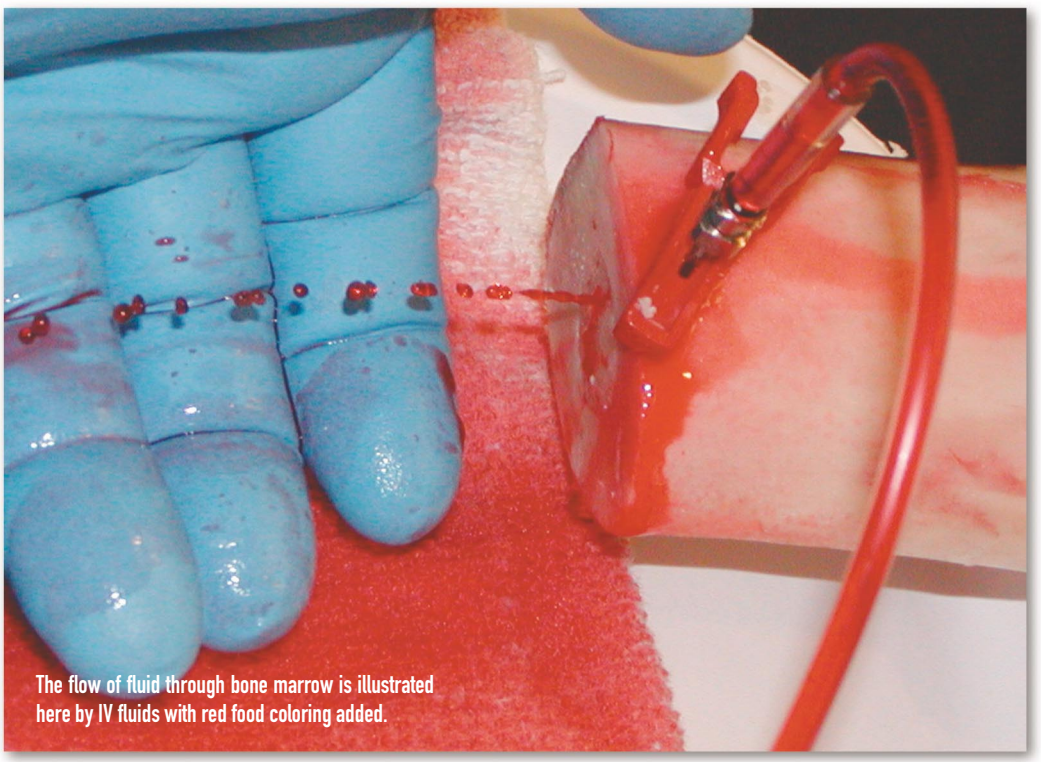
Hands On

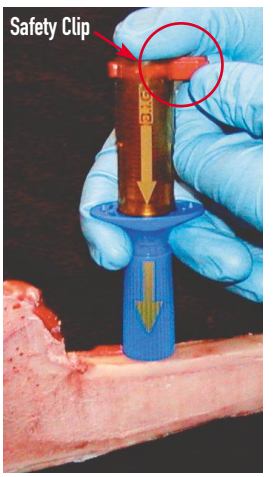
Gear, Gadgets & Great Ideas



The flow of fluid through bone marrow is illustrated here by IV fluids with red food coloring added.

PHOTOS A.J. HEIGHTMAN

Blue: Adult B.I.G.
Red: Pediatric B.I.G.



When you're ready to inject the IO needle into the bone, remove the safety clip and pull the trigger.

Ready, Aim, Fire!

New IO device simplifies vascular access in severe cases

By Jeff Lindsey

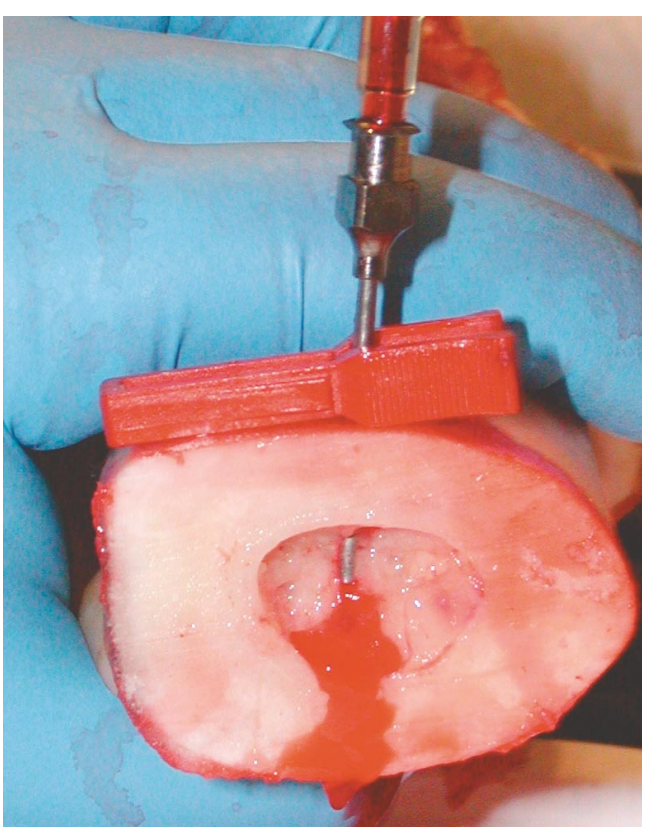
As I reflect on my first pediatric course 12 years ago, I remember taking an intraosseous (IO) needle and using a twisting motion until I felt the pop of the needle entering the bone of the chicken leg. Inflicting pain like this on a pediatric patient almost seemed barbaric and hurt me as much as it did them.

A number of times throughout my career as a street medic, I encountered circumstances in which vascular access proved difficult and, in some instances, impossible. Patients with burns, multiple trauma, shock, cardiac arrest and other emergencies all presented challenging vascular access situations.

The words, "Ready, aim, fire!" aren't typically heard in patient care. But a new device developed by WaisMed and sold exclusively through Tri-anim has brought new meaning to those words and introduced a more humane way to perform an IO infusion.

Known as the B.I.G. (Bone Injection Gun), it's the world's first automatic IO infusion device. The B.I.G. is a potent weapon in the fight for vascular access. The small, disposable IO injector connects easily to standard infusion equipment and provides rapid intravascular access through the bone marrow to deliver fluids or medications in situations where vascular access is restricted or impossible, particularly due to the collapse of a patient's veins.

Developed in Israel, the device has been used extensively by the Israel Defense



This B.I.G. inserted into a tibia (cut to order at a local butcher shop) illustrates fluid flowing into the bone marrow.

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Forces and Israeli National EMS. It has proven useful for patients who need rapid fluid access in hazardous environments that don't allow for standard IV access methods.

The IO needle is spring-loaded with enough force to insert the needle into bone with minimal pain to the patient. The device must be handled like a loaded weapon, as the word *gun* in the name implies. *Handle with care:* Once you remove the unit's safety clip, the needle could discharge if placed against your skin or the patient's skin.

The yellow plastic section contains the spring and a small red safety clip that protects the B.I.G. from firing prematurely. You must make sure to place this yellow chamber in your palm when you position the device, then pull the red clip and fire the needle into the patient's bone.

The B.I.G. is available in models specifically designed for adult or pediatric patients. The only difference in the packaging is the color-coding of the section that houses the needle: blue for adults and red for infants and children up to 12 years of age. The color-coded section contains the needle and a double-winged platform on which to place your second and third fingers and pull back toward the yellow chamber to fire the device into a bone.

The adult (blue) B.I.G. has a 15-gauge needle packaged at a depth of 2.5 cm. The pediatric version uses an 18-gauge needle, and the depth to which the needle penetrates is adjustable (from 0.5 cm to 1.5 cm). Simply twist the red chamber until the appropriate depth setting appears.

WaisMed received FDA approval based on placement into the proximal tibia location in adult and pediatric patients. However, the device is designed for use in four locations on adults and pediatrics: medial to the tibial tuberosity, above the medial malleolus, at the distal end of the radius or at the head of the humerus.

Use of the B.I.G. requires a three-step process. First, position it at the injection site and remove the red safety clip. (Set it nearby because you'll use it for another purpose later.) Next, squeeze the trigger mechanism to fire the needle into the bone. Disconnect the barrel from the needle, pull out the trocar stylette and snap the red safety clip around the cannula to stabilize it. The cannula remains firmly positioned in the bone and can be attached to any standard IV system.

Prior to using the B.I.G., all personnel must familiarize themselves with it through extensive training by Tri-anim salespeople and use of the special training device and training video or CD provided by WaisMed and Tri-anim. As with any invasive device, prior approval from your agency's medical director is a must.

For additional information, visit www.waismed.com. To purchase the B.I.G., contact tri-anim at 800/TRI-ANIM or visit its Web site at www.Tri-anim.com.

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eJEMS

Electronic & Data Management Issues

ILLUSTRATION KEITH ROBINSON

The New IT Thing

Does EMS understand information technology?

By William E. Ott

As I write this in early December, North and South Carolina are experiencing the worst ice storm in their history, leaving more than two million people without power at the storm's peak. I've recharged and powered one of my notebooks from my car while the power remains out, and I've stayed online via a GMRS (general mobile radio service) wireless modem. Many people in the region will go for nearly a week before full power restoration.

This brings up the topic of business continuity, contingency and backups. I know my systems are OK, but I also know there will be a post-storm surge of crises as businesses come back to life and discover various types of data loss and corruption. Post-storm recovery is always a good time to evaluate the effectiveness and completeness of your business continuity plans prior to the next emergency.

This month I'd like to address the fact that EMS isn't as savvy regarding information technology (IT) issues as other public safety entities. I've worked with a variety of public safety agencies around the country on IT-related projects. It's been my experience that, of all the emergency services, EMS as a whole fails to understand and apply sound IT budgeting and resource deployment principles when compared with law enforcement or the fire service. And even police and fire agencies aren't as savvy as the private sector. Understand, some EMS agencies do make IT work effectively for them, but they're in the minority.

The private sector (non-EMS), the defense sector and EMS agencies with well developed IT programs consistently spend 3–10% of their annual budgets on IT-related expenses. In the private sector, a number of economic and accounting principles can be used to mea-

Data Theft Threat

A new and growing threat I've become aware of in the past couple of months is one everyone needs to be aware of in relation to data security.

I watched some teenagers in a local Best Buy store attach an Apple iPod MP3 player to a store computer and download the software from the PC to their iPod, thereby saving themselves the cost of having to buy the software in question. This is the electronic equivalent to shoplifting, as well as a violation of numerous copyright laws.

I've since learned serious data theft is possible through Firewire and USB ports with storage devices that plug directly into these ports. In the Windows 98/ME/2000/XP operating systems and in the Apple operating system, devices connected to Firewire and USB ports are automatically recognized and will even allow scripts or instructions from these ports to be run automatically.

This is a dangerous potential entry point to your computer or network by a skilled hacker. New USB memory "plugs," the size of a quarter, can hold hundreds of megabytes of data. By skillfully creating a script to be run on insertion, a hacker can retrieve data from your system, obtain your network's logical layout, steal a copy of your digital signature or your system's encryption keys ... the list goes on.

By default, Windows allows this, so you should disable automatic recognition of devices that plug into USB and Firewire; when necessary, activate it for your use, then disable it when you complete your task.

Electronic shoplifting poses a major threat to your systems, especially from a HIPAA perspective. I'll detail more about this issue in a future article.

sure the effectiveness of such IT expenditures as a component of gross revenues, profit and return on investment.

These principles prove difficult to apply to any type of public EMS agency. EMS requires different models for evaluating IT's financial effectiveness. I don't know yet what that model should be because a variety of unique issues come into play. I do believe effective IT implementation for EMS makes an agency more efficient and provides the ability to track, trend and report on agency operations in ways that paper-based systems realistically can't do.

The ultimate goal of any EMS IT project should be to improve the delivery of care to patients. In a business sense, any EMS IT project should also assist in increasing and speeding collections, and allowing research into operational trends. These can then be applied to a continuing education program or other operational area to—in the end—improve and speed delivery of care.

It has been my experience that many EMS agencies apply a "shotgun" type approach to IT use, meaning they give little thought to the products or strategies involved. I've seen agencies not budget recurring IT costs effectively, thinking once they buy PCs or servers and network them, they've completed the work. This simply isn't true. Hardware must be maintained and replaced, which is outside of any software costs or licensing arrangements. Think of IT costs like utility costs. They'll be there every year.

Recent studies by Gartner Group and Forrester Group (technocentric research and survey firms) show that the 18-month to three-year replacement cycle many businesses use to keep their PCs current isn't necessary. Current thinking is that an additional 10–20% purchase cost should be applied to PC workstations at purchase to get full-feature workstations without skimping on anything and shoot for a five-year life span, which allows for a depreciation over 60 months rather than 36. This approach frees more capital each year for other uses. Many services may find it more attractive to replace one-fifth of all their PCs each year to equalize costs.

I've also learned that many EMS managers have no concept of software copyright laws, the need for proper licensing of all software, the cost of software development or the cost of software licensing. Unless an agency develops software internally, that agency doesn't own the software; it simply purchases a license to use the software, according to the license terms. Seldom is an enterprise-wide data system an inexpensive or a one-time cost solution.

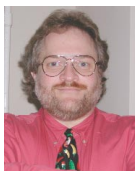
Many law enforcement agencies and fire departments have their own internal IT staff who manage systems, assist users and perform complex tasks, such as custom data queries, integrating data into geographical information systems and making maps or map books. A small percentage of EMS agencies, when compared with law enforcement or the fire service, have this in-house capability. If done at all, it's by other local government departments, or it's outsourced. The ability to answer questions about how your computer agency operates will likely become an important issue as budget dollars get tighter and collections get tougher.

Another related issue: Many EMS management-level personnel have little or no formal undergraduate education, and fewer still have formal business, management or technology-specific education. I believe this is one reason EMS as a whole is weak and slow to implement technology in an effective manner. We can remedy this over time by recruiting people with this type of education into EMS management positions and creating internal tuition assistance programs to allow current EMS employees to further their educations, especially in the business, management and technology disciplines. Although EMS differs from other businesses, it *is* a business, and, for long-term respectability and stability, EMS as an industry must start acting like other businesses (successful ones, hopefully).

Computer equipment today is remarkably reliable and inexpensive in terms of mean time between failure of components, cost per megabyte of storage or cost per instructions per second (speed) of processors as compared to equipment from just two years ago. This trend has been ongoing for more than 35 years. It's known as Moore's Law, named after Gordon Moore, PhD, cofounder of Intel Corporation who, in 1965, predicted exponential increases in the power vs. price relationship occurring every couple of years.

Moore's vision has proven true, and computer industry experts anticipate this to continue for at least two more decades. This doesn't mean you should replace your hardware every two years (except in special cases). Keep in mind that the majority of IT costs are in personnel and software—then equipment. The trick is finding the right balance of cost, investment return, IT infrastructure, increased collections and, ultimately, more efficient delivery of patient care.

William Ott is president and chief consultant of CPCS Technologies, a North Carolina-based technology consultancy that provides services to the public safety, and defense communities. He's been involved in EMS since 1981 in field, education and administrative capacities. Contact him at ejems@cpcstech.com.



Hands On
TRICKS of the Trade
BENNIES

A financial strategy for valuable people

By Thom Dick

REMEMBER WHAT IT WAS LIKE TO BE really new in EMS? I mean, so new it was hard to make the buttons work on your uniform shirts?

There was an awful lot going on in those days, right? Learning all those rules, deciphering all those personalities, puzzling over which coffee cups were OK to use and where to sit at the table and even trying to guess the amount of your first paycheck—especially that paycheck part, if you were new in town.

Starting out can be a scary thing anywhere and for more than just financial reasons. But when you have paramedic school to pay for and a couple of mouths to feed, your financial dilemmas can be overwhelming all by themselves.

I once met a paramedic who made it his practice to watch out for new EMSers, especially the ones from out of town. When it became apparent a newcomer was having financial troubles, he'd single the person out and quietly press a $100 bill in their hand. "Don't pay me back," he would say. "Instead, remember what you're going through right now. And someday, when you're back on your feet and you meet somebody who's struggling, do this for them."

One time, two paramedics separately approached the same probie, an EMT who was a single mom. Neither one knew the other had given her money. It meant the world to her, even though there was no way her problems could be solved by a lousy $200. That was many years ago, and today she is still a fine caregiver.

See, it's not the money. It's the message.

When you're new, you don't know anybody. You have no self-confidence. You wonder if the whole EMS idea was a big mistake. Then, all of a sudden, somebody comes up to you and tells you in unmistakable terms how valuable you are. That's major.

At one time or another, we've probably all second-guessed our own decisions to spend our lives helping people. EMS money will never be great, but it amounts to enough—eventually.

I'm sure some beginners have reached their breaking point and walked away from it all. Makes you wonder: What if somebody great comes along and decides they just can't make it? What if a Jim Page or an Alan Brunacini (or maybe a Ron Stewart or a Baxter Larmon) had reached the end of their rope? Maybe we shouldn't underestimate the money, Life-Saver.

If we all did the kind of thing described in this article, the money would add up for people who really need it. Besides, it makes a lot of sense. When you respond to a woman's call for chest pain and her husband is in denial, don't you figure it out anyway? We've disciplined ourselves to detect other people's troubles and make them better. Shouldn't we do the same for our own EMS family?

Do you know somebody who's new in your system and having a real hard time? Surprise them. Walk up and lay a Bennie on 'em. Don't make a show out of it, and don't embarrass them by doing it in front of anyone else. This is about them, not you.

You never know who somebody will be when they grow up. And you never know how many people they might help along the way.

I read a story in *Reader's Digest* about a doc named Paul Farmer. He graduated from Harvard, so he could pull down the big bucks anywhere in the free world. Instead, he lives in Haiti and takes care of peasants in exchange for chickens—or nothing at all. And how about that once-obscure nun in Calcutta, India? She spent her whole life quietly taking care of people for free, and today everybody on earth knows her name. What if either of them had gotten out of bed one day and decided they just couldn't do it anymore?

You'll never know what a difference you can make by helping just one person. But if they turn out to be a good caregiver, just imagine ...

PHOTO THOM DICK

Don't make a big deal out of it, but slip a Bennie to a coworker in need.

Thom Dick has been an EMT and a paramedic for 23 years and is the quality care coordinator for Pridemark Paramedic Services, Arvada, Colo. Contact him via e-mail at Boxcar414@aol.com.

Acknowledgment: *Bennies are named after Ben Franklin, the mostly bald guy on the front side of a $100 bill, whom most of us don't see very often and who never seemed to be able to afford a trim. The author thanks Jennifer Torres, NREMT, and Bruce Amdahl, NREMT-P, for their assistance in the preparation of this article.*

Tricks of the Trade presents ways to improve patient care. Views expressed here are those of the author. Readers are cautioned not to alter standard practices without proper authorization of local medical control.

Correction: *The photos in January Tricks of the Trade were taken by Jeff Forster, not Thom Dick. We regret the error.*