IIRM International Institute for Race Medicine

ENDURANCE AND SPORTS MEDICINE

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In this Issue:

Endurance and Sports Medicine

The mission of the International Institute for Race Medicine (IIRM) is to promote the health and safety of athletes participating in endurance events through education, research, and the development of medical best practices.

Opinions expressed in *Endurance and Sports Medicine* are not necessarily endorsed by the IIRM.

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*If you are interested in being considered for the Editorial Advisory Board, please write to journal@racemedicine.org.

IIRM NEWS

We Are Pleased to Announce Our Return to Boston in 2019

The IIRM will be partnering with Northeastern University Bouvé College of Health Sciences and the Department of Physical Therapy, Movement and Rehabilitation Sciences to present the IIRM 2019 Sports Medicine Conference Series: Boston. This one-day meeting will be held on Saturday, April 13, from 8:00 am to 5:00 pm. Additional information on the agenda will be released soon.

A room block is being reserved at The Colonnade Hotel, only a few blocks from Northeastern University, with the following rates (two-night minimum):

Friday: $309
Saturday: $379
Sunday: $379
Monday: $309

If you are interested in receiving the link to make reservations at The Colonnade Hotel, please contact IIRM Meeting Coordinator Barbara Baldwin, MPH, at bbaldwin@racemedicine.org.

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LETTER FROM LEADERSHIP

Dear IIRM Members,

As the founder of the International Institute for Race Medicine (IIRM), I am delighted to be addressing you in our third issue of *Endurance and Sports Medicine*.

In 2003, together with other marathon medical directors, I formed the IIRM with the goal to improve the understanding of road race medicine and enhance the provision of medical care at endurance events. The organization was initially called the American Road Race Medical Society (ARRMS) and was housed in the same office with the American Medical Athletic Association (AMAA), where Executive Director Dave Watt and his staff provided support. We recruited members from science and medicine to address the vision of the new organization and help advance its scope of race medicine and broaden the science base for medical decision-making. Long-term goals recorded in the minutes of the initial meeting held in Chicago were to:

- Develop a network of road race medicine experts to provide consultation for groups staging endurance events.
- Develop standardized race registration and race medical encounter forms to assist with care at events and to collect data to inform races and participants of the event risks and outcomes.
- Facilitate an evidence-based standard of care for endurance event participants.
- Develop educational materials for runners.
- Develop a website with recommendations for runners and event management, as well as education for providers.
- Develop a web-based data collection site.

We recruited members from science and medicine to address the vision of the new organization and help advance its scope of race medicine and broaden the science base for medical decision-making.

Our first major event, the 2006 World Congress on the Science and Medicine of the Marathon, was held in Chicago. This was the 30th anniversary of the New York Academy of Sciences meeting on the same topic and the education shared at the event provided a much overdue update. There were 49 presentations that spanned the scope of race medicine and science, and the proceedings was published by *Sports Medicine* in 2007 (the manuscripts in this publication are often cited in the context of marathon medicine and marathon science).

ARRMS was initially funded by individual and race memberships; however, this funding source did not support the goals of the organization, nor could it sustain its existence. Consequently, through the tireless work of Chris Troyanos, a relationship with the Matthew Good Foundation was established and a grant was awarded to allow expansion of the website and membership services.

Members and ARRMS' board members gather at one of the organizations first meetings in Chicago (2003).

In an effort to bring the organization to a world presence, the name was transitioned to the International Institute for Race Medicine, again with the help of the Matthew Good Foundation. The international presence has allowed the membership to expand and has broadened the scope of our available services. For example, with our new international focus, we were able to develop an advisory relationship with the Association of International Marathons and Distance Races (AIMS); this increased our visibility on the world stage. In addition to broadening to an international focus, the IIRM is also working to expand its scope to include triathlon and bike racing. Many of the basic principles of event medical management cross the disciplines and the goal to provide participant safety is the same.

Over the past year, the IIRM has integrated AMAA into its membership. The long history of the AMAA contributing to runner safety and education is a welcome addition to the IIRM and we hope to keep that history alive. The former *AMAA Journal* is now the official journal of the IIRM, with a redesigned look, a name change to *Endurance and Sports Medicine*, and a shift to electronic delivery. We hope to improve upon the strong tradition of this publication—the combined membership of the IIRM and AMAA should be a rich source of manuscripts and topics for the journal. We welcome your feedback and submissions. If you have comments or would like to contribute, please contact Managing Editor Barbara Baldwin at bbaldwin@racemedicine.org.

As we continue to grow and further expand our educational outreach, we hope you will take advantage of the opportunities available to you. We have a great two-day sports medicine conference held in conjunction with the Marine Corps Marathon in October and we will be returning to Boston in April 2019 with a one-day conference being held at Northeastern University [see "IIRM News" on p.2]. Also, the education provided on our

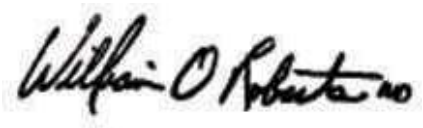
The long history of the AMAA contributing to runner safety and education is a welcome addition to the IIRM and we hope to keep that history alive.

website can help races keep their volunteers ahead of the curve for race medicine education and as our race encounter database grows, we will have the means to make race-day recommendations based on "big data." This may help delineate questions like "When is it too hot to start?" and "Can we reasonably screen participants during the registration period and just prior to the start?"

If I had a crystal ball, I would love to tell you where the organization will be in the next decade. Unfortunately, I do not have that power. I do know, though, that both event and individual members are very important to the mission of the IIRM—and I know the IIRM is stronger with the addition of AMAA members. You bring knowledge, enthusiasm, and a rich history of working with runners and being endurance runners yourselves.

I hope we can move the needle with research and education to make events as safe as they can be. We have learned much in the nearly 40 years I have been involved in road race and event medicine and I strongly believe that the combined experience of our members is a great fund of knowledge. Tapping that knowledge base and applying basic research principles to race medicine and management should lead to a safer race environment that we can share with the running world.

I look forward to working with you to meet our goals.



William O. Roberts, MD
Medical Director, Medtronic Twin Cities Marathon

The education provided on our website can help races keep their volunteers ahead of the curve for race medicine education and as our race encounter database grows, we will have the means to make race-day recommendations based on "big data."

The IIRM is going to the Republic of Estonia to participate in the 22nd World Congress of the Association of International Marathons and Distance Races (AIMS). The Congress is being held from September 6-8 in conjunction with Estonia's 100th anniversary since its first independence. IIRM Executive Director Chris Troyanos, ATC, will discuss climate change and its impact on endurance events.

The AIMS Congress will also coincide with Estonia's Tallinn Marathon and three-day family running festival. With over 21,000 participants, the marathon race course passes through the beautiful City Centre, Old Town, and the modern Centre. For more information about AIMS and the World Congress, go to aims-worldrunning.org/aims.html.

Can or Should Kids Go the Distance?
Benefits and Risks Associated with Youth Distance Running

By Emily Miller, MD; Stephanie Kliethermes, PhD; and Anthony Beutler, MD

Youth distance running continues to grow in popularity as organized running events for kids become more and more common. With star athletes such as Shalane Flanagan and Meb Keflezighi finding success in running and serving as role models for today's young athletes in ways that Michael Jordan or Mia Hamm once did for basketball and soccer, it's perhaps no surprise kids are showing greater interest and desire to challenge themselves at longer distances. Increasingly, kids are exposed to the sport of running at a young age, especially if their parents are runners. There are hundreds of community and school-based running programs for kids across the US, including nationally recognized programs such as Girls on the Run or Just Run. Pre-schoolers are completing 5Ks and kids as young as 9 or 10 years old are participating in half and full marathons. For local road races, an associated "toddler trot," "junior dash" or "kids fun run" is becoming the norm. Larger and longer races are finding creative ways to engage kids in the weekend race events, including overt encouragement for youth to go the full 13.1 or 26.2 miles. And for those youth looking for a different endurance challenge, the Spartan race series allows kids as young as 6 years old to participate in an obstacle course race, and even provides training plans for them.

Katie Maehlmann and her 7-year-old son Nate running the Huntsville, Alabama, Twilight 5K in June 2013. Nate is now 12 years old and still enjoys participating in the occasional 5K and 10K races. (Photo Credit: Gregg Gelmis)

But with these increased opportunities for youth running come an equal number of questions regarding appropriate participation and safety for youth runners: is it safe for kids to participate in distance running? Is there a minimum age for a particular distance? What are the benefits to youth who participate in distance running? Unfortunately, little scientific data exists to answer these questions and experts land on all sides of the argument. While this article cannot resolve the debate, by outlining the key issues, we hope the running community can be better informed regarding the risks and benefits (both known and unknown) for youth runners. Despite the dearth of scientific evidence to support or dissuade youth running, one thing is clear: children and adolescents continue to sign up for and participate in distance races. Fully understanding the benefits and risks of youth running will allow coaches, parents, and kids themselves the opportunity to make informed decisions on sport participation.

Benefits

The limited available scientific evidence related to youth running focuses primarily on potential risks, with little attention given to benefits. However, the benefits of sport and physical activity in creating healthy children are well-described in the scientific literature. Simply put, participation in sports positively contributes to a child's physical, mental, and personal development. These benefits easily translate and apply to the sport of running. Running, via free-play, is one of the first sports and types of physical activity kids learn. As a result, kids who run build and maintain strong cardiovascular, muscular, and skeletal systems throughout childhood (1,2). The CDC recommends all kids, beginning at 6 years of age, participate in a minimum of 60 minutes per day of moderate- to vigorous-intensity physical activity (2,3). Young runners—appropriately trained for their age, interest, and skill-level—can readily achieve these recommendations and reap the numerous benefits, including lower rates of cardiovascular disease, type 2 diabetes, and obesity as they grow through childhood and into adult life (2).

The mental and personal benefits of running are commonly described in adults; however, these are less studied in kids. Available studies suggest that kids who are regularly physically active have better school attendance, improved academic performance, and less risk for anxiety and depression (4,5). Unquestionably, youth endurance running is only one way in which kids can be physically active; the CDC recommends kids participate in a variety of physical activities that are both age-appropriate and perceived as fun (2). So although running should not be promoted as the only type of physical activity for kids, it is arguably one of the most basic and easily accessible forms of physical activity for most youth. In 2016-2017, the NFHS [The National Federation of State High School Associations] reported 492,310 cross-country athletes and over one million track and field athletes, making track the second most popular high school sport for boys (second only to football) and the most popular sport among girls. Cross-country ranked sixth for both sexes (6). With the popularity of this sport continuing to grow among kids of all ages, and at a time when 70% of children drop out of organized sports by age 13 (7), the sport of running has much to offer to our young athletes in regards to physical, mental, and personal health and development.

Despite these known benefits of physical activity (and running), there are potential risks associated with all sports for young participants, including youth runners. In youth sport, the biggest risk comes from imposing the physical and mental demands of adult training regimens on the bodies and minds of kids. Kids are not small adults, mentally or physically. Their default mental mindset is "play" and "fun," not "train" and "compete." Their musculoskeletal systems are well-adapted to free play, but more prone to overuse injury when subjected to repetitive training loads. Since running a half or full marathon requires training on a regular basis, possibly for several months, to ensure one is physically ready for race day, young athletes are at increased risk for mental and physical injury when participating in these repetitive training programs.

Physical Injury Risks

Overuse injuries occur when repetitive loading of musculoskeletal structures leads to microtrauma. If there is inadequate recovery time or excessive stress on a particular area following microtrauma, structures become weakened and damaged and have diminished ability to repair and recover. Youth athletes may not fully mature until 18 years of age and have an evolving gait through childhood and adolescence, thus making youth runners particularly susceptible to these types of injuries. During periods of rapid growth their limb length can exceed their muscular strength, resulting in imbalances that may predispose them to injury.

Additionally, young athletes have open growth plates, areas where active bone and cartilage synthesis occur, which creates unique overuse injury risks in this population. As new cartilage is synthesized in the growth plate, it pushes the two ends of the bone outward and is thus responsible for the longitudinal growth of bones. However, these growth plates are also the "weakest link" in the musculoskeletal system and the most common sites of bone injury in youth athletes. The most common growth plate injuries are apophyseal injuries, which are injuries that occur where a tendon attaches on one side of an open growth plate. The tendons that insert on these apophyseal sites are stronger than the adjacent growth plate. So, when subjected to repetitive, excessive stresses, these apophyseal growth plates can become injured or inflamed. Common sites of apophyseal injuries are the heel (Sever Disease) and knee (Osgood-Schlatter Disease) (8). While most overuse growth plate injuries heal with rest and gradual return to activity, it is concerning that most youth athletes and parents find it incredibly difficult for early adolescents to take the required four to eight weeks off from organized training to heal. Importantly, other types of growth plate injuries often require surgical treatment (slipped capital femoral epiphysis and elbow medial epicondyle avulsion) and can lead to long-term complications even after surgical treatment. Prevention, accurate and prompt diagnosis, and appropriate treatment of growth plate injuries are all important to minimize long-term risks in young athletes and runners.

As young athletes proceed through adolescence, their growth plates close and they become susceptible to the overuse injuries commonly seen in the ligaments, tendons, and bones of adult runners. Shin splints, patellofemoral pain syndrome, and stress fractures are some of the most common injuries in many late adolescent athletes, including runners (8). Risk factors predisposing to the development of bone stress injuries include a rapid increase in training mileage, training intensity, overtraining, a history of prior stress fracture, and female gender (in particular if there is a history of menstrual dysfunction and/or disordered eating). Overuse injuries can be lessened

(but likely not eliminated) by ensuring that youth runners have proper footwear, are cross-training to improve flexibility and strength, and engage in an appropriately progressive training program.

Even after appropriate training, race day risks may affect the youth runner. Physiologic studies of the cardiac, hepatic, and renal systems of adolescents completing marathons show transient rises in cardiac troponins (heart muscle enzymes), creatinine (a marker of renal function), and liver enzymes (9,10). While youth athlete levels are similar to those seen in adult athletes, experts still debate whether these enzyme elevations are merely normal markers of intense stress or whether these indicate important damage patterns at a micro-cellular level.

In 2014, at age 15, Kristen De Sousa became the youngest person to run a marathon on all seven continents (in just three months). She is shown here with her medals after completing a 50K ultra marathon in Punta Arenas, Chile, her final race in the series. She chose to finish with the 50K distance because she was having fun and felt good. (Photo Credit: Phil Cha)

Another race day concern is the development of heat illness. The American Academy of Pediatrics published an updated policy statement on "Climatic Heat Stress and Exercising Children and Adolescents" in 2011 (11). Exertional heat illness, including heat exhaustion and heat stroke, can occur when vigorous exercise occurs in warm to hot environments. Some of the risk factors for exertional heat illness include hot and/or humid weather, poor preparation, excessive physical exertion, insufficient fluids, and current or recent illness. While it was previously thought that children and adolescents were at increased risk of developing heat illness, recent studies demonstrate that with adequate hydration the risk of youth participants is similar to that of adults (11-14). From a monitoring perspective, medical personnel should ensure that runners receive appropriate hydration and heat-illness education prior to the race, that appropriate hydration is available throughout the race, and that trained personnel and adequate equipment are available to recognize and quickly treat heat illness.

Mental Health Risks

The development of burnout remains an important concern for youth participating in an intense training program, regardless of sport. Youth participate in physical activities for many reasons but survey data consistently show that "fun" and "time with friends" are at the top of the list, especially in pre and early adolescent athletes. Adult training regimens that focus more on repetitive drills and discrete skill enhancement, and less on actual sport play, are not compatible with both the mental mindset and the physical structure of young athletes. Youth running experts agree that if kids want to run a particular distance, it should stem from a love of running, not from pressure imposed by coaches or parents to run a specific distance in a specific time. The focus throughout training, and race day, should always be on fun and enjoyment. Parents and coaches should be on the lookout for signs of burnout such as a decreased desire or interest in running, mood changes, and fatigue (7,15). Kids who burn out in sport are at a high risk to adopt a physically inactive lifestyle—a lifestyle known to have increased physical and psychological risks in adolescent and adult life.

Race Data

From a practical perspective, youth do have the capacity to successfully complete marathon distances. Dr. William Roberts has previously described his experience working with the Twin Cities Marathon (16,17). Over the course of 26 years they have had 310 youth (ages 7-17) complete the marathon with only four requiring evaluation in the medical tent for minor medical events. Students Run Los Angeles (SRLA) is a non-profit organization which has been guiding high risk middle and high school students through a training program for the LA Marathon (18). Over 63,000 students have participated in the program over its 28-year history. In 2018 they had a 99.7% completion rate for students who started on race day.

Summary

As with all youth sports, there are benefits and risks associated with participation. In the sport of running, the risks become more pronounced with increased race distance and, thus, increased training volume. In general, youth runners are at risk for burnout, overuse injuries, and potential race-day setbacks. However, no current data suggests that the risk of youth running are different from those of youth athletes participating in other sports. With proper implementation of training and competition for youth runners, the physical, mental, and personal benefits should outweigh the risks. At a time when obesity rates and a sedentary lifestyle are rapidly increasing even among children, we can and should be doing our part to promote running and other forms of physical activity in today's youth. By focusing on fun and friends rather than competition and drills—on proper technique rather than winning—our children can achieve and enjoy an active lifestyle that can be maintained well into adulthood. So, if a child shows interest in the sport of running (no matter the distance) perhaps the most pressing question is not "Is it safe for kids to participate in running events?" but rather "How can we safely support and encourage kids who wish to participate in running as a sport?"

Editor's Note

There is substantial data from the Los Angeles and Twin Cities Marathons regarding the participation of children in these races spanning a couple of decades. Collecting data from other events throughout the world would be helpful in creating guidelines for race directors and medical directors who may be hesitant to allow youth participation. Any data that can be provided from races that you direct or for which you provide medical coverage can help us establish an information base. If you are interested in helping the IIRM create a youth running registry, please contact us at journal@racemedicine.org.

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The Boston Marathon Medical Tent Experience

By Fred H. Brennan, Jr., DO, FAOASM, FAAFP, FACSM

As I picked up my volunteer package this year and glanced down at my badge I could not believe this was my 10th year as a volunteer at the Boston Marathon. Even after moving to Tampa Bay in 2017, I could not miss the opportunity to once again be at the Boston Marathon on Patriot's Day. What is it about the Boston volunteer medical experience that makes this so special? Why do I keep coming back year after year as many have done well before I began?

My first year, 2008, I was a volunteer on the medical sweep team. Our mission: to herd tired, nauseated, and elated runners through the congested chute and back to either their loved ones or to Med Tent B. That was a long day! I truly got an appreciation of how hard the sweep team worked to keep athletes moving to prevent exercise-associated collapse. Despite dodging sweat, tears of joy, and occasional vomit, I felt that I made a meaningful contribution that day.

In 2009, I started volunteering in Med Tent B. At that time, I felt like Tent B was the "forgotten child" with less personnel, fewer assets, and less clarity to our role as a medical support element. But in truth the demands of the race were such that Tent B had become very busy, undersized, chaotic, and in need of procedural upgrades. In 2010, I was given the priceless opportunity to serve as the Chief Medical Officer of Med Tent B. Since then we have worked together to improve the triage process, designate an area for minor injury care, improve patient traffic flow in and out of the tent, and coordinate seamlessly with Boston EMS personnel. Our tent has also grown much larger with 175 cots! Each year hundreds of volunteers join me, many repeat volunteers, in providing world-class care to athletes of all ages and abilities. Why do they do it? Because they want to help people. They give up their Monday, for some it is their only day off that week, to use their skills to help others. Each member of the team brings their own unique skill set, their own unique past experiences, and their own unique ability to care for the athlete in distress.

After our tent meeting, the medical team is released to begin setting up their respective areas. I love to watch this part of the experience the most. People who have never worked together introduce themselves with a smile and a handshake. And then it all begins. The definition of teamwork. Everyone is learning their role and getting it done. No egos, just dedicated individuals who know what the goal is—to get Med Tent B ready to receive the first batch of runners in need of care. Friendships are made, established working relationships get stronger, and stories are created.

Dr. Brennan (blue jacket) with 2018 Boston Marathon medical team members representing the 157th Medical Group of the New Hampshire Air National Guard. From left: Lt Col Bob Piotrowski, MD; Maj Cynthia Dechenes, MD; Maj Tori Scearbo, RN; and Maj Heidi MacVittie, MD.

A match made in Medical Tent B—Ami Adams, MS, LAT, ATC, CES and William Adams, PhD, ATC, married in 2013 after meeting as volunteers.

We even had a couple meet while volunteering at the medical tent who then married a few years later.

In 2012 we experienced one of the hottest days ever for the Boston Marathon. We all knew it was going to be a long hard day. As expected, the casualties piled up. The medical tent was full and there were dozens and dozens of runners being cared for on the street outside of it. Everyone pitched in. That entire day I did not hear one complaint from our volunteers. I thought to myself and later expressed as I thanked our team, "What an amazing group of people. It's hot, they are tired, and everyone is just focusing on helping their athletes!" This really is a fun experience and I am proud to work with each and every one of the volunteers.

The year 2013 will forever be in our thoughts and memories. The weather was picture perfect and the volunteers were providing their usual excellent care with our tent at 75% capacity— then the first bomb exploded. There was the expected pause of relative silence. Our tent was too far from the scene to see what had happened. Then the second explosion occurred and we began to see dark smoke billowing through the streets. I picked up the tent microphone and asked people to remain calm, to continue to care for their athletes, and to start preparing to receive potential casualties. Although people clearly had fear in their eyes, they did not waiver. Our volunteers stayed calm and focused as they cared for the handful of minor injuries and psychologically traumatized patients who made their way to our medical tent. My 18-year-old daughter Alyssa was helping with medical records that day. She was so scared but insisted on continuing with her job. Before that day

From the tireless medical leadership to the volunteers filling ice bags, everyone has an important role. Volunteering at the Boston Marathon is a showcase of great people doing great things selflessly for others in need.

Dr. Brennan checking on a runner suffering from hypothermia following his completion of the 2018 marathon.

she was undecided about which degree to pursue in college. She said to me later that night. "I know now what I want to do....I want to be an RN. This is where I think I could provide the most good for people." The pride I had in her and in the medical team that day is beyond any words that I could write here. It is just an example of what makes volunteering at the Boston Marathon so unique and special.

From the tireless medical leadership to the volunteers filling ice bags, everyone has an important role. Volunteering at the Boston Marathon is a showcase of great people doing great things selflessly for others in need. Whether it's dealing with the heat of 2012, the bombings in 2013, or the cold windy rains of 2018, how could you not want to be part of this experience? Thanks to all those who have volunteered over the years. See you in 2019!

Dr. Brennan is Affiliate Assistant Professor of the Department of Family Medicine at the University of South Florida Morsani College of Medicine in Tampa, Florida and at the Department of Kinesiology at the University of New Hampshire in Durham, New Hampshire. He is also Assistant Director of the University of South Florida/BayCare Sports Medicine Fellowship and the University of South Florida/Turley Family Medicine Residency in Clearwater, Florida. Dr. Brennan is a retired US Army Lieutenant Colonel who served in Iraq in the 28th Combat Support Hospital (2003), as well as a retired Commander of the 157th Medical Group of the New Hampshire Air National Guard. He has also completed the Hawaiian Ironman World Championship, and a two-time Boston Marathon finisher.

Race Medicine: A Nurse's Perspective

By Kathleen Powers, RN, IBCLC

Race medicine is its own specialty. I have come to know races, runners, medical teams, geography, and the experiences are as diverse as they are similar. I have come to appreciate how universal basic medical care can be implemented to help whatever kind of patient presents to the medical team. I have come to love the fact that we always start with vital signs for they are what is vital to every life.

Race medicine is a delayed calling for me. My primary duties as a nurse revolve around mothers and babies. An off-handed remark from a fellow nurse who was preparing to run the Marine Corps Marathon led me to call Shelley Weinstein, the race medical coordinator. I asked if the Marine Corps Marathon could use an extra nurse to help at the marathon. She said "yes," and with this reply, opened to me the world of race medicine.

Planning for an athletic event prevents poor performance. Runners know this and prepare for months if not years to run marathons. As a newbie into the world of race medicine I had difficulty finding material to help me prepare for taking care of the runners who came to the medical arena at a race.

As luck would have it, a runner at the Boston Marathon led me to discover the American Medical Athletic Association (AMAA). After joining the organization, I regularly attended their symposiums held before both the Marine Corps and the Boston Marathons and gained a wealth of knowledge. I am excited that the integration of AMAA into the IIRM will help me further increase this knowledge base, as this organization has a mission to prepare medical teams to appropriately care for runners who need help during and after a race.

After having volunteered at 28 races, I have come to appreciate how there needs to be a formalized approach to caring for runners. Education is the key. Experience is the cement. The educational opportunities the IIRM provides is a major step in the right direction of providing guidelines in the care of runners.

One of my early experiences was learning how the on-scene medical team is crucial in treating the hyperthermic runner. I was volunteering at a race that did not have a "heat deck." We had a runner come in towards the end of the race, hot but not sweating. I helped her into a gator to take her to the medical area. By the time we got her there she was gasping for breath. I often think of her. The next time I volunteered at that race, thankfully, there was a "heat deck."

One might think taking care of mothers and babies, something I do regularly, is routine with not much variation. This is not true. Each situation reflects the common adage, "Each patient is a case of one." Taking care of runners is the same. Every runner is unique and even though their complaints may be similar, there are often variations in their cases, just like my moms and babies.

Every race brings new experiences. I find race medicine is not only about the physiology of what happens to the human body during a race, but also understanding and appreciating the emotional challenges.

My first marathon, the Marine Corps Marathon, wetted my appetite to want to work more races. Just like runners discuss the different medals they get at different races, medical teams talk about the shirts and jackets. The MCM gives the medical team long sleeved t-shirts and ball caps, Boston gives a jacket, Chicago gives the medical team both a jacket and a short sleeve t-shirt, Cowtown a t-shirt, and Houston a jacket and t-shirt. I cherish these items just as a runner would their medals.

The set up for the medical area is different with each race. I have worked in big tents, little tents, a

One of Katie's less complicated jobs at the New York City Marathon—making a sign for volunteers to find the "facilities."

"swine barn," a convention center, and in the open air. I have found it to be very important to check out all equipment available before runners start arriving. At one race a few years ago we had a runner come in who was struggling to breathe. It turns out he had an allergy to peanuts and had eaten a cookie that was causing him now to have a severe allergic reaction. There was a scramble to find who had the epi pen. As a result, I learned to always find out *before* a race who has the epi pen.

People run marathons for different reasons. One common thread I have found amongst runners is they are people who push themselves to excel. The medical team is the same. We bring to the tent our everyday experiences, no matter what our specialty is, and combine it with another set of skills, race medicine, to every race.

I have treated sore nipples, recognized runners who are on the autistic spectrum, had a patient who had a near death experience, soothed panic attack patients, helped mothers pump, explained to pregnant runners we cannot hear her baby's heartbeat with a stethoscope, as well helped treat exercise-associated collapse, heart attacks, hypothermia, and hyperthermia. Runners are always so grateful for the help we give them. One young man, in his twenties, even offered to help me find a boyfriend.

Psychologist Mihaly Csikszentmihalyi talks and writes about the "flow" runners experience. Getting in the "flow" refers to "getting in the zone, cranking out your best stuff, and just being awesomely lost in a creative process." I can honestly say I feel that "flow" when volunteering with races. Yes the runners are amazing people. One has to admire someone who has dedicated themselves to push to train and finish a race. For me the "flow" begins before the race. My "flow" starts when I see my fellow medical volunteers. I have made friends, dear wonderful treasured friends—people I look forward to seeing all year at different races. I have grown as a nurse. When I am asked what kind of nursing I do I tell people: mothers and runners.

Thank you Shelley for your first "yes;" it changed my life. Thank you Barb, Chris, Jeff, Pierre, Jeanette, Francesca, Sara, Karen, Julia, Nicole, Bill, Tom, Robert, Bruce, Matt, Mike, Amanda, Heather, Dixie, John, Doug, Brandan, Stu, Scott, Betty and many more for welcoming me and teaching me.

Marathons are like ice cream. They consist of many flavors and all are delicious. They have all been special and I would welcome the opportunity to work even more races. I am looking forward to what I will learn at the IIRM medical meeting in October. Already counting the days!

Katie Powers, RN, is an international board certified lactation consultant and perinantal educator at Manatee Memorial Hospital in Bradenton, Florida.

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Running the Mile Continues on the West Coast

By Patrick Hogan III, DO

This past May marked the 8th annual *National Run a Mile Days* for elementary school-aged kids. The *Run a Mile Days* program was conceptualized by former AMAA Executive Director Dave Watt and, over the years, he closely managed its growth. The idea was to bring elementary school-aged kids across the nation together in a fun running training program that would lead up to a mile run on a given day in May [the program has now expanded to also include part of June]. The ultimate goal of the program has been to promote the love of running in younger children to, in turn, encourage more activity as they grow. This, of course, would address the sedentary issues associated with childhood obesity.

The *Run A Mile Days* program had been supported by the American Medical Athletic Association, utilizing funds generated by the Boston Marathon charity run program. With that support, elementary school-aged kids throughout the country joined their schoolmates each spring to run or walk/run a mile. This included our 14,000 students in the Gig Harbor/Tacoma, Washington, region. However, with the dissolution of the AMAA and its accompanying financial support for *Run a Mile Days*, the program became more limited.

In the Gig Harbor/Tacoma area, we were fortunate to maintain the program through the efforts of many local elementary physical education teachers and personal contributions to help purchase incentive prizes and materials. This past May we still had over 6,000 smiling kids enjoying the accomplishment of running a mile with their classmates on various days throughout the month. And with support from IIRM Executive Director Chris Troyanos and my own personal contributions, the kids were thrilled to receive "spinner" *Run A Mile Days* medals at the finish of their run.

Each day of the *National Run Days* program is filled with smiles and laughter, as it is not only a big accomplishment for the children but also tremendous fun for everyone involved—including the organizers. It is very gratifying to see the joy on the face of the children when they have reached the goal distance.

Besides the health benefits to be discussed, the greatest value of the program is to introduce young people to the joy of running so that they will continue to run on their own. The idea is to frame running in a positive light early on in life to avoid the

Students from Harbor Heights Elementary School in Gig Harbor, Washington, eagerly set out to run their one-mile course.

IIRM Member Dr. Pat Hogan encourages a young runner as he completes a lap.

Harbor Heights PE teacher David Rucci is an exemplary advocate for including fun physical activities in schools.

A finisher proudly displays her new medal.

negative connotations often associated with running. For example, youth sports teams use it to reprimand unwanted behavior and "dieters" sometimes use it as their own punishment when they believe they have consumed too many calories.

Although the kids do recognize that what they are doing is "good for them," they are not aware of the extent of physiologic benefits that are occurring in their brains and bodies. It has been long-recognized scientifically, but vastly under-recognized in the educational system, that children who exercise regularly (or during the school day) perform better academically and have less behavior problems than sedentary students. This was discussed in Dr. John Ratey's classic book Spark over 10 years ago and has been documented physiologically in research since then. We now know that as these kids (as well as exercising adults) are activating their muscles in a challenging and rhythmical manner, a sequence of epigenetic changes are occurring. The challenged muscle releases PGC 1 alpha that epigenetically actives exercise hormone Irisin that enters the brain as an activator of Brain Derived Neurotrophic Factor (BDNF). This in turn epigenetically promotes neuronogenesis and synaptogenesis. Although the primary intent of this sequence is to improve cerebral mediated muscle control and endurance, it also results in improved memory, executive function, and emotional control.

Children who exercise regularly (or during the school day) perform better academically and have less behavior problems than sedentary students

The kids also don't realize that running enables them to maintain their telomere length. In the recently published book *The Telomere Effect* by Nobel prize winner Elizabeth Blackburn, PhD, and co-author Ellisa Epel, PhD, it was explained that adequate exercise has a major role in enhancing telomerase and slowing the shortening of telomeres, as well as recovering their length. They note that those who maintain their telomere length have less incidence of neurodegenerative disorders including cognitive decline and Alzheimer's disease. Telomeres are structures on the chromosome ends that are essential for providing protection from enzymatic end-degradation and maintaining chromosomal and genomic stability.

What is important to note in regards to the *Run A Mile Days* program is that it encourages individuals to get active at an early age and, the organizers hope, to find the joy in staying active over time. The effect on the telomere length is greatest for the people who have done life-long exercise, rather than starting later in life (although it is never too late to start and always too soon to stop).

As a neurologist, the cerebral benefits of running are most intriguing to me but one of the major reasons for initiation of the *Run a Mile Days* program was as a countermeasure to the childhood obesity epidemic. Although the benefits of running seems obvious for childhood obesity prevention, it has greater implications long-term. We now know that obesity produces epigenetic changes that can be passed on to multiple subsequent generations leading to familial tendency of obesity. Besides the obvious goal of improving the health of the individual child by obesity prevention, it is also the far-reaching societal objective of controlling the obesity epidemic by prevention of obesity in their subsequent generations.

For all the reasons discussed, it is my hope that *National Run A Mile Days* can be maintained throughout the country. It is not a difficult formula to follow if champion benefactors can be established along with champion elementary physical education teachers. In our region, Dave Rucci of Harbor Heights Elementary School successfully promoted the program to other PE teachers in his district; I then used their example to promote it to other schools in our region. Over time, it can become self-perpetuating as it turns into an annual tradition in the schools (depending on the enthusiasm of the PE teacher and the recognition of its importance by their administration).

On the day of the run, some schools run in mass but it is more organized and fun to run in one or two grades at a time throughout the day. After each lap around a track, the child receives a mark on their hand to record the completion of the lap. These marks provide a further sense of accomplishment as they add up to one mile or, for many, beyond one mile.

T-shirts used to be provided as an incentive but they became too onerous to deal with in regards to sizing concerns, cost, and bulk. We discovered this year that the kids were even more excited to receive special *Run A Mile Days* "spinner" medals or "You did it!" wrist bands as their reward (and these were much easier to purchase and hand out). You can also bring in motivational speakers as we have done in previous years with Boston Marathon runners Harry Cordallis, who holds a record for his finish time as a blind runner, and Ed Lychik, who has a leg amputation at the hip but successfully completed the course.

Please contact me at the email below if you'd like advice on how to bring the program to your area, or if you have ideas on establishing alternate funding for the program. It is my understanding that Dave Watt is working to establish a non-profit to support *National Run A Mile Days* and still has an active website at www.runamile.org.

Patrick Hogan III, DO, is a "running neurologist" at Puget Sound Neurology in Tacoma, Washington. He is Director of the Puget Sound Regional Movement and Motility Disorder Clinic and the Tacoma Neurological Headache Center. He can be contacted at Hoganpsn@aol.com.

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The IIRM Welcomes Sweden and Canada

The International Institute for Race Medicine is pleased to welcome Mats Börjesson, MD, PhD (Sweden) and Lowell Greib, MSc, ND, CISSN (Canada) as representatives of our Ambassador Program. As IIRM Ambassadors, they will help us expand our global efforts to share evidence-based recommendations for medical care provided at endurance races. They will also facilitate the development of a collective voice within the race medical and public safety communities across the globe.

Mats Börjesson, MD, PhD

Dr. Börjesson is a professor at Göteborg University (Institute of Food, Nutrition and Sports Science and the Institute of Neuroscience and Physiology) and Sahlgrenska University Hospital. He is also Director of the Center for Health and Performance, Göteborg University, and a practicing physician in Östra, Goteborg with specialties in internal medicine and cardiology.

Börjesson has served on many task forces and chaired multiple societies including the Sports Cardiology Section of the European Society of Cardiology (2008-10); Swedish Society of Exercise and Sports Medicine (2013-15), where he was also the president from 2015-17; and the Swedish Society of Cardiology (2016-18).

In addition to sharing his expertise with many groups, Börjesson also enjoys providing care to competing athletes. He is currently the team doctor for the Sweden Women's National Football Team and the Ivory Coast Men's National Football Team. He is also an international speaker and has authored over 145 peer-reviewed scientific papers.

Dr. Lowell Greib, MSc, ND, CISSN

Dr. Greib holds academic positions at the Canadian Memorial Chiropractic College, National University of Natural Medicine, and the University of West Indies where he teaches methodology to improve athlete performance. He is the president of The SportLab, a specialized clinic located in Huntsville, Ontario, which offers consulting in sport injury rehabilitation and management to professional, Olympic, X-Games, and occupational athletes. He has also been the medical director for a variety of events including the Toronto Marathon, Limberlost Challenge Ultramarathon, and the IFSS Winter World Championships.

During his four years of medical training at the Canadian College of Naturopathic Medicine, Greib founded (and subsequently directed) the sports medicine program. And prior to that, while completing both his degree in Biochemistry/ Biotechnology and his graduate research in analytical chemistry at the University of Waterloo, he raced professionally as an ultra-distance mountain biker. He has also completed numerous marathons and is a two-time Boston Marathon finisher with multiple qualifications and a PR of sub-3 hours.

If you are interested in learning more about the IIRM Ambassador Program, please write to info@racemedicine.org.

IIRM EDUCATION & RESEARCH FUND

Donor Recognition

The following individuals contributed to the AMAA Premier Member program and/or the IIRM Research & Education Fund at the Olympian, Patron, or Supporter level from April 1, 2017 to July 1, 2018.

To make a contribution to the Fund, go to www.racemedicine.org and click on the "Donations" icon on the home page. If you prefer to mail your contribution, please make your check payable to the International Institute for Race Medicine (or IIRM) and send to 41 Lafayette Lane, Norfolk, MA 02056. Be sure to include your name and contact information with the check so we can properly recognize you for your donation. All donations are tax-deductible and individuals contributing at the Supporter level or above will receive a one-year IIRM membership (or renewal).

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Terrence Kavanagh
Jeffrey T. Kirchner

** Contributions surpass Olympian level*
± Life Member

IIRM Olympian Member Scott Clark, MD (far right), with family members at the 2018 Boston Marathon Expo. Included in the photo are, from left, his two nephews Yannick Cornuz and Russell Clark (camo and blue jackets); wife Nicole Clark, RN; former AMAA Board Member S. Mark Courtney; and Scott's mother and father, Cindy and Charles Clark, MD, who happens to be one of the original AMAA members.

IIRM 2018 Sports Medicine Conference Series: Washington, DC

Alice and Russell True Auditorium/
MedStar Washington Hospital Center
110 Irving Street, NW, Washington, DC
October 26-27, 2018

MedStar Sports Medicine

Presented by the International Institute for Sports Medicine, sponsored by MedStar Sports Medicine, and held in conjunction with the Marine Corps Marathon and Uniformed Services University Consortium for Health and Military Performance (CHAMP).

Lectures include a keynote presentation by Robert Sallis, MD, FAAFP, FACSM, on exercise prescription; as well as gait retraining for running injuries by Eric Magrum, DPT, OCS, FAAOMPT; cardiovascular considerations for runners by Ankit Shah, MD; advanced therapies for injury by Sean Mulvaney, MD; and more. The program also includes multiple workshops focusing on team-based analysis of medical tent scenarios and interactive sessions on topics such as dry needling and VO2Max testing and zone training implementation. The full agenda can be viewed at www.racemedicine.org under "Education/Resources."

Attendees have the option of running the SOLD-OUT Marine Corps Marathon* (limited number of entries) or volunteering in the medical tent for additional CME credit hours.

*If you are interested in running the Marine Corps Marathon, please contact IIRM Membership Director Barbara Baldwin, MPH, at bbaldwin@racemedicine.org.

Follow our blog authored by Marine Corps Marathon Medical Coordinator Shelly Weinstein, PT, MS, SCS, ATC, USN Retired. Among the topics currently being discussed are testing and treatment for hyponatremia. Should sodium levels be tested prior to the introduction of an IV? Shelly also brings up the topic of athletes with disabilities. What particulars should race and medical directors address in order to have a safe course and appropriate care for such athletes? Another population discussed in the blog are youth participants. At what age should children be allowed to first participate in an endurance event?

Join these discussions and others, by going to **https://racemedicine.blogspot.com.**