ACGME International

Advanced Specialty Program Requirements for Graduate Medical Education in Sports Cardiology (Cardiology)

Initial approval:

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Int. Introduction

Background and Intent: Programs must achieve and maintain Foundational Accreditation according to the ACGME-I Foundational Requirements prior to receiving Advanced Specialty Accreditation. The Advanced Specialty Requirements noted below complement ACGME-I Foundational Requirements. For each section, the Advanced Specialty Requirements should be considered together with the Foundational Requirements.

Int. I. Definition and Scope of the Specialty

Sports cardiology is a subspecialty of cardiology focused on the prevention, diagnosis, risk stratification, and management of cardiovascular conditions in individuals participating in physical activity and competitive sports. Sports cardiologists apply core principles of cardiovascular medicine in conjunction with specialized knowledge of exercise physiology, cardiac adaptation to training, and sport-specific demands.

Sports cardiologists provide comprehensive, multidisciplinary, patient-centered care to competitive athletes and highly active individuals across the lifespan.

Int. II. Duration of Education

Int. II.A. The educational program in sports cardiology must be 12 or 24 months in length.

I. Institution

I.A. Sponsoring Institution

I.A.1. An institution that sponsors a sports cardiology fellowship must have access to robust clinical and educational expertise in general cardiology, including a comprehensive range of cardiovascular services, subspecialty consultation, and qualified faculty members.

I.A.2. If the program permits fellows to engage in independent practice in general cardiology during the educational program, time spent in general practice must not exceed 20 percent of the fellows’ time per week, or 10 weeks a year.

I.A.2.a) Time spent in independent practice during fellowship must count toward all clinical and education work hour limits.

I.B. Participating Sites

See International Foundational Requirements, Section I.B.

II. Program Personnel and Resources

II.A. Program Director

See International Foundational Requirements, Section II.A.

II.B. Faculty

II.B.1. Qualified faculty members in the following specialties must be available to teach and provide consultation to the fellows:

II.B.1.a) cardiovascular imaging;

II.B.1.b) general cardiology;

II.B.1.c) interventional cardiology;

II.B.1.d) orthopaedic surgery;

II.B.1.e) pediatric cardiology; and,

II.B.1.f) sports and exercise medicine.

II.B.2. A faculty member in cardiac electrophysiology should be available to teach and provide consultation to the fellows.

II.B.3. Faculty members should encourage and support fellows in scholarly activity.

II.C. Other Program Personnel

II.C.1. Programs must have access to personnel with expertise in sports physiotherapy or athletic training, consistent with local practice models and resources.

II.C.2. Programs should have access to qualified staff members in disciplines such as behavioral science, exercise physiology, nutrition, and physical therapy.

II.C.3. When caring for athletes in team-based sports, a team physician or equivalent sports and exercise medicine physician should be available to consult with fellows.

II.D. Resources

II.D.1. There must be a patient population that includes individuals across the lifespan, with a broad range of physical activity levels and athletic participation; and that reflects diversity in age, sex, and ethnicity; and is sufficient in number and clinical variety to ensure fellows achieve competence in the evaluation and management of cardiovascular conditions in both competitive athletes and highly active individuals.

II.D.2. There must be an identifiable sports cardiology clinic that offers consultation and continuing care to patients regarding sports- or exercise-related cardiovascular health problems, and that has:

II.D.2.a) advanced diagnostic imaging, including transthoracic echocardiography, rest and exercise echocardiography, and nuclear myocardial perfusion imaging;

II.D.2.b) ambulatory rhythm monitoring;

II.D.2.c) cardiopulmonary exercise testing, including treadmill or bicycle exercise stress testing; and,

II.D.2.d) Holter ambulatory blood pressure monitoring.

II.D.3. There must be cardiac magnetic resonance imaging (MRI) and computed tomography (CT) available at the primary clinical site or at a participating site offering a required rotation.

II.D.4. Consultation in medical and surgical specialties and subspecialties must be readily available.

II.D.5. The program must have access to sporting events, including local or international events, individual or team sports, and professional and elite or mass-participation events.

II.D.6. There must be an acute care facility that provides access to the full range of services typically found in an acute care general hospital.

II.D.7. The program should have access to functional rehabilitation services, including cardiac rehabilitation and exercise prescription support.

III. Fellow Appointment

III.A. Eligibility Criteria

III.A.1. Prior to appointment in the program, fellows must have completed an ACGME-I-accredited fellowship program in adult cardiology or a cardiology fellowship program acceptable to the Sponsoring Institution’s Graduate Medical Education Committee.

III.B. Number of Fellows

See International Foundational Requirements, Section III.B.

IV. Specialty-Specific Educational Program

IV.A. ACGME-I Competencies

IV.A.1. The program must integrate the following ACGME-I Competencies into

154 the curriculum.
155
156 IV.A.1.a) Professionalism
157
158 IV.A.1.a).(1) Fellows must demonstrate a commitment to
159 professionalism and an adherence to ethical principles.
160
161 IV.A.1.b) Patient Care and Procedural Skills
162
163 IV.A.1.b).(1) Fellows must provide patient care that is compassionate,
164 appropriate, and effective for the treatment of health
165 problems and the promotion of health.
166
167 IV.A.1.b).(1).(a) Fellows must demonstrate competence in
168 managing care of cardiac problems in competitive
169 athletes and highly active people, to include:
170
171 IV.A.1.b).(1).(a).(i) performing a comprehensive personal and
172 family medical history that includes detailed
173 characterization of exercise and physical
174 activity habits; prior athletic participation;
175 evaluation of family history of premature
176 cardiovascular disease, sudden cardiac
177 death, and inherited cardiac conditions; and,
178 assessment of the use of performance-
179 enhancing substances, supplements, and
180 other agents that may impact cardiovascular
181 health;
182
183 IV.A.1.b).(1).(a).(ii) evaluating physical activity and exercise
184 patterns, including frequency, type,
185 duration, and intensity of training and
186 competition, to determine patterns of
187 underlying exercise induced cardiac
188 remodeling;
189
190 IV.A.1.b).(1).(a).(iii) evaluating athletes and highly active
191 individuals who present with chest pain
192 during or unrelated to exercise;
193
194 IV.A.1.b).(1).(a).(iv) evaluating athletes and highly active people
195 who present with syncope and/or
196 presyncope during or unrelated to exercise,
197 including selection of diagnostic imaging
198 and ambulatory rhythm monitoring;
199
200 IV.A.1.b).(1).(a).(v) evaluating athletes and highly active people
201 who present with palpitations during or
202 unrelated to exercise, including selection of
203 diagnostic imaging and ambulatory rhythm
204 monitoring;

205
206 IV.A.1.b).(1).(a).(vi) using a collaborative and multidisciplinary
207 approach in assessing athletes and highly
208 active people with impaired exercise
209 capacity or decrements in exercise
210 performance;
211
212 IV.A.1.b).(1).(a).(vii) applying local, national, and/or international
213 recommendations for sports eligibility,
214 exercise participation, and return-to-play
215 decision-making, using shared decision-
216 making and individualized risk assessment
217 for competitive and recreational athletes
218 following diagnosis of definitive or
219 suspected cardiovascular disease;
220
221 IV.A.1.b).(1).(a).(viii) prescribing exercise designed to optimize
222 long-term health outcomes among athletes
223 who are restricted from competitive sports
224 participation or require modification of
225 sports participation due to underlying
226 genetic, structural, or electrical heart
227 disease;
228
229 IV.A.1.b).(1).(a).(ix) assessing risk of adverse cardiovascular
230 events during sports and exercise
231 participation and determining strategies to
232 optimize safety of competitive and
233 recreational sports participation for those
234 with cardiovascular conditions, including
235 indication of medical therapy decisions on
236 implantable cardiac devices and
237 development of individually tailored
238 emergency action plans;
239
240 IV.A.1.b).(1).(a).(x) managing patients with atherosclerotic
241 coronary artery disease, including making
242 recommendations on selection and duration
243 of medication, decision-making regarding
244 revascularization, and application of cardiac
245 rehabilitation following acute coronary
246 syndrome, as well as return-to-sport
247 decisions;
248
249 IV.A.1.b).(1).(a).(xi) diagnosing hypertension at rest and during
250 exercise in athletes and highly active
251 people;
252
253 IV.A.1.b).(1).(a).(xii) determining lifestyle modifications and
254 medical therapy for patients with
255 hypertension that have minimal effects on

256 exercise capacity and sport safety, avoiding
257 when possible the use of substances
258 included in the most updated World
259 Antidoping Agency (WADA) list of prohibited
260 substances in sports;
261
262 IV.A.1.b).(1).(a).(xiii) diagnosing and managing, in collaboration
263 with an electrophysiologist, paroxysmal
264 atrial arrhythmias, including atrial fibrillation
265 and atrial flutter, with comprehensive
266 assessment of rhythm versus rate control
267 strategies; selection, sequencing, and
268 monitoring of pharmacologic and catheter-
269 based interventions; and guideline-directed
270 use of anticoagulation with careful
271 consideration of implications for sport
272 participation, exercise safety, and
273 performance; and,
274
275 IV.A.1.b).(1).(a).(xiv) conducting and/or overseeing all aspects of
276 a pre-participation cardiac screening
277 program, including:
278
279 IV.A.1.b).(1).(a).(xiv).(a) conducting and documenting a
280 focused medical history and physical
281 examination and interpreting
282 electrocardiogram (ECG) data using
283 athlete criteria;
284
285 IV.A.1.b).(1).(a).(xiv).(b) performing and interpreting
286 echocardiography as required; and,
287
288 IV.A.1.b).(1).(a).(xiv).(c) working in a team-based,
289 collaborative manner during all
290 aspects of the design,
291 implementation, and refinement of a
292 pre-participation cardiac screening
293 program.
294
295 IV.A.1.b).(2) Fellows must perform all medical, diagnostic, and surgical
296 procedures considered essential for the practice of sports
297 cardiology. Fellows must demonstrate competence in:
298
299 IV.A.1.b).(2).(a) applying contemporary ECG interpretation criteria
300 for athletes in varied clinical settings, ranging from
301 traditional clinic to in-the-field preparticipation
302 cardiac screening;
303
304 IV.A.1.b).(2).(b) performing and interpreting transthoracic
305 echocardiographic data with emphasis on
306 recognition of imaging consistent with adaptive

307 exercise-induced remodeling;
308
309 IV.A.1.b).(2).(c) overseeing conventional assessment of exercise
310 testing, to include the use of continuous ECG and
311 standard forms of non-invasive imaging;
312
313 IV.A.1.b).(2).(d) interpreting ambulatory rhythm monitoring in
314 athletes and highly active people;
315
316 IV.A.1.b).(2).(e) interpreting cardiopulmonary exercise testing; and,
317
318 IV.A.1.b).(2).(f) integrating comprehensive findings from ECG,
319 ambulatory rhythm monitoring, exercise testing,
320 cardiopulmonary exercise testing,
321 echocardiography, and cardiac CT and/or MRI to
322 guide evidence-based return-to-play decisions,
323 individualized exercise prescriptions, and risk
324 stratification for competitive and recreational
325 athletes.
326
327 IV.A.1.c) Medical Knowledge
328
329 IV.A.1.c).(1) Fellows must demonstrate knowledge of established and
330 evolving biomedical, clinical, epidemiological, and social-
331 behavioral sciences, as well as the application of this
332 knowledge to patient care. Fellows must demonstrate
333 knowledge of:
334
335 IV.A.1.c).(1).(a) the fundamental hemodynamic characteristics of
336 dynamic and static exercise;
337
338 IV.A.1.c).(1).(b) the basic structural and functional patterns of
339 cardiovascular adaptation that accompany different
340 forms of exercise;
341
342 IV.A.1.c).(1).(c) factors that may contribute to variability of exercise-
343 induced cardiac remodeling;
344
345 IV.A.1.c).(1).(d) benign or adaptive ECG patterns and patterns not
346 related to exercise training but potentially reflective
347 of underlying disease;
348
349 IV.A.1.c).(1).(e) variations in non-invasive imaging in competitive
350 athletes and highly active people;
351
352 IV.A.1.c).(1).(f) differential diagnosis for left and right ventricular
353 chamber dilation and left ventricular wall thickening
354 in competitive athletes and highly active people;
355
356 IV.A.1.c).(1).(g) differential diagnosis, including cardiovascular and
357 non-cardiovascular causes of chest pain, in

358 competitive athletes and highly active people;
359
360 IV.A.1.c).(1).(h) common atypical presentations of exertional
361 ischemic chest pain in competitive athletes and
362 highly active people;
363
364 IV.A.1.c).(1).(i) how and when to customize exercise testing,
365 including use of adjunct testing measures, in
366 competitive athletes and highly active people;
367
368 IV.A.1.c).(1).(j) common causes of collapse during exercise;
369
370 IV.A.1.c).(1).(k) the physiology of post-exertional neurally mediated
371 syncope;
372
373 IV.A.1.c).(1).(l) common causes of palpitations in competitive
374 athletes and highly active people;
375
376 IV.A.1.c).(1).(m) rationale and suggested use of eligibility and
377 disqualification recommendations for competitive
378 athletes;
379
380 IV.A.1.c).(1).(n) physical activity guidelines for the general
381 population with an emphasis on differentiation of
382 the role of exercise for health promotion versus
383 athletic performance;
384
385 IV.A.1.c).(1).(o) diagnosis, risk stratification, and management of
386 common inherited, congenital, and acquired forms
387 of heart disease associated with an increased risk
388 of adverse cardiovascular events during exercise;
389
390 IV.A.1.c).(1).(p) diagnosis, risk stratification, and management of
391 common genetic and acquired forms of electrical
392 heart disease associated with a risk of adverse
393 cardiovascular events during exercise;
394
395 IV.A.1.c).(1).(q) current indications for implantable cardiac devices
396 in primary and secondary prevention settings and
397 safety of competitive sports in competitive athletes
398 and highly active people with such devices;
399
400 IV.A.1.c).(1).(r) the effect on exercise physiology and exercise
401 safety in patients with atherosclerotic coronary
402 artery disease;
403
404 IV.A.1.c).(1).(s) the effect of exercise physiology and exercise
405 safety in athletes with common inherited and
406 acquired forms of valve disease;
407
408 IV.A.1.c).(1).(t) the impact of antihypertensive agents,

409 antiarrhythmic drugs, and commonly prescribed
410 medications for management of atherosclerotic
411 coronary disease on exercise physiology;
412
413 IV.A.1.c).(1).(u) the association between atrial arrhythmia and long-
414 term exposure to endurance sports and treatment
415 options for competitive athletes and highly active
416 people with atria arrhythmia;
417
418 IV.A.1.c).(1).(v) the cardiovascular effects of substance abuse and
419 use of performance enhancing drugs;
420
421 IV.A.1.c).(1).(w) current recommendations for preparticipation
422 cardiovascular screening, including how to rapidly
423 and effectively manage abnormal findings;
424
425 IV.A.1.c).(1).(x) the role of the sports cardiologist in the design,
426 implementation and revision of a preparticipation
427 cardiovascular screening program;
428
429 IV.A.1.c).(1).(y) the role of the sports cardiologist in the design,
430 implementation, and revision of a cardiac
431 rehabilitation program for recreational athletes after
432 a cardiovascular event or when indicated before
433 return to sport; and,
434
435 IV.A.1.c).(1).(z) indications and process for the request of
436 Therapeutic Use Exemption (TUE) of medication
437 included in the WADA list of substances prohibited
438 in sports when they are required in the
439 management of competitive athletes with
440 cardiovascular conditions.
441
442 IV.A.1.d) Practice-Based Learning and Improvement
443
444 IV.A.1.d).(1) Fellows must demonstrate the ability to investigate and
445 evaluate their care of patients, to appraise and assimilate
446 scientific evidence, and to continuously improve patient
447 care based on constant self-evaluation and lifelong
448 learning.
449
450 IV.A.1.e) Interpersonal and Communication Skills
451
452 IV.A.1.e).(1) Fellows must demonstrate interpersonal and
453 communication skills that result in the effective exchange
454 of information and collaboration with patients, patients'
455 families, and health professionals. Fellows must
456 demonstrate skill in:
457
458 IV.A.1.e).(1).(a) communicating risk, uncertainty, and
459 recommendations regarding sports eligibility,

exercise participation, and return-to-play decisions to athletes and highly active individuals, families, coaches, teams, and other health professionals, as appropriate; and,

IV.A.1.e).(1).(b) balancing confidentiality, autonomy, and shared decision-making in circumstances in which organizational, team, school, or competitive pressures may influence clinical decision-making.

IV.A.1.f) Systems-Based Practice

IV.A.1.f).(1) Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, including the social determinants of health, as well as the ability to call effectively on other resources in the system to produce optimal care. Fellows must work effectively:

IV.A.1.f).(1).(a) in various systems in which sports cardiology is practiced, to include schools, clubs, federations, team-based organizations, and event-based medical systems;

IV.A.1.f).(1).(b) within systems of care at sporting venues and mass-participation events, to include implementing emergency preparedness protocols; and,

IV.A.1.f).(1).(c) within multidisciplinary teams to optimize patient safety, quality of care, and coordination of care across outpatient, inpatient, and event-based settings.

IV.B. Regularly Scheduled Educational Activities

IV.B.1. There must be regularly scheduled conferences, seminars, and/or workshops in sports cardiology specifically designed to augment fellows' clinical experiences.

IV.C. Clinical Experiences

IV.C.1. Fellows must have at least 10 months of clinical experience in sports cardiology.

IV.C.2. Fellows must participate in pre-participation physical evaluations of athletes that include:

IV.C.2.a) conducting a sports cardiology-focused history and clinical examination;

IV.C.2.b) interpreting 12-lead ECG;

511
512 IV.C.2.c) performing and interpreting echocardiography as required;
513 and,
514
515 IV.C.2.d) determining further investigation/follow-up and return-to-
516 play decisions.
517
518 IV.C.3. Fellows must have experience conducting and/or interpreting
519 studies and procedures relevant to the practice of sports
520 cardiology, including:
521
522 IV.C.3.a) ambulatory blood pressure monitoring;
523
524 IV.C.3.b) analysis of rhythm recording (Holter, event recorders);
525
526 IV.C.3.c) cardiac MRI for structural and functional assessment;
527
528 IV.C.3.d) cardiopulmonary exercise testing;
529
530 IV.C.3.e) exercise testing;
531
532 IV.C.3.f) signal averaged ECG;
533
534 IV.C.3.g) transthoracic echocardiogram, both resting and during
535 exercise; and,
536
537 IV.C.3.h) 12-lead ECG.
538
539 IV.C.4. Fellows must have a sports cardiology clinic experience.
540
541 IV.C.4.a) Fellows must provide sports cardiology clinic patients with
542 continuing, comprehensive care and provide consultation for
543 cardiovascular problems related to sports and exercise.
544
545 IV.C.4.b) In a 12-month program, each fellow must spend at least one day
546 per week for 10 months in a single sports cardiology clinic
547 providing care to patients.
548
549 IV.C.4.c) In a 24-month program, each fellow must spend at least one day
550 per week for 20 months in a single sports cardiology clinic
551 providing care to patients.
552
553 IV.C.4.d) If a fellow's sports cardiology clinic patients are hospitalized, the
554 fellow must either follow them during their inpatient stay and
555 resume outpatient care following the hospitalization, or remain in
556 active communication with the inpatient care team regarding
557 management and treatment decisions and resume outpatient care
558 following the hospitalization.
559

IV.C.5. Fellows must participate in competitive sports events as a member of the medical team providing services at the event and/or medical services organizing committee.

IV.C.6. Clinical experiences should be structured to facilitate learning in a manner that allows the fellows to function as part of an effective interprofessional team that works together longitudinally with shared goals of patient safety and quality improvement.

IV.D. Scholarly Activity

IV.D.1. Fellows' Scholarly Activity

IV.D.1.a) Each fellow must complete a scholarly or quality improvement project.

IV.D.1.b) Fellows must attend at least one national or international subspecialty meeting in sports cardiology.

IV.D.2. Faculty Scholarly Activity

See International Foundational Requirements, Section IV.D.2.

V. Evaluation

See International Foundational Requirements, Section V.

VI. The Learning and Working Environment

See International Foundational Requirements, Section VI.