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A National Perspective on Ambulance Crashes and Safety

Guidance from the National Highway Traffic Safety Administration on ambulance safety for patients and providers

By Noah Smith, MPH, EMT

Ambulance safety has special significance to the staff at the National Highway Traffic Safety Administration (NHTSA) and its Office of Emergency Medical Services. As current or former EMTs, paramedics, firefighters, emergency nurses and state EMS officials, many of us have spent time in ambulances and routinely respond to traffic crashes.

The people at NHTSA all work to advance emergency medical services by collecting and analyzing critical EMS data and by leading collaborative efforts among national, state and local organizations engaged in improving EMS nationwide. But we serve a broader mission as well: keeping people safe on our nation's roadways.

The incredible story of an ambulance crash in Minnesota (see "A Profound Impact" on page 84) dem-

onstrates the serious impact a single crash can have on an EMS agency. At the national level, significant efforts are underway to better understand the causes and effects of crashes to help identify ways of keeping both patients and practitioners as safe as possible.

How Many Fatal Ambulance Crashes Are There?

At NHTSA, we analyzed data from the past 20 years and found that each year, the nation averages 29 fatal crashes involving an ambulance, resulting in an average of 33 fatalities annually.[1] While one-fourth of those fatalities are inside the ambulance at the time of the crash, in the majority of fatal crashes involving an ambulance, the driver or passenger of another vehicle is the one who is killed.

We see a different distribution of nonfatal injuries: We estimate that an average of 1,500 ambulance crashes per year result in injury, with 46% of injuries occurring among people inside the ambulance at the time of the collision.[2]

The number of ambulance crashes and fatalities may seem high, but the nation lost 32,719 people in roadway crashes during 2013; our job is to make sure those numbers decrease.[3]

How Is National Crash Data Collected?

Since 1975, NHTSA has collected information on every fatal crash in the country through the Fatality Analysis Reporting System (FARS). Through NHTSA's General Estimates System (GES) program, we conduct a nationally representative sample of police-reported crashes across the country and estimate the number of total crashes resulting in injuries, including those involving ambulances. We know whether the people killed or injured were drivers or passengers in the ambulances involved in crashes, but we are still working to collect consistent data on whether they were patients, providers or neither, such as patient family members.

Lesson From Crash Investigations

For more than a decade, NHTSA's Special Crash Investigations teams have conducted investigations of serious ambulance crashes. Investigators collect information about pre-crash, crash and post-crash events. These events include pre-crash activities of the persons involved and the circumstances or contributing factors to the crash, including any environmental, roadway or equipment factors.

By using visual inspections of roadways and vehicles along with interviewing all involved, the investigations provide factual insight into the crash. This type of data is invaluable to determine the nature and causes of injuries sustained in the crash by all occupants. NHTSA has conducted more than 50 of these in-depth investigations.

While we continue to analyze the data, our most significant finding has been a tragically simple one: EMS personnel are not buckling up. Fully 4 in 5 EMS providers in the back of the ambulance were unbelted at the time of a serious crash. Of the 45 providers in the patient compartment at the time of the crash, only 7 (16%) were wearing a seat belt at the time of the crash, meaning 38 (84%) were unrestrained.[4] In addition, 11 of the providers (22%) driving the ambulance were unbelted.

Data from every fatal crash involving an ambulance for the last 20 years shows a similar pattern of results—most ambulance occupants are not wearing seat belts during crashes.

We found that whether ambulance occupants wear seat belts or not significantly predicts the severity of occupant injuries and fatalities. And unbelted providers are doing more than just getting injured: They also risk injuring their patients. Occupant-to-occupant contact was identified as a source of the injuries sustained by patients, and in at least two cases, these injuries were fatal.[4]

When EMS arrives at a scene and patients are loaded into the ambulance, they and their families should feel safe knowing help has arrived. Because of this, the EMS profession has an incredible responsibility; keeping our patients safe during a call is paramount to good care and should be a priority for any EMS crew transporting a patient.

The good news is that EMS personnel are excellent about buckling up their patients: Investigations show that 96% of those patients were belted at the time of the crash.

The bad news is that 61% of them were restrained with only lateral belts, while only 33% were correctly restrained with lateral belts and shoulder straps to keep them secured to the cot. Of the serious crashes investigated, 44% of patients were ejected from their cots and patients not restrained by both shoulder and lateral restraints were at a significantly greater risk of being ejected from the cot and sustaining serious or fatal injuries.[4]

In other words, simply using those shoulder restraints can save our patients' lives and prevent devastating injuries. Our analysis found that providers reported that a shoulder harness was not attached or available in 33% of serious crashes.[5] However, in more than a third (38%) of the cases, providers reported that though the shoulder harness was attached to the cot, it was not used.[5]

WHEN AMBULANCES CRASH

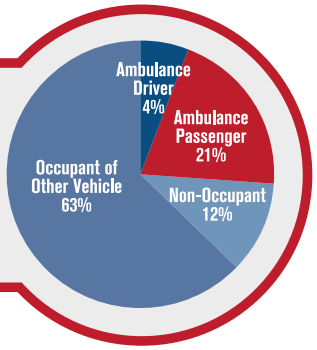
EMS Provider & Patient Safety

DATA COLLECTED BETWEEN 1992-2011

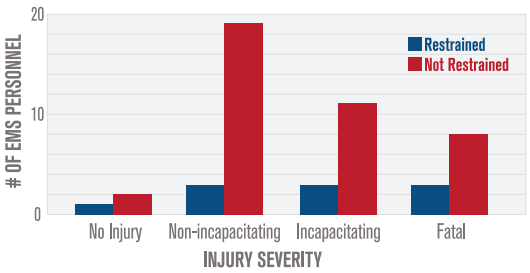
4,500
vehicle traffic crashes involving an ambulance per year
ESTIMATED ANNUAL AVERAGE

34%
resulted in injuries

33
people killed per year



Injury Severity and Use of Safety Restraints in EMS Providers*



84%
OF EMS PROVIDERS IN THE PATIENT COMPARTMENT

WERE NOT RESTRAINED*

ONLY 33% OF PATIENTS

WERE SECURED*

WITH SHOULDER AND LAP RESTRAINTS

*IN SERIOUS CRASHES INVESTIGATED BY NHTSA

44% of patients were ejected from the cot in serious crashes*

61% restrained with lateral belts only*

38% shoulder harnesses were available but were not used*

SIT DOWN & BUCKLE UP!

Secure Your Patients. They Rely on You!

This safety message brought to you by NHTSA's Office of EMS.

ems.gov

EMS agencies are encouraged to post or share this infographic.
Free downloads are available at ems.gov.

Produced for NHTSA by the RedFlash Group

Identifying Ambulance Crash Factors

Factors associated with ambulance crashes are not unlike those of the general driving population, although they are sometimes exacerbated or influenced by the nature of EMS work. NHTSA is addressing several of these to help keep responders safe.

Fatigue affects everyone—especially those who work long shifts or in the middle of the night. A number of recently published peer-reviewed research studies have demonstrated not only that about half of EMS providers report symptoms of severe fatigue, but also that drowsy or fatigued EMS providers are substantially more likely to be injured on the job,[6,7] commit a medical error, or perform a safety-compromising behavior while driving.[6] This year, NHTSA's Office of Behavioral Safety Research will begin bringing together fatigue experts and EMS stakeholders to help improve fatigue-related guidelines, scheduling and reporting in EMS.

SITTING IN A PROPER SEAT AND WEARING A SEAT BELT CAN SIGNIFICANTLY DECREASE YOUR CHANCE OF INJURY IN A CRASH OR EVEN A SUDDEN MANEUVER.

Equipment defects can occur in an ambulance like they can in any vehicle (such as in the suspension or braking system) or in special mission-critical components of an ambulance (like the HVAC system or a fastening device). The NHTSA Office of Defects Investigations collects complaints from drivers and fleet managers who think something just isn't working the way it should and addresses them with the manufacturer. If you think a mission-critical component of your ambulance isn't working properly, report it immediately to your fleet manager and to NHTSA at www.Safercar.gov. This will give NHTSA the data it needs to determine whether the defect is specific to your agency or something occurring nationally that requires further investigation—or potentially a recall.

Effective driver training remains a top priority for EMS agencies across the country. NHTSA's Office of Behavioral Safety Research is currently conducting a nationwide review of emergency vehicle operator training practices. As part of this review, we are talking to state and local EMS stakeholders to determine what emergency vehicle driver training they require, what other prerequisites they have in place before drivers can get behind the wheel of an ambulance, and what steps they take after a crash to determine the cause and prevent future incidents from occurring.

Easy Steps to Prevent Injury to Yourself and Your Patient

There are several things you can do to prevent injuries and fatalities from ambulance crashes, from staying rested to using safe driving techniques. But the easiest steps are:

- Sit down and buckle up. When you get injured in an ambulance crash, it can have devastating effects on you, your family, your colleagues and your patients. Sitting in a proper seat and wearing a seat belt can significantly decrease your chance of injury in a crash or even a sudden maneuver (such as hard braking), and can also decrease the severity of injury in such an event.
- Secure all equipment safely. In a crash or during emergency maneuvering, unsecured items can become dangerous missiles and cause serious injury or death.
- Ensure everyone—your patients and your colleagues—is properly restrained. Don't be afraid to speak up. You just might save your partner's life.

Conclusion

Safety is a critical component of great patient care, and NHTSA works as a team to help put the right information in your hands to make the best decisions on scene. Ultimately, the responsibility rests on you as an EMS provider to keep yourself, your patients and your partners safe.

ABOUT THE AUTHOR

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A Profound Impact

After a serious ambulance crash, an EMS community emerges stronger.

By Brian LaCroix

Photo by Jeff Lucia/RedFlash Group

Paramedic Brian Nagel (left) and EMT Tim Daly from Allina Health EMS hold a photo showing the ambulance crash they were involved in on January 18, 2014.

Allina Health EMS experienced its worst-ever ambulance crash in the early morning hours of Saturday, January 18, 2014. This is our story.

Snow was falling at an ever-increasing rate, and it was getting harder to see markings on the road. A short time earlier, when paramedic Brian Nagel and EMT Tim Daly had been dispatched to the medical call, there was a stiff breeze, but the snow was fairly light. Now it was coming down at a fast clip, and the large flakes were reflecting in the headlights, limiting visibility to just 30 yards or so.

There was such a fast accumulation of snow that Daly, who was driving the 2012 Ford Type-III ambulance, reported riding close to the shoulder so he could hear the rumble strips in the pavement to be certain of his position on the road. Nonetheless, the experienced EMS provider was in control, maintaining speeds of approximately 35 mph while en route to the hospital some 10 miles away.

This event was unfolding in what we call our Wright County Division. The 9-1-1 geographic service area of Allina Health EMS spreads far and wide across Minnesota. One million people live within the areas we serve, which include urban centers such as the Mall of America and the Minneapolis-St. Paul International airport, as well as more rural areas like Wright County, about an hour west of Minneapolis.

At the time of impact, the Allina ambulance was traveling at 37 mph. The vehicle that struck the ambulance was driving in excess of 60 mph.

Brian was in the back of the rig and had just given his patient some medication. He had been seated on the squad bench earlier in the call, but was now standing to reach the sharps container to dispose of the syringe and call his report into the receiving hospital. He tells us he also remembers leaning from the patient compartment into the cab, asking about the noise he heard while Tim was riding the rumble strips.

Through the wall of falling snow, Tim saw headlights coming toward him fast. In the millisecond he had to react he tried to maneuver the ambulance away from the oncoming vehicle. Many credit his action with making the outcome of the crash less devastating than it might have been. There was a thunderous crash, followed by deep silence, then everything went dark.

The patient, safely belted on the cot, including shoulder restraints, remained conscious and alert throughout, and sustained no serious injuries—in fact, the patient became the source of much information in the aftermath of the incident. For example, it was through the patient that we learned that neither Tim nor Brian responded to calls for help for a period after the impact.

While Brian has no memory of the aftermath of the crash, Tim remembers being dazed and hearing nothing. "It was a deafening silence," he recounts. In addition, everything went black. The violence of the impact had sheared the battery cables on the ambulance and the engine went dead. No lights, no motors, no radios. Now, beneath the dark, cloud-filled skies, the road was being buried, as were the wrecked vehicles and the four souls within them, under a blanket of heavy snow.

Later we learned that at the time of impact our ambulance was traveling at 37 mph. The vehicle that struck us was driving in excess of 60 mph.

The Response

Tim recalls struggling through the smashed ambulance cab—as the firewall had been pushed in 18 inches and entrapped his feet. He had suffered bilateral fractures to his lower extremities—unknown to him at the time—but he made it back to Brian and the patient to do whatever he could until more help arrived. It was then that Tim discovered Brian unresponsive with a head injury.

In a strange twist, while Tim was making his way out of the cab, the patient had retrieved Brian's cell phone from his cargo pants pocket and called 9-1-1. In our dispatch center in St. Paul, emergency medical dispatcher Jennifer Stewart quickly determined that the caller was a patient in the back of one of our own ambulances and began providing prearrival instructions.

Word of the ambulance crash spread quickly. In addition to our crews who were dispatched to the scene to help treat and transport their own colleagues and the driver of the other vehicle, personnel from six different agencies joined in the response.

We know from existing research that responding and caring for a severely injured coworker is highly stressful and challenging for EMS providers. Nonetheless, everyone did an exceptional job. We will always be grateful for the outstanding performance of our responding crews and the support we received from neighboring EMS and fire agencies, local and state law enforcement, and hospital staff.

The Call

Some 1,600 miles from the crash scene, my cell phone rang around midnight. I was in Tucson, AZ, attending the annual meeting of the National Association of EMS Physicians. It was a dreadful call to receive from Operations Director/Deputy Chief Kevin Miller.

"There's been a crash," he said. "It's still evolving, but here's what I know: Two employees hurt, Tim Daly and Brian Nagel. Tim is conscious and being treated locally. Brian is unconscious, intubated with a head injury, and being transferred to a Level 1 trauma center 30 miles away. Helicopters can't fly due to weather, so he's going by ground. The patient is OK, but the driver of the other vehicle sustained multisystem traumatic injuries." (That driver later died from injuries sustained in the crash.)

Being miles away from home, there was nothing I could do directly. Besides, I knew my leadership team were handling things. My primary thoughts shifted to notifications. Tim had made contact with his wife himself, but Kevin reported that Brian's family hadn't yet been informed of the crash.

Brian Nagel was 30 years old at the time and single. Our records showed he listed his parents as his next-of-kin. They were semi-retired and living part-time in Florida. I told Kevin I would call them.

Six years earlier, we had added an EMS chaplain to our staff. Soon after he joined us I asked Rev. Russ Myers to help research and create a line-of-duty-death protocol. It was one of those things I knew we should prepare for with hopes of never having to use it. The exercise of creating that SOP was helpful that night. As odd as it may sound, I had practiced the conversation I was about to have with these complete strangers, telling them their son was critically injured and might die.

I woke the Nagels in the middle of the night, 3 a.m. Florida time. Few of us had ever met Terry and Jill Nagel before, but we would come to know them well in the months to come. They are a remarkable family.

Later that day, we got an update about the condition of our guys. Tim was OK but in for a long recovery, which would include multiple surgeries. As for Brian, all we knew was that he had safely been transferred to the ICU at the Level 1 trauma center at North Memorial Medical Center in a Minneapolis suburb. He was intubated and unresponsive, and his prognosis was far from clear. The rest of our crews, including those who'd responded, were doing OK, and word was spreading quickly among the Minnesota public safety community.

This was the beginning of a key lesson in crisis communications. Our line-of-duty-death protocol called for an in-person notification of family by myself, our chaplain, operations director, etc. Looking back, that concept seems somewhat nostalgic and completely naive.

Within about an hour of the crash, a complete set of dispatch audio tapes were posted on a website called mnpoliceclips.com. Soon after, the site had received hundreds of hits, and the link was reposted by dozens of well-intended and concerned people via Facebook, Twitter and other sites. In the age of social media, smartphones and a tech-savvy public, the idea that any of us can "control the message" is an outdated concept. The best we can hope for is to stay abreast with the communication, which will be happening all around us at warp speed.

Another lesson learned has to do with privacy. It's not that we broke any rules regarding HIPAA or other privacy considerations, but we didn't obsess about them. We knew that our staff wanted to know what was going on, and they deserved to be kept informed. We also knew social media was abuzz, often with incorrect information. Beyond our own agency, there was

Building a Better Ambulance

In 2014, there were just 5,884 U.S. domestic ambulance sales. Contrast that to the more than 60 million cars produced in this country each year. Safety research and development is time-consuming and expensive, so you can imagine how difficult it can be to get the manufacturers to spend a lot of R & D money for fewer than 6,000 units per year. But we are making progress as an industry.

At Allina Health EMS, we have learned from our European colleagues and others and redesigned the patient compartment of our rigs. The bench seat is gone, replaced by forward-facing crew seats with four-point restraint systems. We want to be near the patient and within reach of most equipment that might be needed to provide patient care, while remaining belted in. An important goal is to limit the need to ever stand in the back of a moving ambulance.

We had three manufacturers accept the challenge and, this summer, we have taken delivery of three different designs—variations on this theme. They are all based on the Mercedes Sprinter chassis and are currently being tested in the field. We expect we will make a selection on the final design and manufacturer and begin standardizing our new fleet with a much safer ambulance in the coming year.

Photo by Jeff Lucia/RedFlash Group

"Tim and Brian both have been an incredible inspiration to the Allina Health EMS family—and the entire community," says Operations Director/Deputy Chief Kevin Miller.

a large group of hospital and public safety colleagues who had a genuine concern for our crew. And of course there were the media, both local and national, who were interested in information about the crash.

With all of that in mind, our leadership team agreed on one golden rule: We would only share information with explicit approval from our crew and/or their families. Early on I called Tim and asked what he was comfortable with us sharing. He gave me the green light to let folks know what was going on with him and his road to recovery. As for Brian, that was part of a conversation I had with his parents and his sister in the ICU about 18 hours after the crash.

My memory of that first meeting with Brian's family is still emotional and raw. There was clearly a sense of shared sadness and angst for what the future held. We talked about the organization's commitment to see things through no matter what the outcome. Brian's mother also asked some challenging questions: "Was he standing? Was he wearing a seat belt? How does that work in the back of an ambulance anyway?"

During that meeting, almost as an afterthought, Jeff Czyson, our operations director, asked the family if they had heard of Caring Bridge, a website where families can post updates about ill or injured loved ones. Jeff explained how it works, and within a couple of hours Brian's sister Amanda had created a page about the crash. When I awoke the next day, I looked at the site and was amazed to see 200 visits from overnight. Within days the number would balloon to several thousand, eventually reaching nearly 100,000 visits from people all around the world.

As far as sharing information, the Nagel family was clear: "Yes, we want people to know what happened, and we need their prayers."

We decided to be proactive and used the Allina Health EMS Facebook page to communicate with our own internal staff and the broader community. The media picked up on it and over the next few days often simply reposted our Facebook updates.

That Sunday, less than 24 hours after the crash, members of our senior leadership team and I visited the ambulance bases that were most impacted. We didn't really have an agenda, but as our chaplain put it, "It's being present that matters most." Many people showed up just to be together and share the experience. Plenty of tears were shed.

We discovered right away that people wanted to do something. Working with our union partners from the International Association of EMTs & Paramedics Local 167, we created a family liaison schedule. Dozens of Brian and Tim's co-workers signed on to help. Support came in many forms, from a round-the-clock uniformed staff member at the hospital, to dog

After the Crash: Lessons Learned

As you might imagine, the ambulance crash we experienced caused us to do some soul searching that is still going on 18 months after. As is often the case, facing a catastrophe has given us the opportunity, and the responsibility, to emerge stronger. Here are some of our take-aways.

There's no such thing as too much preparation. For any organization, "be prepared" is probably the most important lesson. It seemed like we had prepared for an event like this years in advance, and we put pretty much every bit of that planning into action after our crash.

Think before acting, then act thoughtfully. Following any major or catastrophic event, there is typically a call for sweeping and rapid change. After our crash, such a call came not just from street-level clinicians, but from all levels within the organization, that we must take steps to prevent and/or minimize similar future events. As much as we felt compelled to take immediate action, we realized that what actually needed to occur was planned, multi-stage change.

Secure, secure, secure. Early on we spread word of the "three S's" of the patient compartment: Secure your patient, secure your equipment and secure yourself. This was done via safety messages developed by our Safety Committee.

Treat prior to transport. We encouraged clinicians to, for example, initiate IV therapy and other procedures prior to transport, procedures they may have been doing during transport. We also recommended they position and secure equipment they may need during transport so they could remain seat-belted, and if they had to get up and move about the patient compartment, to buckle up once they sat back down.

Keep emergency contacts current. Keeping updated emergency contact information can seem like a lot of work, but these contacts can be crucial when you need them.

Modify driving behavior. Electronic driver monitoring/feedback systems have proven to be very effective. We think of them not as a "gotcha" device, but as safety adjuncts, much like the technologies that help airline pilots fly safely.

Rethink speed. Speed is dangerous. While it was not the case in our crash, we know that 70% of all ambulance crashes occur while operating in an emergency mode. We have begun routine reviews and revisions of the protocols under which ambulances drive code 3.

Expect that social media will play a huge role. Think through your crisis communication plan in an era of social media when you can't control the message.

Review SOPs. Examine long-held practices with fresh eyes and understand what rules you might be willing to break. These have all been the subject of important conversations within our organization.

Involve medical directors. The National Association of EMS Physicians (NAEMSP) has endorsed the idea that medical directors need to get involved and lead safety issues, including response protocols, and have issued a position paper on the subject. In part the paper states, "Shorter response times are not without cost; inappropriate use of lights and sirens carries established, significant safety risks for EMS providers and the public alike. Most important is the proper triage of calls to determine which ones require rapid 'lights and siren' responses and which ones can be handled in a timely, but safer fashion." Our own medical director, Dr. Charles Lick, plays a key role in our safety initiatives.

Consider the ambulance design itself. Last year, we initiated plans to redesign our ambulance fleet with a focus on provider safety. We formed a multi-disciplinary committee that includes front-line providers, mechanics, union leaders and managers. We wanted to get everyone's perspective as we took this first step toward a significant vehicle change. Everyone had a say. We had folks who were tall and short as well as light and heavy to get a feel for comfort, clearance and safe ergonomics, along with efficient patient care. (See "Building a Better Ambulance" on page 87.)

Make safety improvement an ongoing effort. Over the past 18 months, our Safety Committee has continued reviewing and debating the above issues and more, from creating cultural changes to trialing the use of helmets. Like most quality improvement practices, this will be a never-ending exploration.

Implementing a Safe Driving Culture

Allina Health EMS operates a fleet of nearly 100 vehicles, mostly ambulances, but also wheelchair vans and operations vehicles. We respond to about 260 requests for ambulance service each day, and drive more than 4 million miles every year (many of those miles driving Code 3).

Long before this crash we launched a focused effort on driving safety. In 2011 we hired a new fleet director, Gary LeLoup, an experienced fleet manager from the trucking industry. One of the first things Gary did was to install informatics (black box) devices in all of our vehicles. The primary purpose of the devices was to help us track mileage so we could get vehicles in for maintenance rotations in a timely manner.

However, an additional data point that we began to better understand was the speed that some of our people were driving. Informatics allowed us to track certain aspects of driver behavior in real time and, on a whim, Gary set up his pager to alert anytime someone was driving more than 90 mph.

One day he called me to explain what he had done and added, "My pager sounds like a popcorn popper going off." Our blissful ignorance had ended, and we knew we had a problem that needed immediate attention.

At first I set up my own pager the same way. For several weeks, whenever I received an alert about high-speed driving,

I started personally calling crews to give them some real-time coaching about expectations for safe driving. This was very effective, as word quickly hit the street that careless drivers were getting a call from the chief, sometimes in the middle of the night. But in an organization of nearly 600 staff members, it was only a short-term solution. The long-term solution meant changing a culture of "driving fast." We launched a comprehensive education program and engaged the technology of Road Safety and Geotab.

It's important to note here that our January crash had nothing to do with an ambulance driving at high speeds. As reported, our rig was traveling just 37 mph when it was struck by the car that crossed the snowy center line. But we were implementing a culture of driving safety across our organization.

sitting and making meals. Keeping vigil and supporting the family at the hospital was great therapy for all.

The Long Road

Tim Daly was discharged from the hospital after a few days, but spent the following three months in a wheelchair and had multiple corrective surgeries on his feet and lower legs.

Brian remained unconscious for seven days. On day seven, he recalls not being able to see well because, among his multiple injuries, his eye was severely damaged. But he remembers the blurry image of the wall in his hospital room…and hearing his mother's voice. When he woke up, it was like the sun finally shining after a very dark period.

He was discharged to an inpatient rehab center and spent months in recovery. Like many patients with traumatic brain injury, Brian reports having experienced some strange occurrences when he was unconscious and in the days after he awoke. He remembers dreaming that he and his father were living in Nicaragua, a place he has never been to before or since. He says he thought they were "hiding out" there until something terrible blew over. Weeks and weeks of rehab followed.

In March, a fundraiser was held at a local fire department where Tim Daly serves as a volunteer firefighter. It was the first time that most people had seen Tim and Brian since the crash—Tim in his wheelchair, and Brian wearing a cervical collar and baseball cap covering his head wounds. It was a glorious day.

Healing

Tim returned to full duty late last year. Brian is back at work continuing the re-entry process, hopefully returning to the streets soon. Both continue to face the challenges of a long recovery. As friends and coworkers, we are committed to standing beside them as they do so, with a deep sense of gratitude to have Tim and Brian with us.

And as an organization, we've committed to making ongoing safety improvements. It's an essential part of our responsibility to our patients, our clinicians and our community.

ABOUT THE AUTHOR

Brian LaCroix is the president/EMS chief for Allina Health EMS, based in St. Paul, MN. Allina Health EMS serves more than a million people with a team of more than 600 caregivers. Brian also serves on the board of the National EMS Management Association (NEMSMA).