Table 1. Clinical Characteristics of Children Exposed to Laundry Pods

| Clinical Characteristics | Pods, no. (%) (n = 454) | Nonpods, no. (%) (n = 414) | *P* Value |
|---|---|---|---|
| Vomiting | 251 (55) | 139 (34) | < .001 |
| Coughing/choking | 70 (15) | 45 (11) | .048 |
| Eye irritation/pain | 51 (11) | 68 (16) | .026 |
| Red eyes/ conjunctivitis | 38 (8) | 36 (9) | > .05 |
| Drowsiness/lethargy | 34 (7) | 9 (2) | < .001 |
| Nausea | 26 (6) | 18 (4) | > .05 |
| No effects | 90 (20) | 153 (37) | < .001 |

Adapted from Centers for Disease Control and Prevention. US Department of Health and Human Services. Health Hazards Associated with Laundry Detergent Pods—United States, May–June 2012.61(41). October 19, 2012.

treatment of opioid dependency in adults, is involved in a disproportionate number of unsupervised ingestions by children, accounting for 9.5% of all pediatric overdose admissions [CDC. *MMWR Morb Mortal Wkly Rep.* 2013]. Unintentional ingestion of buprenorphine can cause dose-dependent respiratory depression in children [Kim HK et al. *Pediatrics.* 2012].

Overall, the United States is experiencing a rising number of deaths due to overdoses of prescription opioid analgesics and cocaine [Okie S. *N Engl Med*. 2010].

Levamisole, a veterinary antiparasitic drug, has been found in up to 70% of cocaine confiscated at the US border [CDC. *MMWR Morb Mortal Wkly Rep.* 2009]. Side effects of levamisole include necrotizing vasculitis. This type of poisoning should be considered in cocaine users presenting with atypical symptoms. A thorough skin examination should be performed, and patients should be watched for development of neutropenia.

In high doses, energy supplements containing caffeine, taurine, or guarana can cause confusion, tremors, seizures, and a significant increase in blood pressure [Franks AM et al. *Ann Pharmacother*. 2012]. Dr Mycyk presented a case report of intentional caffeine overdose that resulted in severe rhabdomyolysis and acute renal failure requiring hemodialysis [Campana C et al. *Am J Emerg Med.* 2014].

Cannabinoid hyperemesis syndrome (CHS) is a type of cyclical vomiting that results from heavy marijuana use. Standard anti-emetic treatment often fails, but abstinence and hot showers (!) can be successful. Haloperidol has been shown to successfully treat CHS in a single case study [Hickey JL et al. *Am J Emerg Med*. 2013].

Dr Mycyk recommends that clinicians caring for potential overdose patients pay close attention to collateral history, consider typical and atypical toxidromes, and not rely on standard "tox screens." He recommends reading the Centers for Disease Control's *Morbidity and Mortality Weekly Report* and a weekly blog called *The Poison Review*.

## Medical Care for Mass Gathering Events

Written by Maria Vinall

Planning for the delivery of emergency medical services at large-scale public events was the top of a review by Eric W. Ossmann, MD, Duke University Health System, Durham, North Carolina, USA. Dr Ossmann began by distinguishing a "mass gathering"—which is any event where a large number of people are involved in a coordinated activity—from a "mass casualty," which is defined by the number and severity of injuries.

In formulating a medical plan for a mass gathering, medical responders should always plan for the unexpected but at the same time take into consideration the type of event in calculating the potential patient presentation rate (PPR), the hospital transport rate, and even the cardiac arrest rate [Arbon P. *Prehosp Disaster Med*. 2007]. According to Dr Ossmann, the plan itself must cover threat assessment and gap identification. Medical threat assessment includes an understanding of the population baseline risk, event-specific risks (activities and the environment), and crowd size and composition (age range and known comorbidities). Gap analysis considers the positioning and availability of on-site, local, and regional equipment, facilities, and resources.

In Dr Ossmann's opinion, one of the best papers on planning for a mass gathering was based on a 1988 model developed from the study of medical incident patterns at events in large college stadiums. Medical incidents occurred at a rate of 1.20 to 5.23 per 10 000 people, with acute emergencies occurring at a rate of 0.09 to 0.31 per 10 000 people. Cardiac arrest and patient transport were much less common.

An important paper from 1991 discussed planning for a papal mass conducted during September in the US Southwest in which the heat index (about 102°F) was expected to play a major part. The plan included pre-event public education, water stations, cooling shelters, and on-site medical care. Although the majority of the individuals (about 78%) who experienced heat illness were treated on-site, about 19% were transported to off-site facilities. In general, there is a strong correlation

between heat index and PPR; PPR increases by 3% for every 10-degree increase in the heat index [Perron AD et al. *Prehosp Emerg Care.* 2005].

Dr Ossmann outlined 4 echelons of care that need to be addressed at any mass gathering: frontline staff (eg, ushers and security officers), mobile treatment teams, on-site medical facilities, and transfer arrangements with local hospitals.

A 25-year review of mass gathering events characterized them by size, number of off-site medical transports, and sudden cardiac deaths. Variables that best predicted medical usage, specific injury patterns, and levels of care included event type and ambient temperature [Milsten AM et al. *Prehosp Disaster Med.* 2003].

Dr Ossmann concluded by highlighting some key features of a robust event plan: accessible and functional first aid equipment, a large network of cardiopulmonary resuscitation–trained personnel, a dedicated event control center, a published communication plan, on-site physicians with experience and training, and internal and external surveillance and coordination.

## Minimizing Compression Interruptions Key to Good Outcomes

Written by Muriel Cunningham

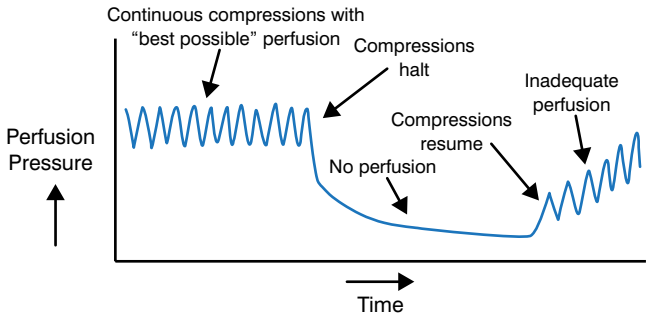
J. Scott Wieters, MD, Texas A&M University, Temple, Texas, USA, reviewed data confirming the importance of minimizing compression pauses during defibrillation of patients in cardiac arrest.

Although the 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care recommend stopping compressions during defibrillation, Dr Wieters stated that there is no convincing evidence in the literature to support this practice. From 1986 to 1990, 13 injuries were reported with "hands-on" defibrillation, most consisting of mild shocks or burns. In experimental models of hands-on defibrillation, current leakage (mean, 283 ± 140 μA; range, 18.9 to 907 μA) was within the acceptable safety limits [Lloyd MS et al. *Circulation.* 2008].

At the same time, there is substantial evidence indicating that interruptions in chest compression pauses should be avoided at all costs. Cardiac perfusion drops off dramatically when chest compressions stop, and perfusion takes time to rise when compressions resume (Figure 1). In one study, if the preshock pause was > 10 seconds, return of spontaneous circulation (ROSC) decreased by 50% [Eftestøl T et al. *Circulation.* 2002].

In another study, when preshock pauses were < 3 seconds, the ROSC was 6 times higher. Keeping postshock pauses to < 6 seconds led to 18 times more ROSC [Edelson DP et al. *Resuscitation.* 2006]. In a large multicenter trial of 815 patients with out-of-hospital (OOH) cardiac arrest, patients with a preshock pause of < 10 seconds had 50% less mortality when compared with patients with a preshock pause > 20 seconds [Cheskes S et al. *Circulation.* 2011]. Every 5-second delay led to 18% mortality.

Figure 1. Effect of Compression Pauses on Cardiac Perfusion




Adapted from *American Journal of Emergency Medicine*, 30, Cunningham LM et al, Cardiopulmonary resuscitation for cardiac arrest: the importance of uninterrupted chest compressions in cardiac arrest resuscitation, 1630-1638. Copyright (2012), with permission from Elsevier.

Dr Wieters emphasized that compressions should certainly continue during preshock charging and that, after defibrillation, end tidal carbon dioxide should be employed in place of pulse checks to monitor perfusion.

In a prospective observational cohort study of 506 cases of OOH cardiac arrest, the best survival (28.7%) was seen when the compressions were performed 60% to 80% of the total resuscitation time [Christensen J et al. *Circulation.* 2009]. Physicians should therefore aim for a chest compression fraction > 80%. Dr Wieters concluded by stating that a shock delivered with perfusion pressure at its peak will more likely result in ROSC.

## Latest Drugs and Guidelines for Treating Hemostasis

Written by Toni Rizzo

Nilesh Patel, DO, St Joseph's Regional Medical Center, Paterson, New Jersey, USA, presented the latest drug developments and guidelines regarding hemostasis. He discussed tranexamic acid (TXA) for the reversal of bleeding in target-specific oral anticoagulants (TSOAs) and the use of thromboelastography (TEG) for monitoring hemostasis in trauma and critically ill patients.