



AUTO+ MEDICAL

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TESTING TIMES

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 We welcome your feedback: medical@fiainstitute.com



For many sports, doping has been a near constant and unfortunate narrative.

Thankfully this problem has never been prominent in motor sport, but just because there is no epidemic does not mean that there is not a lot of hard work and consideration put into our own control systems. Our lead story this issue focuses on providing an insight into the FIA's anti-doping procedures and the challenges facing those tasked with administering and enforcing them.

We also speak with Dr Jacques Tropenat, the FIA's medical delegate for WTCC, GT and WEC events, who discusses the many aspects to his roles. We then bring you a timely interview with three-time Le Mans winner Allan McNish on his experience of medical care as a racing driver, after a series of concussions.

Following the successful Medicine in Motor Sport Summit in Doha we look at some of the most thought-provoking papers from that event. Our Scientific Paper this time looks at the challenges of setting up a medical facility at a Formula One race, using the inaugural Austin Grand Prix as a case study.

I hope you enjoy the latest issue.

Professor Gérard Saillant
 FIA Institute President

LETTERS

In this section, we print the best letters and emails received from readers around the world. We welcome comments on articles as well as suggestions for future content or insight into an area of motor sport medicine you feel would be relevant. If you wish to send in a letter or email, please direct it to: medical@fiainstitute.com

Dear Editor

As CMO for motor sport in the UAE for the last nine years I have been involved in managing many incidents on both the track and in the rally environment. It is a current requirement to have a doctor in medical intervention vehicles according to regulation. This is at odds to what would happen at a normal road traffic accident where an incident would be attended by a very experience paramedic team in the first instance. Pre-hospital medicine is what paramedics do best. It takes a special kind of doctor to understand the pre-hospital scene.

The first principles of pre-hospital medicine are well understood. Time to definitive care is the crucial factor. Definitive care is usually the full trauma team in a hospital environment and not the doctor at the track medical centre. Is it not time to increase the number of paramedics at motor sport events and reduce the number of doctors? I wonder what experience others have from around the world?

DR. SEAN PETHERBRIDGE MBBS MRCP
CHIEF MEDICAL OFFICER
AUTOMOBILE & TOURING CLUB OF THE UAE

Editor: Thanks for raising this topic. AUTO+Medical aims to provide a platform for discussion and debate within the motor sport medical community. We look forward to responses from around the world.

Dear Editor

After three issues of Auto+ Medical, I want to thank the editorial board for publishing this International Journal of Motor Sport Medicine.

I enjoy every article and section, from the letters to the editor to scientific papers. But I want to especially thank those who have participated in “the road back” section.

Thanks to Anthony Davidson, Mike Conway and Marcus Gronholm for sharing with us your experiences. We paramedics, technicians, nurses, doctors, etc., have a lot to learn from those experiences.

I’m proud to be part of this family: the Motor Sport Medicine family.

DR. PEDRO L. ESTEBAN
FIA MEDICAL PERMANENT DELEGATE
(WORLD RX)

Editor: Thanks for providing this feedback. We would encourage all of our readers to let us know what they like and perhaps dislike about the journal so we can continue to provide the most relevant information to our audience. All should feel free to write and offer suggestions for future subjects they would like to see covered in the publication

STAR LETTER

Dear Editor

Thank you for the new issue of Auto+Medical.

People have become more and more conscious of the great advantages of the 'Lid Lifter' balaclava (*see news article in A+M #3*) and this device is now integrated in the NHRA rulebook (Drag racing, USA, more than 100 000 members), so we are really happy that Auto+Medical can spread the information even further. For sure, all the people who have tested it were impressed and the medical teams we met during the first international extrication seminar at Le Mans but also during the FIA Pan-American Medical Congress in Acapulco and the FIA Institute Medical Summit in Doha gave us clearly the feedback that it would ease a part of their work.

The article about Markus Gronholm was also a positive thing because he underlines the need for drivers to give more attention to their equipment and more education about their functions, which is totally what we try to do with our foundation www.racinggoessafer.org and what other organizations like the FIA foundation put ahead.

And I personally was particularly sensitive to the Article of Dr Edward S. Potkanowicz and the part about heat stress. I was in touch with the likes of Mansell, Senna, Piquet, Prost, etc. in the 80s to develop new racing suits which offered breathability (Launched in 86). They were quickly adopted by them for this feature but unfortunately forsaken when racewear in Formula 1 became nothing but sponsorship.

Today, the heirs of these suits are still the most breathable in the world (and the only ones 100% stretchable) and a big medical study we made with Pr Meistelman and the French army 10 years ago as well as independent studies (From JAF, for example) clearly shown that the effort duration greatly depends on the performance of drivers equipment.

Thank you once more for the quality and diversity of your articles.

YVES MORIZOT, CHAIRMAN AND FOUNDER, STAND 21

GLOBAL NEWS



ACCIDENT DATA RECORDERS FOR F4

Accident Data Recorders (ADRs) are set to become mandatory for all cars in national FIA Formula 4 Championships around the world, following a decision by the FIA World Motor Sport Council. The low-cost formula was introduced in 2014 as an entry-level single-seater series and all eight of the regional championships operating under F4 rules will incorporate the devices.

This is on top of the recent addition of ADRs in the FIA GT championships, as well as Germany's popular DTM series and the FIA Formula 3 European Championship. It is all part of the FIA Institute's ongoing efforts to provide

the technology in affordable form for all motor racing championships.

These 'black boxes' can hugely help with safety development by providing specific crash data to safety researchers. "The benefit is understanding more about what happens in accidents and how the safety systems and crash structures respond during a crash," said research consultant Andy Mellor. "It also helps us understand how the driver's safety equipment is performing and allows us to more fully understand the limits concerning drivers' tolerance to injury."

SFI ISSUES FAKE EQUIPMENT WARNING

The SFI Foundation, a non-profit organisation established to issue standards for racing equipment, has warned that there are counterfeit HANS devices in circulation and that anyone who suspects that they might have one should take action immediately.

The foundation said that Simpson Performance Products has discovered copies of its head and neck restraints being used.

Those who have Hutchens Hybrid Pro devices with a 2013 SFI 38.1 label are warned by the company that they might not be genuine, particularly if they have been purchased from a third party through websites such as Ebay. They further note that the counterfeit products have straight stitching rather than 'box x' stitching on the tethers.

The fake equipment is potentially endangering lives, as these versions are often manufactured to a substandard quality and have not undergone stringent testing to ensure they properly protect the user.

The SFI advises that if you suspect you have such a device and you are participating in an event, immediately present it to technical officials.



F1 TEAMS LEAD MULTI-DISCIPLINE MEDICAL EVENT



Leading names from the motor sport, automotive and medtech industries came together in Oxford, UK in March to discuss how advances in those sectors could drive quality health services.

Organisers Lifesciences Healthcare Ltd have been test-driving such cross discipline sessions in partnership with the Science and Technology Facilities Council (STFC).

Williams Advanced Engineering, Magna International, McLaren Applied Technologies, STFC's RAL-Space and Computing

departments, Innovate UK, Oxford Academic Health Science Network and Leica Biosystems, delivered keynote talks.

The one-day event at the STFC's Rutherford Appleton Laboratory focused on exploring how advanced technology used to monitor performance could be transferred to enhancing how patients are cared for.

"The monitoring techniques being used in care are a long way behind those in sectors such as F1," said Dr Gugs Lushai, a Director at Medilink.

WORLD COUNCIL APPROVES

The FIA World Motor Sport Council (WMSC) approved a number of medical and safety regulations and changes at its recent meeting in March.

Officials voted in favour of imposing penalties on all those who fail to comply fully with mandatory medical questionnaire requirements, starting from 1 January 2016. Exact plans for sanctions have yet to be announced.

The FIA's Appendix H, the set of rules that applies to racetrack safety, will now be used as part of Rally Safety Guidelines with the intention of enhancing spectator safety at such events.

Competitors in historic motor sport events will now be allowed to install a harness with only four mounting points when it is not possible to use a harness with five or six points. This regulation change is in reference to regulations in Appendix K and FIA standards 5584/98 and 8853/98.

COSTA RICA TO HOST YOUTH ROAD SAFETY CONFERENCE

As part of the United Nations' road safety initiative, the Automobile Club of Costa Rica (ACCR) has been chosen to host the Child Road Safety in the Americas Conference on 7-8 May this year.

The event will take place during the UN's third global road safety week in San Jose, Costa Rica, with representatives from various countries, bodies and organisations meeting to discuss and deliberate an agenda made up of wide ranging road safety issues.

The Costa Rican Vice President, Ana Helena Chacón Echeverría, will also be in attendance.

The FIA Foundation is providing financial and logistical support, while other organising committee partners include the US Center for Disease Control & Injury Prevention, the Inter-American Development Bank, the World Bank, IRAP and the Gonzalo Rodriguez Foundation.

Carlos Macaya, President of the Automobile Club of Costa Rica, said: "The Congress on Child Road Safety in the Americas will provide an important and timely opportunity to raise awareness about the scale of child death and injury on the roads of Latin America and the Caribbean, and to call for high level support for road safety action."

'HEAT' AND 'HELMETS' UP FOR DISCUSSION AT SAFETY SEMINAR

The fourth annual Racing Goes Safer Seminar was held during the Toyota Grand Prix of Long Beach on Saturday, 18 April.

The event, organised by the Stand 21 Safety Foundation, is open to drivers, crew, medical personnel and other motor racing industry professionals. It covered contemporary medical subjects that affect motor sport.

The concept of the seminar is to provide a platform for education on pressing safety issues and for every attendee to leave with new knowledge that they can immediately apply to make the sport safer. To achieve this, the foundation asked respected figures in motor racing to present ideas and research to those in attendance.

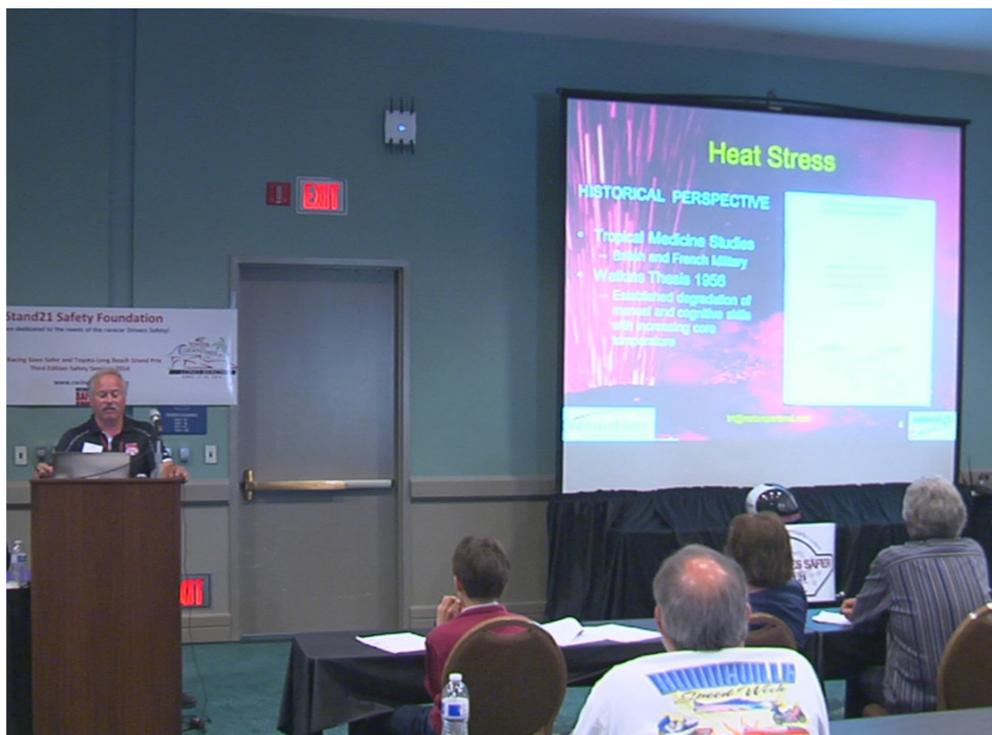
Yves Morizot, President of the Stand 21 Safety Foundation and founder of Stand 21 Racewear, said: "Having dedicated the last forty plus years to developing better safety equipment, I saw the need to bring the knowledge of racing safety experts down to the

participants at all levels and in all forms of racing."

This year's speakers included Dr Jacques Dallaire who delivered a presentation on how to maintain optimum focus while racing and Martin Christensen who talked about how to safely remove a helmet in isolated conditions. Christensen, himself a noted off-road racer, also provided insight on other issues that drivers might face when racing in the desert.

Ohio Northern University's Dr Edward Potkanowicz spoke about the dangers of heat stress to drivers in his talk titled 'The Heat of the Competition'. His session included advice to drivers on how to prepare for the challenge of racing in hot conditions.

In addition, Ed Becker, Executive Director and Chief Engineer of the Snell Memorial Group, discussed the new Snell SA2015 specifications for helmets that will come into effect later this year, informing those present of the changes and how and why they came about.



APPLICATIONS OPEN FOR WATKINS SCHOLARSHIP

Candidates are invited to apply for the Sid Watkins Scholarship, a fully funded internship that will enable the successful individual to contribute to important motor sport safety research. The FIA, FIA Foundation and the FIA Institute are jointly funding the scholarship, which is open to candidates currently studying engineering or medicine.

Former FIA Institute President Professor Sid Watkins OBE, who passed away in September 2012, is regarded as one of the leading pioneers of safety in motor racing.

The scholarship pays tribute to his vision and philosophy, rewarding the successful applicant with a paid internship to pursue a range of relevant medical or technical research projects. They will work with the Institute's research partner, the Global Institute for Motor Sport Safety (GIMMS), and will be expected to dedicate a minimum of three days a week to the role.

Info: fiainstitute.com



MCLAREN AND OXFORD UNIVERSITY FORM MEDICAL CARE PARTNERSHIP

McLaren Applied Technologies and Oxford University have entered into a partnership to look into ways of improving patient care and enhancing treatment journeys.

The three-year agreement, signed at McLaren's headquarters, will see the two entities collaborate on surgical simulations and outcomes monitoring as well as optimising clinical care and the use of facilities.

Oxford's leading surgical minds will look to draw upon McLaren's experience and expertise in simulation technology, data management and predictive analysis to improve the delivery of key NHS services and procedures. The initiative will also create job opportunities for both students and permanent staff as part of the new joint project team.

Sir John Bell, Regius Professor of Medicine at Oxford, commented: "We are excited about the collaboration with McLaren as it will bring a new type of thinking to the issues of medical technology and efficiency. There are likely to be great benefits to patients that emerge from this interaction."

McLaren has a track record of assisting the medical profession, once helping cardiac surgeons at Great Ormond Street Hospital to reduce the risks involved with changing feed lines during patient handovers. The Formula One team used their experience of similar high-intensity manoeuvres during Grand Prix pit stops to advise on how the hospital could improve their procedures.



WORLD'S LIGHTEST HANS GETS FIA APPROVAL

The HANS Pro Ultra Lite has been awarded certification by the FIA to be used in competition, making it the lightest device of its kind available.

Manufactured by Simpson Performance Products, it is 100 grams lighter than its predecessor, achieving the weight savings by using aerospace grade carbon fibre. The device retains features from previous models such as winglets for operational ease.

The Head and Neck Support (HANS) device is a protective piece of equipment designed to drastically reduce the risk of head and neck injuries, particularly basilar skull fractures.

Chuck Davies, Simpson's CEO, reaffirmed the company's commitment to refining their HANS products and said that improving their FIA product line is something that they have focused on recently.

FEATURES

TESTING TIMES

With stricter punishments and a planned compulsory education programme for international racing drivers, the FIA is seeking to drive drugs out of motor sport.

The use of performance enhancing drugs is not widespread in motor sport but the dangers and consequences of drivers doping are very real. This is why the FIA takes the matter seriously and has been increasing its efforts in this area.

On average 160 drivers are tested in and out of competition every season at the international level and only a handful of them test positive for a banned substance. Many of those who test positive are not deliberately cheating but have taken recreational drugs or inadvertently doped with prescription medicine. But this can be even more of a problem given the inherent dangers in motor sport.

So whilst there is clearly no pandemic, the cases that come to light each year demonstrate the continuing need to tackle any use of banned substances.

To deal with the issue, the FIA is utilising a two-pronged approach. The first strategy is to deter competitors from even considering doping as an option. Drivers, teams, event organisers and even FIA officials are unaware if and when a doping test will be carried out, and tests are indeed carried out, in all disciplines and in all continents. This serves as a deterrent to potential dopers with the simple premise that they could be caught at any moment. Furthermore standard bans for intentional doping have been increased from two to four years in line with the World Anti-Doping Agency's (WADA) policies.

The second measure is educational. The FIA is planning to make its e-learning programme, Race True, mandatory for all drivers with an international licence from 2016 onwards. The course and quiz, available in seven languages (with more to come), are entirely online and take about one hour to complete.

Although Race True is already available via the FIA website many drivers ignore it, as they



Sandra Silveira Camargo is the FIA's Head of Medical Affairs.



Jan Stovicek is President of the FIA Anti-Doping Disciplinary Committee.

do with other information about anti-doping. But under new rules they will have to take the course or risk losing their racing licence.

Jan Stovicek, President of the FIA Anti-Doping Disciplinary Committee (ADC), explains: "Some drivers are prescribed medicines for illness and they don't realise that it might contain a prohibited substance. This is serious because in the regulations it is necessary to apply to the FIA for a Therapeutic Use Exemption (TUE). Sometimes drivers think if the doctor in the hospital prescribes the medicine then it is OK but not all doctors are aware of the anti-doping regulations or what substances are banned and it is not their responsibility to know either."

While many might see this as an unnecessary fuss, it is important to note that not only can these drugs be performance enhancing, they can also have a negative effect on a driver's ability to drive in a safe manner by reducing reaction times and affecting clarity of judgement. Sandra Silveira Camargo, the FIA's Head of Medical Affairs, stresses the importance of such regulations: "In motor sport anti-doping is above all else a matter of safety, not just for the driver concerned but also for his fellow competitors, officials and spectators. The wider safety implications are unique to our sport."

The issue of impaired ability is also the core

concern in the fight against the use of recreational drugs. Such substances, including alcohol, remain in the system for longer than many realise. "Our biggest problem with the drivers is

“OUR BIGGEST PROBLEM WITH THE DRIVERS IS IGNORANCE.”

ignorance," says Stovicek. "This is especially the case for recreational drugs, like cannabis and cocaine. We handle a lot of cases of ignorance with drivers who just don't care about how dangerous it is to use these drugs and how long it stays in the body."

The FIA applies the so-called "WADA Prohibited List", which is the list of substances and methods prohibited in all sports. This list includes two substances prohibited only in certain sports – alcohol and beta-blockers. These substances are not prohibited in sports like athletics and football – but they are in motor sport because they are considered as a temporary performance-enhancer and, of course, above all due to the specific dangers they pose, namely the impairment of the senses that are necessary to drive safely at high speeds.

Because of these risks, much importance is placed on in-competition tests (compared to out-of-competition tests) to ensure that those endangering themselves and others can be caught.

The FIA is clear that at the heart of the matter it is the drivers' responsibility to understand what they are putting in their body, intentionally or otherwise.

"Every driver should take responsibility," says Stovicek. "Firstly, when taking medicine each driver should really be very careful and consult

a specialist who can tell him what is in it. Secondly, the drivers should behave responsibly, especially for drugs like cannabis. You can be intoxicated even by passive smoking so the driver who spends evenings in bars clubbing, even if he or she does not actively smoke, can be intoxicated."

Ultimately it is up to the racing drivers to ensure they stay clear of any situation that may result in a failed doping test. As Stovicek puts it: "Drivers need to realise this and avoid any style of life that includes this danger."

THE 2015 PROHIBITED LIST

PROHIBITED SUBSTANCES

- S0 Non-approved substances (such as drugs under development)
- S1 Anabolic agents (such as testosterone)
- S2 Peptide hormones, growth factors, related substances and mimetics (such as epo)
- S3 Beta-2 agonists (such as terbutaline)
- S4 Hormone and metabolic modulators (such as insulins)
- S5 Diuretics and masking agents (such as thiazides)

PROHIBITED METHODS

- M1 Manipulation of blood and blood components
- M2 Chemical and physical manipulation
- M3 Gene doping

SUBSTANCES AND METHODS PROHIBITED IN-COMPETITION

- S6 Stimulants (such as cocaine, methedrone and amphetamine)
- S7 Narcotics (such as diamorphine and pethidine)
- S8 Cannabinoids (such as hashish and marijuana)
- S9 Glucocorticoids

SUBSTANCES PROHIBITED PARTICULARLY IN MOTOR SPORT

- P1 Alcohol (threshold equivalent to a blood alcohol concentration of 0.10 G/l.)
- P2 Beta-blockers (such as alprenolol and timolol)

DR. VALÉRIE FOURNEYRON

President of the World Anti-Doping Agency's Health, Medical & Research Committee

Following a successful career in politics, Dr Valérie Fourneyron accepted a high-profile role at WADA to strengthen the global anti-doping movement. AUTO+ Medical asked her about her new role and what she thinks about doping in motor sport.

AUTO+ Medical: In January you were appointed President of the Health, Medical and Research Committee for WADA. Why did you want this position?

Valérie Fourneyron: This role allowed me to continue to chase my personal and professional goals, namely the fight against doping. It was a fight I was undertaking very early in my career as a sports doctor working for top volleyball, ice hockey, basketball and swimming teams. In 1989 I was given the task of restructuring the French department for sports medicine at the Ministry for Sport. This job gave me the opportunity to work on projects monitoring high-level athletes, their preparation and their performance as well as the chance to establish doping prevention policies. Then in 1995 I began my career in politics with sport and health being my foremost specialities. I was an assistant for sports in my region, before becoming an MP and Mayor of Rouen, the capital of upper Normandy. This path led me to the Ministry of Youth and Sports in 2012 where I made the fight against doping one of my priorities, which is when I first became involved with WADA through their European Council. Ultimately, my Presidency of the Committee was a natural progression for me. It is a position I am very honoured to hold.

A+M: What are your daily responsibilities in this committee?

VF: I am fully involved in three major areas. These are updating the list of prohibited substances and methods, the accreditation of research laboratories and the prioritising of research projects. I define strategy, provide guidance and ensure we have the ability to be innovative. WADA is a highly scientific organisation operated by top-level experts – they rely upon me to provide advice of a very high quality. The aim of the Presidency is to provide the best platform for WADA members to ensure sport is clean.

A+M: In your opinion, what are the main obstacles you face in your role and why?

VF: A few weeks ago I would have probably said the lack of financial resources for research, but the IOC and various governments have mobilised to provide €13 million of funding. This is truly excellent news. With these additional resources I believe we can make great progress.

A+M: What are the recent initiatives of WADA to reduce or eliminate the problem of doping?

VF: On 1 January 2015 the new World Anti-



Doping Code came into effect. It is a culmination of three years' work that involved all of the anti-doping community. It's a tool that is more effective, more ambitious, more balanced and easier to understand – ultimately it is a huge step towards ensuring safer and fairer competition.

I think it is worth highlighting certain aspects of the new code including the ability to consider indirect evidence, new intelligent controls, the proportionality of sanctions, the capacity to take into account different sporting environments and the increased autonomy of national anti-doping organisations.

Doping as a practice is constantly changing and it does so quickly. Our success depends upon the ability of the tools at our disposal to adapt and involve to the environment in which we are fighting these cheats.

A+M: How is motor sport different from other sports in regards to anti-doping?

VF: The FIA is one of the federations that is fighting to keep alcohol as a prohibited substance.

There has been a debate for years about the possibility of removing it from the list of banned substances and let the individual sports themselves decide if they want to ban it. But motor sport regularly presents a very clear case to show that alcohol has clear doping attributes.

There are three criteria that determine whether a product (or practice) should be considered doping: does it improve athletic performance? Does it infringe upon sports ethics? Does it impact negatively on the health of athletes? I thank the FIA for being so vigilant on this subject.

Fighting against alcohol in motor sport is

also a major safety challenge and a priority of President Jean Todt.

A+M: The FIA's Disciplinary Committee on Anti-Doping said that the main cause of doping is ignorance of the rules. To what extent is this a problem in other sports, and what actions can be taken to train the athletes?

VF: This is an issue in all sports and you are right to point it out. The long-term eradication of doping will be through educational programmes based on the integration of values that promote an anti-doping culture.

The Athletes Committee, led by the Canadian cross-country ski champion Beckie Scott, has made education and training a top priority. After all, how do we fight against doping effectively if the main concepts are misunderstood?

Beckie and her team have created 'athlete friendly' tools that teach their colleagues what they can and cannot do. The guides they have created have clear language, explicitly define jargon and explain just how new rules affect them specifically as athletes.

A+M: What could motor sport do to improve its anti-doping control procedures?

VF: We have recently been informed that a large event - the Paris-Dakar Rally - was not subject to controls at its last edition. I take this opportunity to remind all the major events that there should be intelligent controls at each race and it is important for promoters to work as much as possible with the national and regional anti-doping organisations to maximize the effectiveness of the control plan where necessary.



“ FIGHTING AGAINST ALCOHOL USE IN MOTOR SPORT IS A MAJOR SAFETY CHALLENGE AND A PRIORITY OF PRESIDENT JEAN TODT. ”

A+M: What are your future projects within WADA?

VF: We are particularly active in the development of the new Anti-Doping Administration and Management System (ADAMS). Contrary to what we hear too often, ADAMS is not a geolocation tool. It's a management system that allows us to smartly monitor an athlete's biological passport while allowing for the therapeutic use of medication. It's designed to be a comprehensive tool that greatly improves the efficiency of the fight against doping.

MEDICAL OFFICER PROFILE:

DR JACQUES TROPENAT

Medical Delegate, FIA World Touring Car Championship
 Medical Delegate, FIA World Endurance Championship
 Medical Delegate, FIA GT championships

When a teenage Jacques Tropenat fell in love with motor racing at his local kart track, he dreamed his passion could become his work. It became reality when he was asked to drive the Formula One medical car alongside Professor Sid Watkins for the 2002 season. Now, 13 years later Dr Tropenat still lives and breathes motor sport as the FIA Medical Delegate for WTCC, WEC, and GT.

AUTO+ Medical: How did you first become involved in motor sport?

Jacques Tropenat: I was around 16 when I started karting. The first track I went to was very rudimentary, but it was a revelation to me and I knew immediately that it would be my passion, like a virus that contaminates my life in a positive way.

For personal reasons I was unable to become a professional driver, so I enrolled at medical school swearing that after my studies, if my financial situation allowed me, I would return to motor sport.

To my amazement, at the end of 2001 the FIA contacted me through Stephane Ratel to drive the F1 medical car alongside Professor Sid Watkins. For seven years I did this and progressively my role got more and more medical in function.

A+M: Why did you get involved?

JT: Motor sport is a part of me, it is in my genes so when the FIA asked me to drive the medical car and be a part of F1, it was amazing because I was going to be a part of this sport and get up close to these drivers

who were my heroes. I had never imagined that my profession would combine with F1 and other FIA World Championships. My passion has joined with my business.

A+M: How did you come to be the Medical Delegate for WTCC, WEC and GT championships?

JT: After seven years of loyal service to F1, I was asked to become the medical delegate of the WTCC, WEC and GT championships, which I accepted immediately. Through my work in F1 I had met many people, including all of the medical teams around the world and this enabled me to work with them right away as there was a mutual trust with these teams that we'd already established.

A+M: What do your roles involve?

JT: The role requires me to have a great devotion to the job, but I must say that it is easy when you're passionate about it. Part of my role is about adaptation to different ways and customs of different countries. For example, Chinese, Russian, American and French doctors do not



The drivers under the care of Dr Tropenat pictured with their cars for the 2015 WTCC season



necessarily have the same approach when it comes to pre-hospital care or medical procedures at a circuit. But because specifications for medical care at World Championships are strict, there is little room for different interpretations of the guidelines.

A+M: What are your specific race weekend responsibilities?

JT: The responsibility of the medical representative at an FIA World Championship event is primarily a role of monitoring compliance with Appendix H (the FIA’s medical rules), which must be our bible. Alongside the head doctor I will inspect the entire medical organisation several times a day. This includes the medical centre: verifying personnel, equipment, means of transfer to hospital, ambulances, helicopters etc. are available and of sufficient standard. I also inspect the track: checking the medical cars and equipment and ensuring that the extraction teams, with whom we regularly practice procedures, are ready. In the event of a serious accident and a red

“ WE HAVE THE SAME RIGOUR AS F1 WHEN IT COMES TO MEDICAL SAFETY ”

flag, I will go to the site of the crash to ensure the good care of the injured and that extraction and first aid is of good standard. I will then follow them to the medical centre where I will consult with the head doctor and make sure that the transfer to hospital is appropriate and that the hospital is fully briefed on the situation. Sometimes we must ask the race director to delay or cancel a session if the medical

conditions are not fully up to the standards of Appendix H. An example of this would be if the helicopter were unable to take off from the circuit or land at the hospital, especially if that hospital is far away. Although the ultimate decision is that of the race directors, they will never go against our advice. We are also responsible for the smooth running of anti-doping controls, that is to say that we do everything in our power to ensure that the examining doctor has the right conditions in which to carry out their duty.

A+M: What are the medical challenges in touring car racing?

JT: There is no particular medical challenge specific to the WTCC. For touring cars, like with other World Championships, we have the same rigour as F1 when it comes to medical safety, but I must say that the closeness of the paddock makes it a friendlier working environment. However the financial means of the WTCC are not the same as F1 and it is not uncommon that we find a reluctance to spend money on some of the initiatives we introduce. I believe that apart from the mandated presence of a single helicopter for WTCC races (instead of the two for F1), all of the medical organisation must be the same. WTCC sometimes races at circuits that are in my opinion not worthy of a world championship, but my role is then to apply and enforce Appendix H as best as possible.

A+M: What's been the biggest challenge of your career in motor sport so far?

JT: As a doctor working in motor sport, I do not feel I have had any large challenges. Of course, there have been difficulties because some circuits and medical staff have no experience with world championship motor

sport but passion, dedication and patience help overcome this kind of challenge. I am obviously very sad to announce a death in a race, but fortunately there are very few. I remember that at the death of Henry Surtees, I was so scarred by the circumstances that led to that tragedy that I wondered if I was crazy to worship this sport, to the point of wanting to chuck everything away. But my passion is strong and it helped me through.

A+M: What did you learn from that experience?

JT: I've learnt the importance of good medical organisation, which is something I was not aware of when I was competing. I think a lot of drivers, even at the top echelons of the sport, cannot imagine how many people there can be at a circuit that are immediately available to them if necessary. I had to learn how to cope with the pressure that comes from working with very rich and famous stars. I have found that if you are professional, you will be respected. We are dealing with drivers who operate in a media-centric world, so we must be firm with them.

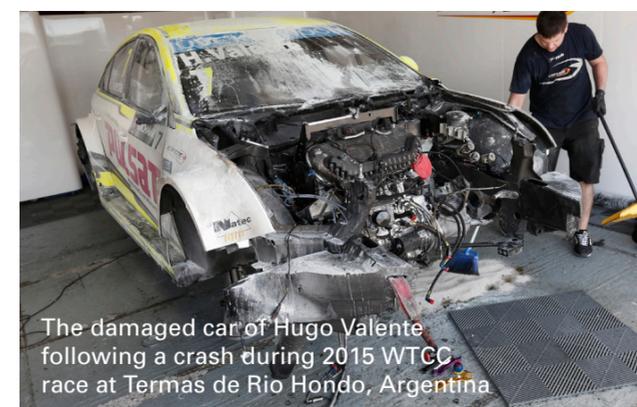
It is also important to anticipate what might go wrong so as not to be caught off guard. It is therefore essential that we have control over a circuit and its personnel so we are prepared to deal with anything that happens.

A+M: What changes to medical practices in motor sport have you seen during your career?

JT: When I started racing, medical support often consisted of just an ambulance and a more-or-less qualified physician. There was no question of having an anaesthesiologist on site, what purpose would it have served?



James Thompson (11) crashes during the 2014 WTCC race at the Salzburgring, Austria.



The damaged car of Hugo Valente following a crash during 2015 WTCC race at Termas de Rio Hondo, Argentina

A+M: In your opinion, what still needs to be improved?

JT: If we are to continue to strive for our sport to have near zero medical risk, medical professionals should be required to consult on the construction of circuits to ensure the requirements we impose can be met. But it is not always the case that new tracks can achieve this. Furthermore it should be mandatory that any doctor working at a motor sport event has specific training. For example it is not uncommon to see a doctor who does not know how to remove a helmet.

A+M: What else would you like to achieve in your motor sport career?

JT: If I were to tell you that I'd like to be President of the Medical Commission, I don't think our current president, Professor Gérard Saillant, would be too happy! I am very satisfied with what I do, because I am at the circuits with colleagues from around the world with whom I share a passion and with whom we overcome difficulties together.

There was no medical centre anyway! If an injury occurred, the patient would be put in the ambulance and driven to the nearest emergency unit. This has all improved significantly, with the presence of specialised doctors, medical staff and facilities. During my time at the FIA, there has been no real change in the medical organisation of an international race. The fundamentals were in place when I started. The only thing that has changed is, in my opinion, Annex H becoming more and more substantial. It imposes more and more regulatory procedures that make it more difficult to misinterpret or obfuscate rules for any reason.

medicine in motor sport+

Doha 01-02 December 2014



MEETING OF MINDS

The 2014 Medicine in Motor Sport Summit featured presentations and papers on a series of thought-provoking subjects

The latest Medicine in Motor Sport Summit, held in Doha in December, featured two days of delegates discussing concepts, presenting research and investigating ways to improve medical practices in motor racing. Jointly organised by the FIA and the FIA Institute, the biennial event forms part of the FIA General Assembly and is a chance for

motor sports' leading medical practitioners to share ideas and experiences. FIA Institute President Prof Gérard Saillant opened the summit and was followed by presentations on the techniques used and specific challenges facing the World Rally Championship, Formula One, GP2, GP3 and Formula E. Round table discussions on

electric, hybrid and rally safety also took place, as well as presentations of research papers from various professors, doctors, chief medical officers and other experts.

The second day involved presentations on the World Endurance, World Touring Car and World Rallycross championships, before becoming more hands on with workshops for attendees at the Aspetar Hospital, the Gulf's first dedicated orthopaedic and sports medicine institute. The state-of-the-art facility hosted a variety of practical exercises and interactive discussions under the guidance of some of the world's leading sport medicine practitioners.

PAPERS AND TOPICS

Many leading experts in their respective fields presented research papers at the summit.

Dr Ian Roberts, Chief Medical Officer of the UK's Silverstone circuit, shared data and findings from his team's review of all 1,079 medical incidents at the track over the past four years. The study provided a statistical platform for future research as well as insight into the volume, demographics and nature of medical care at an international racing venue.

Prof Hugh Scully delved into the history and progression of medicine in motor sport with a presentation on the Critical Role of Physicians in Motor Sport Safety. Using IndyCar and F1 as examples, he highlighted the innovations and developments that had been implemented and the very real difference they've made to both competitors and spectators alike. He also highlighted the ongoing work of the FIA Institute's Medical Advisory Panel.

Dr Sean Petherbridge from Abu Dhabi presented a Case Against Extraction Teams,

arguing for a reform of the deployment model. He called for the allowance of alternative techniques to extricate a driver from a car in situations that don't necessitate an extrication team, pointing to research that suggested that the use of cervical collars, self-extrication and spinal boards cause less additional trauma to patients.

Dr Jean-Jacques Issermann spoke to delegates about the new FIA Accident Database, explaining procedures and policies, while Sandra Camargo, the FIA's Anti-Doping Administrator and Investigator, presented changes to anti-doping regulation for 2015. Dr Michael Scholz presented the case for a universal basic training and handbook for all medical personnel at racetracks and motor sport events.

STRESS LEVEL MONITORING

One of the most interesting research papers presented at the summit looked at the effect of stress on drivers during a race. The study by Prof Daniel Berckmans and Dr Axel Heinemann provided a great deal of insight and many points of discussion, particularly about the use of such monitoring to enhance safety standards.

In collaboration with GetSpeed Performance, a German endurance team, the researchers monitored and analysed the stress levels of drivers over the course of eight endurance races. They used a 3D accelerometer and other sensors to calculate the drivers' stress levels.

"What we measured is quite simple, it's the car movement, the body movement, the heart rate signal and the temperature", said Prof Berckmans. The researchers cross-referenced these measurements with a live feed from the race car, matching the drivers



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The Medicine in Motor Sport Summit was attended by doctors and medical professionals from across the world.





stress levels with on-track events. They also got a full debrief from the drivers immediately after their stints to understand how they were feeling in certain situations.

The collated data allowed the researchers to draw a line between stress levels, performance and focus. Using one particular race at the old Nürburgring as a typical example, Prof Berckmans explained that younger drivers felt more stress than their experienced colleagues and consequently had a far higher fluctuation of lap times over the course of a stint, up to 2.5 minutes variation per lap. In comparison, the experienced drivers' lap times were far more consistent with a range of only 1.7 minutes per lap.

“ THE STUDY FOUND THAT YOUNGER DRIVERS FELT MORE STRESS THAN THEIR EXPERIENCED COLLEAGUES AND CONSEQUENTLY HAD A FAR HIGHER FLUCTUATION OF LAP TIMES ”

The research also identified that experienced drivers had different stressors compared to younger racers. Of two teammates, one an experienced 35 year old and the other a relatively inexperienced 23 year old, the older driver had high stress levels during driver changes, when race control intervened in the race, when he was

being overtaken and when his car had issues. Conversely, the highest stressors for the younger driver were at the start of a stint, during a change of weather, when he was pressured by a competitor and during specific sections of the track.

SAFETY IMPLICATIONS

Berckmans said that whereas performance became erratic when stress levels were high, accidents happened when the drivers' stress levels were too low and therefore had a dip in focus. He cited two incidents from the study where crashes occurred coinciding with a lower than normal stress level. The implications of these findings, he argued, are that if situations in which drivers are

experiencing low stress levels can be identified, processes and schemes can be implemented to reduce the number of incidents caused by low focus.

The study identified that individual drivers will have a zone in which their stress levels are the most conducive to fast and safe racing. Berckmans believes that determining this zone for each driver and investigating the stressors that effect them most and least could provide a springboard for an initiative to prevent accidents and enhance performance. “Maybe the ability to obtain an allowance to race could depend on what you go through mentally on track. Actively detecting stress will open many possibilities in the coming future, of that I am convinced.”

INSIDE THE WTCC MEDICAL CAR

Dr Alain Chantegret, the FIA Medical Delegate during World Touring Car Championship Race in Argentina, talks us through the equipment at his and his teams' disposal in the WTCC medical car.

The Medical Car

This is the first medical vehicle on the scene of an accident. Driven by an experienced driver and carrying the FIA medical delegate, the car is equipped with the necessary equipment to treat and/or resuscitate a patient who could have any number of conditions.

1 LARYNGOSCOPE

"This case contains a laryngoscope with three blades. It is a tool used to intubate the patient if they are experiencing respiratory distress."

2 PULSE OXIMETER

"This allows us to non-invasively monitor blood pressure and oxygenation levels so we can assess the patient's condition before and during treatment."

3 DEFIBRILATOR WITH MONITOR

"This piece of equipment is designed to restart a heart with therapeutic electric shocks. The screen allows us to monitor the cardiac rhythm and ECG."

4 INTUBATION KIT

"This case contains intubation tubes to open a patient's airway and a Guedel cannula to hold the tongue in place during the procedure."

5 CERVICAL COLLAR

"The cervical collar is used to immobilize the patient's neck, thus helping to avoid exacerbation of a spinal cord injury."

6 SURGICAL GLOVES

"A simple yet essential part of any medical professional's equipment."



THE ROAD BACK:

ALLAN MCNISH

Three-time Le Mans winner Allan McNish is no stranger to big accidents. Most recently he was lucky to walk away from a huge crash during the 2011 Le Mans 24 Hours that completely destroyed his Audi LMP1 car.

Allan McNish was interviewed as guest of honour at the recent 2015 Watkins Lecture, the annual safety seminar run by the UK's Motorsport Safety Fund in honour of safety pioneer Prof Sid Watkins. The former F1 driver spoke about the incidents that he has been involved in, how he recovered from them and how they altered his perspective on safety in motor sport.

Question: Did young drivers in your time talk about safety?

Allan McNish: When you are 20 years old you don't think about it for one major reason: you've probably never had a major shunt. You think you are indestructible. I thought I was indestructible; it wasn't until I had a major crash that I thought maybe I'm not. I remember that when a driver got injured, there was just a list of ten drivers the next morning that had rang up looking to take over the drive because it was an opportunity. Motor sport is a very cutthroat game.

Q: There is also a level of compassion though?

AM: In my era, the cutthroat nature changed with Senna. It wasn't until he died that we realised that if he could be killed, then we could be killed too. It was also when the FIA and specifically Professor Sid Watkins got more involved and broke down the resistance to change. Since then, the momentum has

built up dramatically. It did require an incident to start it however and then it required someone to grasp the nettle and run with it, just like Sir Jackie Stewart had done in the 1970s. Now, that momentum is moving in the right way.

Q: Do you think drivers coming through junior formulae are more aware of safety issues nowadays?

AM: They are more aware because these things are discussed in drivers meetings. However, I don't think they treat other drivers or circuits with a lot of respect. There are so many run-off areas that they can get away with making a mistake.

Q: Can motor sport ever be too safe? Has it taken away the challenge?

AM: I can see where people are coming from when they say it is too safe. We don't want to see people getting injured but we do want to see some penalty, where you can't just make a mistake and get away with it. We are in a time however where you are approaching corners significantly quicker than you were before because of downforce, car technology and everything else.

Q: You said there were three main figures in the development of motor sport safety: Sir Jackie Stewart, Prof Sid Watkins and





James Allen interviews Allan McNish on stage. Right: FIA F1 Medical Rescue Coordinator Dr Ian Roberts introduces the event



Max Mosley. How did Jackie contribute in your opinion?

AM: He saw a lot of his friends pass away. Having seen it once or twice in my career, I can see when you see it regularly that you would become passionate about changing it. He was the first main person to take a stand against it and push it forward.

Q: Who are the people throughout your career who have helped you engage with safety?

AM: FIA President Max Mosley and Professor Sid Watkins definitely. I remember I had a crash at Brands Hatch in 1989 and rolled the car. The roll hoop broke off and I was lying with the weight of the car on my head. Jackie said I had to go and see Prof Sid Watkins. He put all these electrodes on my head and

flashed strobe lighting into my eyes. He came back a few hours later and said I couldn't drive for six weeks and that meant I had to miss a few races.

I went to Heathrow and got the cheapest ticket back to Scotland. I phoned my dad and told him to pick me up at Glasgow airport. I was sitting next to a doctor from Edinburgh thinking: "why is this guy flying to Glasgow rather than Edinburgh?" Then the plane landed at Edinburgh. I had flown to the wrong place and realised maybe Prof Watkins knew what he was talking about. Two days later I walked into our front window as I had lost my depth perception. It took six or seven weeks before I was capable of driving again.

Q: Do you notice the cumulative effect of these accidents on you?

“ I HAD FLOWN TO THE WRONG PLACE AND REALISED MAYBE PROF WATKINS KNEW WHAT HE WAS TALKING ABOUT. ”

AM: I do. Each time I have had an accident I have been much more aware of the process and much more open to listen to the people. In terms of vision, that has always been my cue. Dario Franchitti is the perfect example of showing that you can't just keep taking hits to the head. We only have one life and take risks so many times. I was fortunate to get out of motor sport before I took one too many.

Q: San Marino in 1994 was a watershed moment and a real turning point in motor sport safety, how did it feel going through that?

AM: You were definitely aware of it. It was a real shock for everyone in my generation. There was an instant reaction and then a longer process to improve safety. But there wasn't always an immediate acceptance of some of the changes. One example for me is the Head and Neck Support device and its introduction in 2002.

I had seen it in America before and driver changes were much longer so I thought people needed to take more risks on track to counteract this safety system.

I wasn't a big fan of it but in Brazil Prof Sid Watkins showed videos of accidents with and without HANS. As drivers, we had always remembered bits of damage on our helmets in crashes but in these accidents, there was none, so that built some acceptance. It did still take Max Mosley at the end of the year however to turn around and say: "I don't care what you think, you have to make this HANS work. This is a fact. Sid says it is the right thing and we are going for it."

Now, you don't think twice as it is a standard thing and you feel naked if you get in a car without it. Sometimes drivers need to be told what the right direction is.

SCIENCE

MEDICAL SUPPORT AT A LARGE-SCALE MOTOR SPORT MASS-GATHERING EVENT: **THE INAUGURAL US GRAND PRIX IN AUSTIN**

Formula One returned to the United States (US) on November 16-18, 2012 with the inaugural US Grand Prix in Austin. The medical team behind that event look at the unique medical challenges for top-level motor sport and how they prepared for them.

Authors: John P. Sabra MD, José G. Cabañas MD, MPH, John Bedolla MD, Shirley Borgmann RN, James Hawley LP, Kevin Craven RN, MBA, Carlos Brown MD, Chris Ziebell MD, Steve Olvey MD



Mass-gathering events occur when a significant number of people are in attendance at a particular location for a specific purpose and for a defined period of time. The National Association of Emergency Medical Services Physicians defines 1,000 persons as the minimum number of attendees to consider the need for mass-gathering medical care¹⁻². Given these events represent unique challenges for emergency medical services (EMS) systems, medical preparation involves detailed planning and coordination among various public, private, and medical organisations. Preparing specifically for a major motor sports event brings the added element of the inherent danger in the sport to the drivers and crew and the need for additional personnel to provide adequate coverage. Although rare, motor sport events also add the potential for a mass casualty situation given the proximity of fans to high-speed vehicles.

Medical preparation for mass gatherings including motor sports events at existing sites has been reported in the past³⁻⁷. Guidelines exist with recommendations that stress detailed preparation for transportation, communication, and medical staffing⁸. However, there is no published literature outlining specific preparatory details for inaugural mass gathering motor sports events.

The 2012 United States Grand Prix provided a unique opportunity to develop and implement a comprehensive preparedness plan that could serve as a “best practice” framework for inaugural motorsports events. The medical team developed and implemented this plan in coordination with public safety agencies, EMS leadership, and hospital trauma services.

The details of this preparation for a mass

gathering motorsports event at a new racetrack facility are reported with the procedures and methods used. Descriptive data on the details of the medical care rendered during a 3-day race period are also reported.

METHODS

STUDY DESIGN AND POPULATION

After review and approval from the Seton Institutional Review Board (Seton Family of Hospitals, Austin, TX, USA) a retrospective descriptive study utilising post-event summaries was completed for patients evaluated at the United States Grand Prix from November 16-18, 2012. ‘After Action Reports’ provided by the Federation International de L’Automobile (FIA), the City of Austin Office of Homeland Security, and from Austin Travis County Emergency Medical Services were also reviewed^{9,10}.

STUDY SETTING

The United States Formula One Grand Prix included the construction of a purpose-built 3.43-mile (5.52 km) motor racing circuit track and facility (375-acre footprint on a 1,000-acre plot of land) named Circuit of the Americas (COTA), located on the outskirts of Austin, Texas. The facility was designed and built to host a variety of motorsports, athletic, and entertainment events in the future, but its main focus and very first event was to be the pinnacle of motorsports events.

Given that this new facility is located outside the metropolitan area with limited local infrastructure, a medical centre was built at the racetrack to provide medical services during on-going events. The medical centre was strategically placed at the end of pit row, below Turn 2, on the infield side of

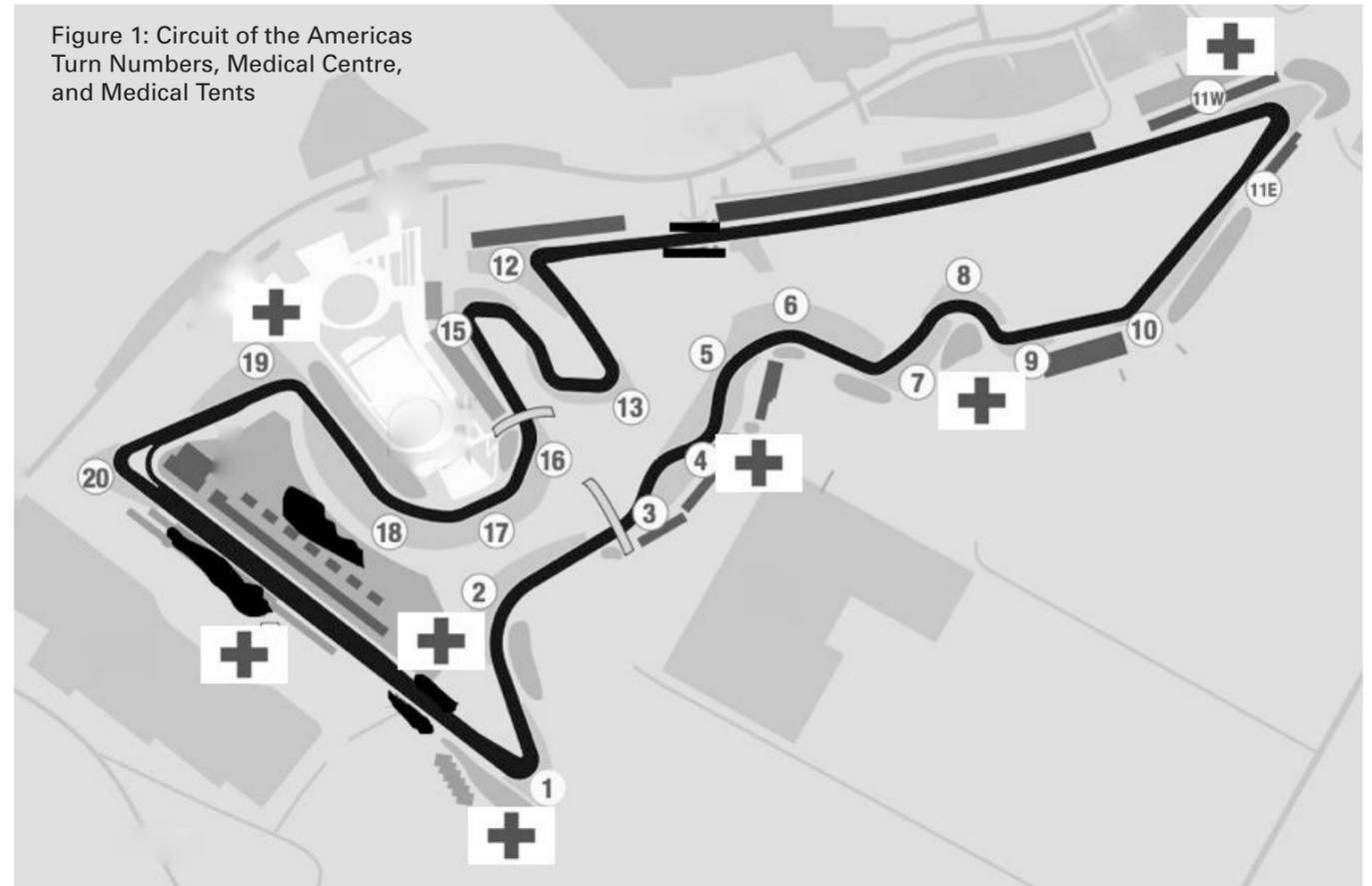


Figure 1: Circuit of the Americas Turn Numbers, Medical Centre, and Medical Tents

the track^{Figure 1}. The large size of the venue and fact that the majority of patients do not necessarily need treatment at the medical centre led to the creation of six medical tents placed strategically around the track to treat minor conditions. These tents were erected as temporary structures, and were approximately ten by ten feet large. They were stocked with first-aid level supplies.

DATA COLLECTION AND PROCESSING

A standardised patient care record was created for every patient encounter that consisted of demographics, vital signs, initial evaluation, treatment and disposition. All relevant reports were compiled and collected by the primary investigator (JPS). Patient data was collected from standardised patient care

records from the track medical facility, medical tents, and EMS electronic patient care records. Data elements were defined a priority by the research team, abstracted by the primary investigator (JPS) and entered into Microsoft Excel® (Microsoft Corp., Redwood, WA) for analysis. Data were cleaned and verified by a second investigator (JB) for accuracy.

DATA ANALYSIS

Basic descriptive statistics were performed and all continuous variables reported as averages, and all categorical variables as percent frequencies. For consistency with previously reported literature on mass-gathering medicine, participant medical usage rates (MUR) are reported as a rate of

patients per 10,000 (PPTT) participants using official estimates of attendance as the denominator for all calculations¹¹⁻¹². Data was entered into a Microsoft Excel Spreadsheet, Version 2010 (Microsoft Corporation, Redmond, Washington, USA).

RESULTS
OVERALL RESULTS

Attendance at the US Grand Prix totalled 265,500 spectators over the three-day event. As expected, the highest single-day attendance was on race-day itself with 117,500 attendees. A total of 566 patients were seen in the track tents and medical centre over the three-day period and there was an average MUR of 21.3 patient visits at the track per 10,000 attendees. When combined with the 22 patients who were taken directly to the hospital by EMS personnel this average goes to 22.1 patients per 10,000 attendees. Visits increased and correlated directly with the higher attendance numbers throughout the course of the event

Table 1.

Of the 566 patients evaluated at the tents and medical centre, only eight were

transported offsite to a hospital. The majority of the presenting complaints were minor in nature^{Table 2}. This translates to 98.6% of patients seen at the track medical facilities being cared for without hospital transfers. Even with the addition of the 22 patients taken directly by EMS to a hospital, the on-site care rate remains high at 95.6%. There were 109 EMS calls placed within the track during the event with an average response time of 2 minutes 30 seconds^{Table 3}. Twenty-five persons (22.9%) declined treatment. Three calls (2.8%) were cancelled. In sixteen calls (14.7%) the patient was not present upon arrival of the EMS team. 21 (19.3%) were transported directly to a local area hospital, 43 (39.4%) were transported to the on-site medical centre for evaluation, and two (1.8%) were taking to a first aid tent. 29 calls (26.6%) were related to a traumatic incident, 71 (65.1%) were non-traumatic, and 9 (8.3%) were unknown. Of the 71 non-traumatic, 17 (23.9%) were for weakness, near syncope, or syncope/unconscious; 10 of the 17 (58.8%) were on the hottest day of the three days^{Table 4}. There were no serious injuries and no deaths reported in any patients cared for by

TABLE 1: CENSUS, MEDICAL USAGE RATE

	FRIDAY (PRACTICE)	SATURDAY (QUALIFYING)	SUNDAY (RACEDAY)	TOTALS
ATTENDANCE	65,000	83,000	117,500	265,500
MEDICAL CENTER	32	17	25	74
TENT 1	24		32	56
TENT 2	6	25	20	51
TENT 3	7	20	23	50
TENT 4	8	21	33	62
TENT 5	3	52	53	108
TENT 6	17	68	80	165
TOTALS	97	203	266	566
PATIENTS/10K	14.9	24.5	22.6	21.3

TABLE 2. MEDICAL TENT CHIEF COMPLAINTS

CATEGORY	NUMBER	PERCENT
Headache	90	15.9%
Extremity Abrasion/Cut	58	10.2%
Blisters (foot)	50	8.8%
Eye Problem	33	5.8%
Hip/knee /foot pain	42	7.4%
Nausea/Vomiting	32	5.7%
Back pain	25	4.4%
Abdominal pain	23	4.1%
Ankle strain	34	6.0%
Bee or insect sting	17	3.0%
Allergy	19	3.4%
Sun burn	13	2.3%
Syncope/Weakness	23	4.1%
Ear plug problem	8	1.4%
Respiratory	4	0.7%
Scalp lac	6	1.1%
Chest pain	7	1.2%
Toothache	5	0.9%
Arm strain/pain	4	0.7%
Nose Bleed	5	0.9%
Seizure	6	1.1%
Diarrhea	2	0.4%
Fall	2	0.4%
Urinary complaint	2	0.4%
Other	56	9.9%
TOTAL	566	100.0%

TABLE 3. EMS RESPONSES AND TIMES

	EMS RESPONSES	AVG. EMS RESPONSE(MINS)	OFF-SITE TRANSPORTS	ESTIMATED ATTENDANCE
EMS RESPONSES DAY 1	32	2:32	6	65,000
EMS RESPONSES DAY 2	23	2:14	3	83,000
EMS RESPONSES DAY 3	54	2:36	13	117,500
TOTAL	109	2:30	22	265,500

TABLE 4. EMS CALLS: CHIEF COMPLAINTS

Dizziness/Syncope	14	12.8%
Knee/Ankle/Foot Injury	14	12.8%
Weakness/Sickness	13	11.9%
Chest Pain	7	6.4%
Respiratory	7	6.4%
Allergic Reaction	5	4.6%
Fall	5	4.6%
Seizure	4	3.7%
Upper Extremity Injury	4	3.7%
Back Pain	4	3.7%
Nausea/Vomiting	3	2.8%
Abdominal Pain	2	1.8%
Scalp Injury	2	1.8%
Eye Injury	1	0.9%
Nose Bleed	1	0.9%
Other	23	21.1%
Total	109	100.0%

EMS, or those seen at the tents and medical centre.

EVENT PLANNING AND EMERGENCY OPERATIONS

The City of Austin, TX and Travis County, as well as State and Regional Partners, established an Area Command at the Austin/Travis County Emergency Operations Centre (EOC). A centralised command centre was established given the large scale of the Grand Prix and expected attendees, its duration over multiple days, and the presence of multiple supporting venues across the city. The EOC addressed multiple issues in planning, communications and logistics including coordinating with the Federal Aviation Administration to determine helicopter flight paths for the hundreds of flights to the track.

EMERGENCY MEDICAL SERVICES

Austin/Travis County EMS (ATCEMS) is the sole provider of pre-hospital medical services for the city of Austin and the Travis County area (population 1.1 million) with approximately 120,000 responses per year. In addition to routine 911 emergency medical services ATCEMS is responsible for the provision of medical support at large public events. For this event, the ATCEMS mass-gathering plan consisted of the strategic deployment of EMS assets throughout the venue to provide EMS coverage and rapid response for the attendees ^{Table 5}. This was done in coordination with an on-site medical facility staffed by emergency physicians for triage and treatment of lower-acuity illness and injury.

EMS assets were distributed throughout

TABLE 5. EMS ON-SITE ASSETS

FOUR (4)	Incident Management Commanders
FIVE (5)	ALS Transport Ambulances
THREE (3)	ALS Bike Medics
TWO (2)	ALS Gators
FOUR (4)	ALS Motorcycle Medics
ONE (1)	ALS Foot Squad
TEN (10)	BLS Foot Teams

the venue utilising the direction of the turns and using a pattern of numerical progression around the track for quick reference of the closest EMS resources. BLS foot-teams were allocated on the track from the main grandstands onto Turn 1 and then counter-clockwise around the track to Turn 20 before reaching the main grandstand. All requests for EMS services were dispatched with the closest BLS foot-team and closest ALS resource. High-risk ALS patients identified by EMS in the venue were to be transported off-site via air medical services if necessary. When EMS did transport off-site with non-critical patients, they were directed to rendezvous with another system ambulance at a pre-defined area to facilitate a quick “in-service” turn around to minimise impact on system resources. To manage the EMS responses outside of COTA property and surrounding community with traffic congestion, EMS utilised paramedics on motorcycles or a squad vehicle to ensure timely EMS response and quicker access amongst the traffic congestion.

Communications

Within the computer assisted dispatch system, a “geo-fence” was defined for EMS communications at this venue. This allowed for the creation of a unique response plan for



the event without interfering with 911 EMS system resources. It also allowed for any 911 calls within the defined “geo-fence” to be sent immediately to the dedicated EMS Communication Medic at the EOC, who would then triage and dispatch the dedicated EMS resources assigned to this event utilising a P25 Digital Trunked 800mhz system (Motorola Solutions, LLC, Schaumburg, Illinois USA). Emergency medical services communications for the race were provided by two certified and dedicated event dispatchers at the EOC. Base-station radios were located at all of the first-aid tents

throughout the track, and portable radios carried by paramedic crews and foot teams.

SITE MEDICAL FACILITIES

Medical coverage at the track was based around a new medical centre, which was constructed according to Formula 1 and FIA guidelines, with interior spaces modelled after the affiliated Level One Trauma Centre emergency department. The medical centre has a minor treatment area with six stations, as well as a separate two-bay trauma area capable of treating major casualties. The centre was staffed each day ^{Table 6} according to FIA and Formula 1 regulations¹³.

The ambulance area is situated immediately next to the trauma stations to facilitate quick patient offloads, and contains a decontamination wash station to clean potential spilled fuel off of patients before they may enter inside. Two permanent helipads are in place directly next to the medical centre ambulance entrance. A medical evacuation helicopter was kept on

TABLE 6. MEDICAL CENTER STAFFING

Emergency Medicine Physicians	2
Trauma Surgeons	2
Orthopedic Surgeon	1
Neurosurgeon	
Registered Nurses	4
Medical Technician	1
Clerk	1



site during the entire event with two paramedic flight crew members. A backup helicopter and crew were kept immediately available to backfill any evacuated flights.

AFFILIATED TRAUMA HOSPITAL

According to Formula 1 and FIA regulations there must be a designated trauma hospital ready to receive patients during the event¹³. An inspection of the hospital by an FIA official and evaluation of its capabilities is undertaken several months prior to the race, and no changes to the designation of a hospital may be undertaken within two months of the race. For the United States Grand Prix, the approved and designated hospital is the University Medical Center at Brackenridge under the Seton Family of Hospitals. This is an American College of Surgeons certified Level 1 trauma centre, located in downtown Austin, Texas, seventeen miles from the track.

MEDICAL OVERSIGHT

Medical care and decision making at the racetrack itself was under the direction of an FIA approved Chief Medical Officer (CMO). The CMO was responsible for the recruitment, implementation, operation and running of the medical care, rescue services and evacuation at the racetrack. As part of the medical oversight planning process, the CMO served as the main medical liaison to coordinate the level of medical coverage with public safety agencies and hospital leadership to ensure a maximal level of readiness and medical support. Medical personnel assigned to cover the track received motor sport specific medical briefs and targeted education in preparation for potential

accidents and injuries.

DISCUSSION

This research describes the preparatory details for an inaugural mass-gathering motor sport event. These events present significant challenges for community EMS and hospital resources. Proper preparation from a medical standpoint for an inaugural motorsports mass gathering event such as the United States Grand Prix took a large effort and coordination on the part of numerous entities. Complete preparation does not simply involve the creation and staffing of a track medical centre; it also includes preparation in conducting a comprehensive assessment of event characteristics that may predict the need for medical services⁹.

One of the concerns with a large number of spectators at any mass gathering motor sports event is the potential for a delay in access to a spectator in need of medical attention. We utilised several strategies to minimise response time and manage any potential barriers for access. First, we allocated EMS resources throughout the racetrack with a higher concentration at locations with a higher number of spectators. Distribution of EMS assets utilising a pattern of numerical progression around the track seemed effective in minimising confusion at the time of dispatch. Multiple pre-event briefings, walkthroughs and grid mapping exercises allowed for all providers to be familiar with the racetrack. Second, the creation of the 911 call “geo-fence” allowed for the almost immediate dispatch after a call was placed which minimised processing time. Finally, the use of alternative transport



modalities such as motorcycles and gators (buggies) helped with effective mobility through crowds and any physical barriers present at the track.

The majority of EMS calls for this event were for non-traumatic events. A sizeable number of patients declined treatment, or were not present, upon EMS arrival. A majority of patients in the EMS call group were transferred to the on-site medical centre, or directly to a hospital. The number of calls per day was not directly related to number of attendees, although the greatest number occurred on race day, which had the highest number of spectators, highest temperatures and longest duration of events.

Although an accurate prediction of patient volume and type for mass gathering events is challenging, the types of patient evaluations seen at this event were typical for a large motor sport event. Most of the evaluations were done for minor complaints such as headaches, blisters, and sprains. These results are consistent with reports seen in

both older and recent medical literature^{3-7,14}. Data from the 2012 US Grand Prix allows predictability of approximately 22 patient visits per 10,000 spectators for this venue. Medical usage rate (MUR) data for other Formula One events have not been published for comparison, but the rate for this single event is significantly higher than that reported over an eight-year period for the Indianapolis 500 (Indianapolis, Indiana USA). Bock et al. reported a MUR of 3.5 PPTT spectators seen at the medical centre for that event³. A likely explanation for the large difference in MUR versus this study's rate is likely the exclusion of patients who were evaluated at First Aid stations.

One aspect of medical care at this event that deserves particular attention is the high on-site care rate. Most patients received a disposition without the need for transport to an off-site medical facility. On-site physician-level medical care at large mass gatherings significantly reduces the number of patients requiring transport to hospitals¹⁵.

Furthermore, the presence of trained pre-hospital and nursing personnel at the peripheral care sites allowed for the majority of cases to receive final dispositions without referral to the medical centre. This arrangement keeps the medical centre from becoming overcrowded with minor complaints and injuries, thus allowing for a high level of readiness for major injuries or potential mass-casualty situations.

An obvious highlight of the medical care at the 2012 United States Grand Prix is that there were zero driver or crew injuries. This safety accomplishment is evidence of major advances in car and track design over the past several decades. Given the current safety of the sport for most drivers, and supported by the fact that all rendered care for this event was on spectators, it is mandatory that medical preparedness plans for motorsports events place realistic emphasis on spectator care preparations. A comprehensive plan includes strategies for both "motorsports medicine" and "mass gathering" medicine. These two areas of medicine are distinctly different and should be treated as such in preparedness planning.

The staffing and medical personnel necessary for event coverage can be roughly estimated by expected crowd size with a predictive analysis of patient numbers. Several studies in the past have described medical preparedness for mass gathering events based upon crowd size^{4,16-18}. Other authors have looked at variables surrounding an event such as weather, crowd size, type of event and crowd mobility to possibly predict MURs¹⁹⁻²¹. These patient visit estimations will vary based not only upon the crowd size, but the type of event as well. Certain motor sport events will attract older or younger crowds, as well as various behaviour patterns that

may lead to more injuries. The weather also plays a crucial role in spectator complaints, with an expected increase in dizziness, fatigue, exhaustion, and heat stroke with higher temperatures.

Overall, the implementation of the medical preparedness plan for this motorsports event was successful. The plan allowed for the ability to treat spectators at the racetrack in a highly efficient manner with limited impact on the EMS System and community hospitals. All requests for medical care during the three-day event were successfully managed with the allocated resources for this event.

LIMITATIONS

This study is limited to a single event occurring over a three-day period, which is infrequent. As a retrospective study there are a number of limitations associated with this study design. Data not captured or lack of complete records by medical personnel may have under-estimated the total patient volume. Also, there is a possibility that incidents with minor illnesses or complaints may have not been reported to an EMS provider or a medical tent nurse.

CONCLUSION

The inaugural US Formula 1 Grand Prix was a mass-gathering motor sport event with a moderate number of patients requiring medical attention throughout the 3-day event. Most patients had minor medical conditions that did not require transportation to off-site medical facilities. The preparedness plan was successfully implemented with minimal impact on 911 EMS system resources and local medical facilities. This medical preparedness plan may serve as a model to other cities preparing for an inaugural motorsports mass gathering event.

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