckert RE. Ann Intern Med 2004; 141:829
 - Finocchiaro G. J Am Coll Cardiol 2016; 67:2108
- SCD in athletes < 35 Y/O in Northern Italy
 - ARVC was the most common abnormality, then coronary atherosclerosis and 3rd most common cause was anomalous origin of a coronary artery
 - Northern Italy has a known higher prevalence of ARVC
 - Corrado D. N Engl J Med 1998; 339:364

SCD

- SCD during athletics also occurs in the absence of structural heart disease known as primary electrical disease
 - Long QT Syndrome
 - Short QT Syndrome
 - Brugada Syndrome
 - Catecholaminergic polymorphic ventricular tachycardia
 - Wolf-Parkinson-White Syndrome (WPW)
- SCD precipitated from trauma
 - Commotio cordis
- SCD in athletes >35 Y/O
 - **Coronary artery disease** is the most common cause of SCD during exercise

Table 1. Causes of Sudden Death in 387 Young Athletes*

Cause	No. of Athletes	Percent
Hypertrophic cardiomyopathy	102	26.4
Commotio cordis	77	19.9
Coronary artery anomalies	53	13.7
Left ventricular hypertrophy of indeterminate causation†	29	7.5
Myocarditis	20	5.2
Ruptured aortic aneurysm (Marfan syndrome)	12	3.1
Arrhythmogenic right ventricular cardiomyopathy	11	2.8
Tunneled (bridged) coronary artery‡	11	2.8
Aortic valve stenosis	10	2.6
Atherosclerotic coronary artery disease	10	2.6
Dilated cardiomyopathy	9	2.3
Myxomatous mitral valve degeneration	9	2.3
Asthma (or other pulmonary condition)	8	2.1
Heat stroke	6	1.6
Drug abuse	4	1.0
Other cardiovascular cause	4	1.0
Long QT syndrome§	3	0.8
Cardiac sarcoidosis	3	0.8
Trauma causing structural cardiac injury	3	0.8
Ruptured cerebral artery	3	0.8

*Data are from the registry of the Minneapolis Heart Institute Foundation (3).

†Findings at autopsy were suggestive of HCM but were insufficient to be diagnostic.

‡Tunneled coronary artery was deemed the cause of death in the absence of any other cardiac abnormality. §The long QT syndrome was documented on clinical evaluation.

Source: Reproduced from Maron B.J. (3) with permission of the Massachusetts Medical Society.

Hypertrophic Cardiomyopathy (HCM)

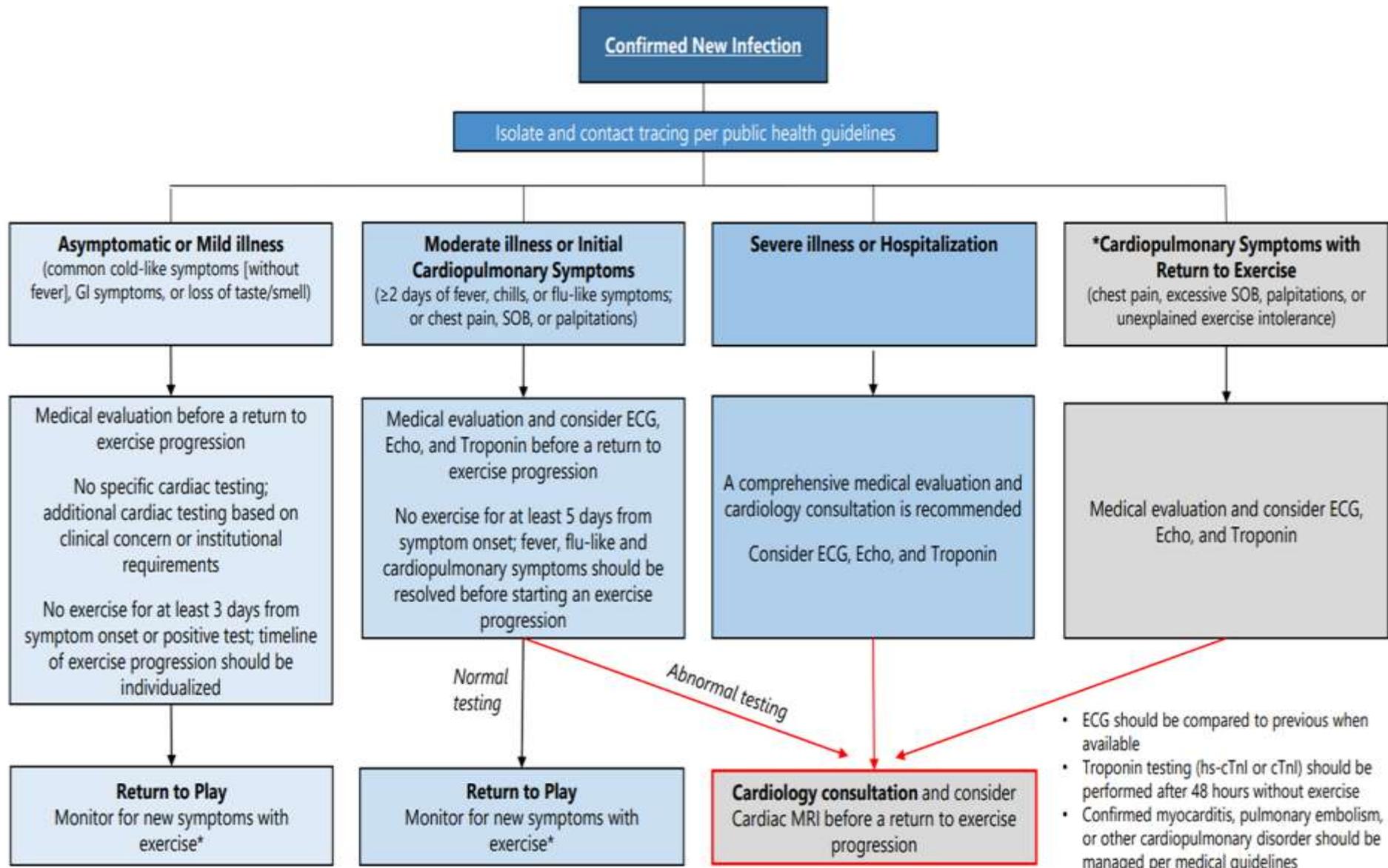
- Most common cause of Sudden Cardiac Death < 35 y/o
- Prevalence of 1 in 500 in general population
- Reported to cause 2-36% of SCD in athletes
 - Different studies report different rates of SCD
 - Corrado 2003 (Italy): 2%
 - Maron 2007 (USA): 36%
 - Harmon 2011 (USA): 3%

Return To Play Post COVID-19 Recommendations

- College

Cardiac Considerations for College Student-Athletes during the COVID-19 Pandemic

*Recommendations for cardiac testing are based on expert consensus and informed by current evidence



Return To Play Post COVID-19 Recommendations

- High School



KSHSAA STUDENT-ATHLETE PRE-PARTICIPATION COVID-19 QUESTIONNAIRE

Based on awareness of potential cardiopulmonary issues in adolescents who have had or been exposed to COVID-19, the American Medical Society for Sports Medicine, the National Federation of High School Associations and the KSHSAA Sports Medicine Advisory Committee recommend a preseason screening of students prior to participating in athletics.

This questionnaire is to be completed and turned in to the school prior to the student's first sports practice (including Spirit) of the 2020-21 school year. It is recommended students/parents complete this form 1-2 weeks prior to the start of the season in case follow-up evaluation is necessary. If timing allows it should be done in conjunction with the student's pre-participation physical exam. This form is NOT intended to replace the recommended daily screening procedures for all students participating in activities.

Student Name: _____

Date: _____

Please check Yes or No for each question and symptom listed below.

	YES	NO
Have you been diagnosed with or tested positive for a COVID-19 infection?		
Have you had any of the following symptoms in the past two weeks?		
Fever		
Cough		
Shortness of breath or difficulty breathing		
Shaking chills		
Chest pain, pressure, or tightness with exercise		
Fatigue or difficulty with exercise		
Racing heart rate		
Unusual dizziness		
Loss of taste or smell		
Sore throat		
Nausea, vomiting, or diarrhea		
Unusual rash or painful discoloration of fingers or toes		
In the past 30 days, have you been exposed to a family member or household member with current or past COVID-19?		

Any student-athlete marking any of the above questions or symptoms "YES" should be evaluated by a healthcare provider and submit written clearance from their healthcare provider to the school before being permitted to participate in sports (including Spirit activities).

Signatures Required

Student

Date

Parent/Guardian

Date

	YES	NO
Have you been diagnosed with or tested positive for a COVID-19 infection?		
Have you had any of the following symptoms in the past two weeks?		
Fever		
Cough		
Shortness of breath or difficulty breathing		
Shaking chills		
Chest pain, pressure, or tightness with exercise		
Fatigue or difficulty with exercise		
Racing heart rate		
Unusual dizziness		
Loss of taste or smell		
Sore throat		
Nausea, vomiting, or diarrhea		
Unusual rash or painful discoloration of fingers or toes		
In the past 30 days, have you been exposed to a family member or household member with current or past COVID-19?		



KSHSAA STUDENT-ATHLETE PRE-PARTICIPATION COVID-19 QUESTIONNAIRE

THIS PAGE ONLY NEEDS COMPLETED IF A "YES" ANSWER WAS PROVIDED ON ANY OF THE ITEMS ON PAGE 1.

Healthcare Provider Release Section:

(Must be completed by MD, DO, DC, PA-C, APRN)

Student Name: _____

I have examined the student named on this form and reviewed the student's previous history of COVID-19 illness and/or exposure.

Student is medically eligible for all sports without restriction

Student is not medically eligible for any sports at this time

Recommendations: _____

Date: _____

Name of healthcare provider: _____

Signature of healthcare provider: _____
MD, DO, DC, PA-C, APRN

Address: _____

Phone: _____



KSHSAA STUDENT-ATHLETE PRE-PARTICIPATION COVID-19 QUESTIONNAIRE

THIS PAGE ONLY NEEDS COMPLETED IF A "YES" ANSWER WAS PROVIDED ON ANY OF THE ITEMS ON PAGE 1.

Healthcare Provider Release Section:

(Must be completed by MD, DO, DC, PA-C, APRN)

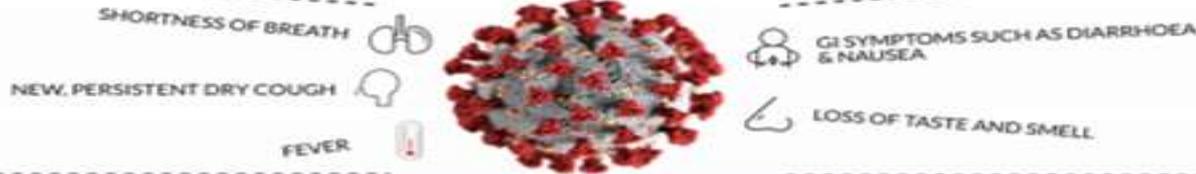
Student Name: _____

I have examined the student named on this form and reviewed the student's previous history of COVID-19 illness and/or exposure.

- Student is medically eligible for all sports without restriction
- Student is not medically eligible for any sports at this time

COVID-19 GRADUATED RETURN TO PLAY FOR PERFORMANCE ATHLETES: GUIDANCE FOR MEDICAL PROFESSIONALS

INDICATORS OF COVID-19 INFECTION



THIS GUIDANCE IS AIMED AT ATHLETES WITH MILD TO MODERATE SYMPTOMS OF COVID-19. ATHLETES SHOULD FOLLOW LOCAL GOVERNMENT GUIDELINES OF COUNTRY OF RESIDENCE FOR MANAGEMENT OF SYMPTOMS INCLUDING ISOLATION AND TESTING PROCESSES. ATHLETES WHO HAVE MORE COMPLICATED INFECTIONS, OR REQUIRED HOSPITAL SUPPORT SHOULD HAVE A MEDICAL ASSESSMENT BEFORE COMMENCING GRTP. ASSESSMENT MAY INCLUDE:

BLOOD TESTING FOR MARKERS OF INFLAMMATION (HS-TROP, BNP, CRP), CONSIDER RENAL & HAEMATOLOGY MONITORING

CARDIAC MONITORING (ECG, ECHO, ETT, CARDIAC MRI)

RESPIRATORY FUNCTION ASSESSMENT (SPIROMETRY)



GRADUATED RETURN TO PLAY PROTOCOL UNDER MEDICAL SUPERVISION

	STAGE 1 1-2 DAYS REST PERIOD	STAGE 2 3 DAYS REST PERIOD	STAGE 3A 1 DAY REST PERIOD	STAGE 3B 1 DAY REST PERIOD	STAGE 4 2 DAYS REST PERIOD	STAGE 5 3 DAYS REST PERIOD	STAGE 6
ACTIVITY DESCRIPTION	NORMAL REST PERIOD	LIGHT ACTIVITY	FREQUENCY OF TRAINING INCREASES	DURATION OF TRAINING INCREASES	INTENSITY OF TRAINING INCREASES	RESUME NORMAL TRAINING PROGRESSION	RETURN TO COMPETITION IN SPORT SPECIFIC TIMELINES
EXERCISE ALLOWED	WALKING, ACTIVITIES OF DAILY LIVING	WALKING, LIGHT JOGGING, STATIONARY CYCLE (NO RESISTANCE TRAINING)	SHUFFLE MOVEMENT ACTIVITIES (E.G. RUNNING DRILLS)	PROGRESSION TO MORE COMPLEX TRAINING ACTIVITIES	NORMAL TRAINING ACTIVITIES	RESUME NORMAL TRAINING PROGRESSION	
% HEART RATE MAX		<70%	<80%	<80%	<80%	RESUME NORMAL TRAINING PROGRESSION	
DURATION	0 DAYS	<15 MINS	<30 MINS	<45 MINS	<60 MINS	RESUME NORMAL TRAINING PROGRESSION	
OBJECTIVE	ALLOW RECOVERY TIME (MINIMUM 2-3 DAYS) RESPIRATORY SYSTEM	INCREASE HEART RATE	INCREASE LOAD GRADUALLY, MANAGE ANY POST VEXAL FATIGUE SYMPTOMS	EXERCISE COORDINATION AND SKILL/TACTICS	RESTORE CONFIDENCE AND ADVANCED FUNCTIONAL SKILLS	RESUME NORMAL TRAINING PROGRESSION	
MONITORING	SUBJECTIVE SYMPTOMS RESTING (RPE 1-3), HR	SUBJECTIVE SYMPTOMS RESTING (RPE 1-3), HR, RPE	SUBJECTIVE SYMPTOMS RESTING (RPE 1-3), HR, RPE	SUBJECTIVE SYMPTOMS RESTING (RPE 1-3), HR, RPE	SUBJECTIVE SYMPTOMS RESTING (RPE 1-3), HR, RPE	SUBJECTIVE SYMPTOMS RESTING (RPE 1-3), HR, RPE	

ACRONYMS: I-PRRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)
NOTE: THIS GUIDANCE IS SPECIFIC TO SPORTS WITH AN AEROBIC COMPONENT



COVID-19 GRADUATED RETURN TO PLAY FOR PERFORMANCE ATHLETES: GUIDANCE FOR MEDICAL PROFESSIONALS

INDICATORS OF COVID-19 INFECTION

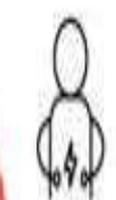
SHORTNESS OF BREATH



NEW, PERSISTENT DRY COUGH



FEVER



GI SYMPTOMS SUCH AS DIARRHOEA & NAUSEA



LOSS OF TASTE AND SMELL

GRADUATED RETURN TO PLAY PROTOCOL

UNDER MEDICAL SUPERVISION

	STAGE 1 10 DAYS MINIMUM	STAGE 2 2 DAYS MINIMUM	STAGE 3A 1 DAY MINIMUM	STAGE 3B 1 DAY MINIMUM	STAGE 4 2 DAYS MINIMUM	STAGE 5 EARLIEST DAY 17	STAGE 6
ACTIVITY DESCRIPTION	MINIMUM REST PERIOD	LIGHT ACTIVITY	FREQUENCY OF TRAINING INCREASES	DURATION OF TRAINING INCREASES	INTENSITY OF TRAINING INCREASES	RESUME NORMAL TRAINING PROGRESSIONS	RETURN TO COMPETITION IN SPORT SPECIFIC TIMELINES
EXERCISE ALLOWED	WALKING, ACTIVITIES OF DAILY LIVING	WALKING, LIGHT JOGGING, STATIONARY CYCLE, NO RESISTANCE TRAINING	SIMPLE MOVEMENT ACTIVITIES E.G. RUNNING DRILLS	PROGRESSION TO MORE COMPLEX TRAINING ACTIVITIES	NORMAL TRAINING ACTIVITIES	RESUME NORMAL TRAINING PROGRESSIONS	
% HEART RATE MAX						RESUME NORMAL TRAINING PROGRESSIONS	
DURATION	10 DAYS	 <15 MINS	 <30 MINS	 <45 MINS	 <60 MINS	RESUME NORMAL TRAINING PROGRESSIONS	
OBJECTIVE	ALLOW RECOVERY TIME, PROTECT CARDIO-RESPIRATORY SYSTEM	INCREASE HEART RATE	INCREASE LOAD GRADUALLY, MANAGE ANY POST VIRAL FATIGUE SYMPTOMS	EXERCISE, COORDINATION AND SKILLS/TACTICS	RESTORE CONFIDENCE AND ASSESS FUNCTIONAL SKILLS	RESUME NORMAL TRAINING PROGRESSIONS	
MONITORING	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE	

ACRONYMS: I-PPRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)

NOTE: THIS GUIDANCE IS SPECIFIC TO SPORTS WITH AN AEROBIC COMPONENT

	STAGE 1 10 DAYS MINIMUM	STAGE 2 2 DAYS MINIMUM	STAGE 3A 1 DAY MINIMUM
ACTIVITY DESCRIPTION	MINIMUM REST PERIOD	LIGHT ACTIVITY	FREQUENCY OF TRAINING INCREASES
EXERCISE ALLOWED	WALKING, ACTIVITIES OF DAILY LIVING	WALKING, LIGHT JOGGING, STATIONARY CYCLE, NO RESISTANCE TRAINING	SIMPLE MOVEMENT ACTIVITIES E.G. RUNNING DRILLS
% HEART RATE MAX			
DURATION	10 DAYS	 <15 MINS	 <30 MINS
OBJECTIVE	ALLOW RECOVERY TIME, PROTECT CARDIO-RESPIRATORY SYSTEM	INCREASE HEART RATE	INCREASE LOAD GRADUALLY, MANAGE ANY POST VIRAL FATIGUE SYMPTOMS
MONITORING	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PPRS, RPE

ACRONYMS: I-PPRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)
 NOTE: THIS GUIDANCE IS SPECIFIC TO SPORTS WITH AN AEROBIC COMPONENT

STAGE 3B 1 DAY MINIMUM	STAGE 4 2 DAYS MINIMUM	STAGE 5 EARLIEST DAY 7†
DURATION OF TRAINING INCREASES	INTENSITY OF TRAINING INCREASES	RESUME NORMAL TRAINING PROGRESSIONS
PROGRESSION TO MORE COMPLEX TRAINING ACTIVITIES	NORMAL TRAINING ACTIVITIES	RESUME NORMAL TRAINING PROGRESSIONS
 <80%	 <80%	RESUME NORMAL TRAINING PROGRESSIONS
 <45 MINS	 <60 MINS	RESUME NORMAL TRAINING PROGRESSIONS
EXERCISE, COORDINATION AND SKILLS/TACTICS	RESTORE CONFIDENCE AND ASSESS FUNCTIONAL SKILLS	RESUME NORMAL TRAINING PROGRESSIONS
SUBJECTIVE SYMPTOMS, RESTING HR, I-PRRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PRRS, RPE	SUBJECTIVE SYMPTOMS, RESTING HR, I-PRRS, RPE

ACRONYMS: I-PRRS (INJURY - PSYCHOLOGICAL READINESS TO RETURN TO SPORT); RPE (RATED PERCEIVED EXERTION SCALE)
 NOTE: THIS GUIDANCE IS SPECIFIC TO SPORTS WITH AN AEROBIC COMPONENT

Emergency Action Plan

- Every school should have a well-rehearsed emergency action plan (EAP) to help with a response to SCA
- On-site automated external defibrillator (AED) program that allows retrieval and use of an AED within 2-3 minutes of collapse at school athletic venues and buildings
- First responders to SCA (Athletic Trainers, School Nurses, Coaches)
 - Trained in CPR
 - Trained in recognition of SCA
 - Trained in use of an AED
- EAP practice yearly

♥ EMERGENCY DEFIBRILLATOR



ZOLL.

Doctor discusses path to safe return for players, teams after pausing seasons due to COVID-19



QUESTIONS

THANK YOU

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