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President's Message

Melissa Oden, DHEd, LMSW-IPR, MPH, CHES

Today, as I write this message, we are barely twenty-four hours removed from what is being called the worst mass shooting in our country's history. I am saddened and disturbed by this event, and other events like this one that have occurred recently in our country. Don't worry – I am not going to turn this column into a diatribe on gun control. However, I do think these events beg the greater question: What roles do we, as public health practitioners, play in addressing these social issues?

To answer that question, I would like to direct you back to a document that you may not have seen for some time: The Principles of the Ethical Practice of Public Health, published by the American Public Health Association (APHA) in July of 2002 via The American Journal of Public Health. You may also know it as the Public Health Code of Ethics (Table 1). The basic tenant of this document is to guide public health practice in such a way that communities and the people who live in them are protected from any potential harm that could befall them by irresponsible public health practice. In the past, ethical public health practice was implicitly assumed; now there is a more overt need to ensure the protection of the public's health at all levels. The Public Health Code of Ethics provides a framework through which the essential elements of public health and their related ethical responsibilities are identified so that not only the practitioner is clear about appropriate behavior, but so is the public.

There are twelve principles of ethical public health practice. While space does not permit me to discuss all twelve here, I believe there are two of those principles that should be highlighted when engaging in a conversation about the role of public health in addressing social problems and challenges. The first principle I would like to highlight is that public health should advocate for, or work for the empowerment of, disenfranchised community members, ensuring that the basic resources and conditions necessary for health are accessible to all people in the community. This means all people; not just those we like or agree with or vote the same as. For example, it is our responsibility to ensure that our fellow citizens with HIV have unencumbered access to care, that folks on the outskirts of our cities have running water, and that we create safe community infrastructure where community members without transportation have access to grocery stores within walking distance of their homes. It means that we do everything we can to make sure that people who need mental health care have access to it without having to jump through fiery hoops to receive assistance. It means that we mobilize a community to meet us on a Saturday morning at the local park, roll up our sleeves, and together spend the day cleaning up the park so that all of the community members can enjoy a safe, clean place to play.

The second ethical principle I would like to highlight states that public health programs and policies should incorporate a variety of approaches that anticipate and respect diverse values, beliefs, and cultures in the community. Policy is, in fact, the best way to create long-lasting change in a community. While it is true that changing individual behaviors can affect change, it is only when good policy is instituted that behavior change can be supported and sustained. Policy, however, needs to include the interests of as many people as possible, so that the policy is representative of that population, and so that more disenfranchisement does not occur. It is a delicate balancing act, to be certain. However, public health practitioners have a responsibility to make sure that policies are adopted and instituted so as to be as representative of the community as a whole as possible.

We now return to the initial question, "What roles do we as public health practitioners play in addressing these social issues?" I think one of the possible answers is that we must maintain the highest ethical standards in our practice. Anything less than that is cheating our communities out of all the possible good that we can help them achieve. Another answer might very well be to craft policies carefully and thoughtfully, taking great care to ensure that policies will not cause harm in any given community. Finally, I believe we should be bold in advocating for the communities we serve. In many cases, our voices may be the only ones speaking up for the people we serve. One way to effectively do this is to join others with the

same goal in mind and support the work that TPHA engages in.. Let me assure you that WE NEED YOU. There is a place at the table for you in TPHA. There is much work to do and I want to strongly encourage our entire membership to seriously consider how to use your specific gifts and talents to further the work of this organization. Please commit to and engage in TPHA's ongoing efforts to improve the health of communities across the state. The voice of many is louder than that of one. If you would like to find out how you can become more involved in the work of TPHA, please do not hesitate to reach out to me at drmissy2011@gmail.com.

Have a wonderful summer!!

Table 1. Principles of the Ethical Practice of Public Health

1. Public health should address principally the fundamental causes of disease and requirements for health, aiming to prevent adverse health outcomes.
2. Public health should achieve community health in a way that respects the rights of individuals in the community.
3. Public health policies, programs, and priorities should be developed and evaluated through processes that ensure an opportunity for input from community members.
4. Public health should advocate for, or work for the empowerment of, disenfranchised community members, ensuring that the basic resources and conditions necessary for health are accessible to all people in the community.
5. Public health should seek the information needed to implement effective policies and programs that protect and promote health.
6. Public health institutions should provide communities with the information they have that is needed for decisions on policies or programs and should obtain the community's consent for their implementation.
7. Public health institutions should act in a timely manner on the information they have within the resources and the mandate given to them by the public.
8. Public health programs and policies should incorporate a variety of approaches that anticipate and respect diverse values, beliefs, and cultures in the community.
9. Public health programs and policies should be implemented in a manner that most enhances the physical and social environment.
10. Public health institutions should protect the confidentiality of information that can bring harm to an individual or community if made public. Exceptions must be justified on the basis of the high likelihood of significant harm to the individual or others.
11. Public health institutions should ensure the professional competence of their employees.
12. Public health institutions and their employees should engage in collaborations and affiliations in ways that build the public's trust and the institution's effectiveness.

Commissioner's Comments

TEXAS Department of State Health Services

Breastfeeding Boosts Infant Health, Public Health

Dr. John Hellerstedt
Texas Department of State Health Services

As a pediatrician in private practice for many years, I saw firsthand how nutrition and feeding impacted a newborn baby's health and happiness – and how pediatricians play a central role in helping new mothers navigate breastfeeding challenges. Over time, breastfeeding has been increasingly emphasized as the best way to provide complete nutrition and immune protection for infants, and significant work has been done to increase duration and promote breastfeeding exclusivity. I believe the benefits last a lifetime. Protection against poor maternal and infant health outcomes is greatest when infants are breastfed. And while the vast majority of Texas mothers choose to breastfeed, exclusive breastfeeding is uncommon and most mothers report that they are unable to meet their personal breastfeeding goals. With six months on the job at the Texas Department of State Health Services, I've had the opportunity to understand and appreciate how public health also plays a central role in breastfeeding success – decreasing barriers, increasing support, and promoting exclusive breastfeeding as the best choice because of the correlation it has with preventing many acute and chronic diseases, obesity and other issues. Breastfeeding is rightfully a public health priority, and DSHS offers comprehensive breastfeeding support for Texas mothers to improve the health of all babies. Many of the barriers that mothers face are systemic issues – such as in health care, employment and the community – that can be effectively improved through population-based public health strategies so that the healthiest choice becomes an easier choice. Returning to work and lack of support in the workplace remain leading barriers to breast feeding initiation, duration and exclusivity. Breastfeeding system support is one of the most cost effective public health interventions and is a core strategy to help prevent both acute and chronic diseases that impact mothers and their children. In Texas, we have a strong effort geared toward helping more mothers breastfeed longer. Our Texas Women, Infants and Children services include breastfeeding education and support. Our Every Ounce Counts campaign serves as a one-stop resource for moms, dads and communities, with special information for working moms. And our research and surveillance teams help us track trends in outcomes and factors impacting breastfeeding to help inform our efforts. A major area of focus is on increasing breastfeeding support in hospitals, birthing centers and worksites. We understand that women want to breastfeed, but they cite a difficult start and returning to work as two key barriers that limit their ability to reach their goals. Getting off to the right start with breastfeeding often occurs in a hospital or birthing facility. The Ten Steps to Successful Breastfeeding is a bundle of evidence-based recommended practices for supporting breastfeeding. The steps include making sure women get accurate info before they give birth, ensure that maternity practices are fully supportive of breastfeeding and that there are systems to guarantee continuity of skilled lactation support between hospitals and health care settings in the community. The Texas Ten Step program is a

DSHS program that provides designations for hospitals and birthing facilities that are working toward implementing those recommended practices. In fact, 77 percent of babies born in facilities that are actively addressing the Ten Steps practices for successful breastfeeding. Our Texas Mother-Friendly Worksite Program aims to increase the number of employers with worksite location support programs. Mothers report barriers to finding clean, private spaces to take lactation breaks to sufficiently maintain their milk supply after returning to work. The Texas program recommends written worksites policies that provide flexible scheduling and access to private spaces to help mothers reach their breastfeeding goals. More than 2,000 worksites have been designated as Mother-Friendly in Texas. Breastfeeding success continues to grow as Texas public health reaches across employment and health care systems to provide information, education, communication and technical assistance to ultimately increase breastfeeding and improve the health of Texas babies. In public health, there is a strong system of support for breastfeeding and that work will continue. Awareness of the resources and available guidance is key to ensuring breastfeeding support remains a public health priority. This is in the interest of the baby, the mother and the state of Texas as a whole.

Poison Control News

Pediatric Ingestions of Lidocaine Products

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Lidocaine is a local anesthetic and acute treatment for ventricular arrhythmias resulting from poisoning by various cardioactive medications and toxins, such as digoxin, cyclic antidepressants, and theophylline. Adverse effects from excessive doses of the drug include dizziness, confusion, agitation, and seizures.[1]

In 2014, the Food and Drug Administration (FDA) reviewed 22 reports of serious adverse events, including six deaths and 11 hospitalizations, among children under four years of age who were given oral viscous lidocaine 2% solution. These involved treatment of mouth pain, such as teething, as well as accidental exposures. The FDA reported that if infants are given too much lidocaine, they may experience seizures, severe brain injury, heart problems, jitteriness, confusion, vision problems, and vomiting.[2,3] As a result, on June 26, 2014, the FDA advised that prescription oral viscous lidocaine 2% solution should not be used to treat teething pain in young children. The FDA also required a Box Warning highlighting this be added to the drug label.[3] Deaths among young children have been reported in association with lidocaine use.[4,5]

During 2000-2015, 532 ingestions of lidocaine by children age five years or less were reported to Texas poison centers. There was no annual or seasonal trend in the exposures. Fifty-five percent of the children were male; the distribution by age was 12.8% less than one year, 33.5% one year, 34.8% two years, 9.4% three years, 5.3% four years, 4.1% five years, and 0.2% unknown exact age. Ninety-seven percent of the exposures occurred at the child's own residence, 2.1% at another residence, 0.8% at a healthcare facility, 0.2% at a school, and 0.2% at an unknown location. The exposures were all unintentional except for one that was reported to be intentional and two that were adverse reactions to the products. Other substances in addition to the lidocaine product were reported in 8.1% of the cases.

Eighty-three percent of the children were managed on site (outside of a healthcare facility), 9.6% were already at or en route to a healthcare facility when the poison center was contacted, 6.8% were referred to a healthcare facility by the poison center, and 0.6% were managed at an unspecified or unknown location. Ninety-four percent of the ingestions were not serious, 4.7% serious, and 1.1% were considered unrelated to the lidocaine. The most commonly reported clinical effects were vomiting (n=18), oral irritation (n=15), and drowsiness or lethargy (n=12), with no other specific clinical effects reported in more than four children. The most frequently reported treatments were dilution (69.9%), eating food or a snack (7.9%), and administration of activated charcoal (4.1%), a cathartic (1.5%), or IV fluids (1.1%).

Thus, of the young children who ingested lidocaine and were reported to Texas poison centers, slightly more than half were male and 81% were age two years or less. The preponderance of the ingestions occurred at child's own residence and were unintentional. In spite of concerns about use of lidocaine with young children, the majority of lidocaine ingestions by children age five years or less reported to Texas poison centers tended not to be serious, with few reporting adverse clinical effects, and were managed outside of a healthcare facility, such as at home.

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Impact of "Pill Mill" Legislation on Prescription Opioid Analgesic Exposures Reported to Texas Poison Centers

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Prescription opioid analgesic use and abuse is increasing in the United States. Since 2000, the number of opioid analgesic prescriptions has risen.[1-5] This increase has resulted in corresponding increases in substance abuse treatment admissions, emergency department visits, calls to poison centers, and deaths related to opioid analgesics.[1,2,5-12]

One source of prescription opioid analgesics are "pill mills," pain management clinics where prescription drugs, including opioids, are prescribed and dispensed inappropriately or for non-medical reasons. According to a 2013 US Drug Enforcement Administration report, pill mills are most prevalent in Texas, California, Florida, and Louisiana.[13] On September 1, 2010, legislation went in effect in Texas in an effort to control pill mills (Texas Occupation Code Chapter 168: Regulation of Pain Management Clinics). This legislation required all pain management clinics to be certified by the Texas Medical Board biennially and to be owned and operated by a licensed physician. Subsequent research found that, since implementation of this legislation, there was a significant reduction in prescription opioid analgesic dose, volume, prescriptions, and pills dispensed in Texas.[14]

An analysis of prescription opioid analgesic exposures reported to Texas poison centers (Texas Poison Center Network) was performed to determine whether this legislation had an impact on such exposures. [It should be noted that Texas Health and Safety Code 161.042 requires the reporting of overdoses to Penalty Group 1 drugs to the Department of State Health Services. The reporting is done through the Texas Poison Center Network. Some prescription opioid analgesic drugs are in Penalty Group 1.] Table 1 presents the annual number of prescription opioid analgesic exposures reported to Texas poison centers during 2006-2015. The total number of exposures increased during 2006-2010 while the rate per 1,000,000 population based on the US Census remained relatively stable during the same time period. However, after 2010, both the total number of exposures and the rate declined each succeeding year through 2015. Of the five most frequently reported prescription opioid analgesics, the number of exposures to three (hydrocodone, propoxyphene, oxycodone) fell between 2010 and 2015. The number of hydrocodone exposures actually demonstrated a particularly large decline of 35% between 2014 and 2015. The number of tramadol exposures increased throughout the ten-year period. The number of codeine exposures decreased between 2010 and 2013 then increased once more in 2014 and 2015; the number of codeine exposures increased 89% between 2014 and 2015. A previous investigation using Texas poison center data has suggested that the rescheduling of hydrocodone from Schedule III to Schedule II in October 2013, increasing regulations on the use of hydrocodone, resulted in a decline in hydrocodone exposures and a corresponding increase in codeine exposures.[15]

A fall in the number of prescription opioid analgesic exposures between 2010 and 2015 was observed among all four age groups, with the largest decline reported among children age five years or less. Likewise, a decrease in the number of exposures occurred in all three of the major types of exposure reasons (unintentional, intentional, adverse reaction). Among intentional exposures, a decline was observed for suspected attempted suicides, abuse, and misuse although the decline was greatest for abuse.

Decreases were observed in the number of prescription opioid analgesic exposures no matter the severity of the exposure. Furthermore, the annual number of deaths declined after 2010. [It should be noted that the deaths involved patients who were already being managed with the assistance of the Texas poison centers. If a person is already dead, the poison centers are not likely to be contacted.]

Although correlation does not necessarily equate with causality, these data suggest that the Texas "pill mill" legislation of September 2010 resulted in a reduction in prescription opioid analgesic exposures reported to Texas poison centers. Reductions were observed among total exposures and the exposure rate, all patient ages, all major exposure reasons, and all medical outcomes (severity of the exposures). While declines were observed with some of the types of opioids, it was not observed for all. This may be due, at least in part, to the rescheduling of hydrocodone. However, this does not appear to account for the increase in tramadol exposures throughout the ten-year period. With respect to exposure reason, that the highest degree of reduction was observed among those exposures involving intentional abuse and misuse of the drugs is of particular note. Continued surveillance of prescription opioid analgesic exposures reported to Texas poison centers will be useful to determine whether the decrease in the number of exposures continues. Continued surveillance may also be useful to identify any impact of future legislation and other actions to reduce prescription opioid analgesic abuse in Texas.

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Table 1. Annual prescription opioid analgesic exposures reported to Texas Poison Center Network [+]

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	% change*
Total exposures	5,642	6,069	5,870	5,955	6,437	6,174	6,086	5,702	5,576	5,303	-18
Rate per 100,000 population	24.0	25.4	24.1	24.0	25.6	24.1	23.3	21.4	20.5	19.1	-25
Most common opioids											
hydrocodone	3,162	3,467	3,265	3,242	3,483	3,587	3,474	3,121	2,849	1,856	-47
tramadol	601	666	787	802	983	1,064	1,224	1,205	1,313	1,529	+56
codeine	495	508	509	571	587	542	510	522	577	1,095	+87
propoxyphene	559	567	557	586	493	139	54	27	19	3	-99
oxycodone	270	285	312	306	378	315	340	303	284	340	-10
Patient age (years)											
0-5	908	894	871	815	845	796	694	706	658	606	-28
6-12	186	219	135	172	163	147	161	138	137	126	-23
13-19	596	638	613	648	649	661	657	635	647	610	-6
20+	3,448	3,769	3,768	3,836	4,206	4,091	4,162	3,883	3,782	3,668	-13
Exposure reason											
intentional	3,194	3,552	3,474	3,540	3,797	3,759	3,746	3,375	3,296	3,148	-17
attempted suicide	1,980	2,250	2,234	2,190	2,317	2,314	2,365	2,189	2,234	2,132	-8
abuse	618	632	482	587	602	569	518	473	401	376	-38
misuse	351	414	491	515	586	553	571	451	412	419	-28
unintentional	2,042	2,128	2,006	2,038	2,115	1,952	1,853	1,901	1,809	1,671	-21
adverse reaction	277	275	267	251	354	310	308	249	284	278	-21
Medical outcome											
not serious	3,649	3,847	3,664	3,757	3,889	3,705	3,611	3,339	3,390	3,185	-18
serious	1,930	2,152	2,129	2,110	2,448	2,363	2,356	2,239	2,086	1,992	-19
death	24	20	15	19	24	16	15	11	17	15	-38

[+] September 1, 2010: "Pill mill" legislation went into effect in Texas *percent change from 2010 to 2015

Public Health Resources: Zika virus Index

David McLellan, DSHS librarian

Many public health professionals are preparing for the possibility of a Zika virus outbreak in the United States this year. To help prepare for this, here are a few selected citations. These and many more are available at the Disaster Information Management Resource Center. (https://sis.nlm.nih.gov/dimrc/zikavirus.html) Over 30 global health bodies including academic journals, NGOs, research funders and institutes, have committed to sharing data and results relevant to the current Zika crisis. These articles are made available to everyone by major journal publishers.

Selected citations: Reviews of Zika Virus and the recent outbreak.

Wikan N, Smith DR. Zika virus: history of a newly emerging arbovirus. Lancet Infect Dis. 2016 Jun 6. pii: S1473-3099(16)30010-X. doi: 10.1016/S1473-3099(16)30010-X. [Epub ahead of print]

Zika virus was originally identified in a sentinel rhesus monkey in the Zika Forest of Uganda in 1947. The virus is a member of the family Flaviviridae, genus Flavivirus, and is transmitted to humans by Aedes species mosquitoes. The first report of Zika virus outside Africa and Asia was in 2007 when the virus was associated with a small outbreak in Yap State, part of the Federated States of Micronesia. Since then, Zika virus infections have been reported around the world, including in southeast Asia; French Polynesia and other islands in the Pacific Ocean; and parts of South, Central, and

North America. Symptomatic infection in human beings normally results in a mild and self-limiting febrile disease, although recent reports have suggested a possible association with more serious sequelae such as Guillain-Barré syndrome, and microcephaly in newborn infants of mothers infected with Zika virus during pregnancy. In this Review, we summarise the history of Zika virus from its first detection to its current worldwide distribution.
Full Text Link http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(16)30010-X/fulltext

Musso D, Gubler DJ. Zika Virus. Clin Microbiol Rev. 2016 Jul;29(3):487-524. doi: 10.1128/CMR.00072-15.
Zika virus (ZIKV) is an arthropod-borne virus (arbovirus) in the genus Flavivirus and the family Flaviviridae. ZIKV was first isolated from a nonhuman primate in 1947 and from mosquitoes in 1948 in Africa, and ZIKV infections in humans were sporadic for half a century before emerging in the Pacific and the Americas. ZIKV is usually transmitted by the bite of infected mosquitoes. The clinical presentation of Zika fever is nonspecific and can be misdiagnosed as other infectious diseases, especially those due to arboviruses such as dengue and chikungunya. ZIKV infection was associated with only mild illness prior to the large French Polynesian outbreak in 2013 and 2014, when severe neurological complications were reported, and the emergence in Brazil of a dramatic increase in severe congenital malformations (microcephaly) suspected to be associated with ZIKV. Laboratory diagnosis of Zika fever relies on virus isolation or detection of ZIKV-specific RNA. Serological diagnosis is complicated by cross-reactivity among members of the Flavivirus genus. The adaptation of ZIKV to an urban cycle involving humans and domestic mosquito vectors in tropical areas where dengue is endemic suggests that the incidence of ZIKV infections may be underestimated. There is a high potential for ZIKV emergence in urban centers in the tropics that are infested with competent mosquito vectors such as Aedes aegypti and Aedes albopictus.
Full Text Link http://cmr.asm.org/content/29/3/487.full?sid=111e2349-47ea-4a63-af51-af40898446bd

Zika and Microcephaly

Johansson MA, Mier-Y-Teran-Romero L, Reefhuis J, Gilboa SM, Hills SL. Zika and the Risk of Microcephaly. N Engl J Med. 2016 May 25. [Epub ahead of print]
Zika virus (ZIKV) infection during pregnancy has been linked to birth defects,1 yet the magnitude of risk remains uncertain. Investigators studying the 2013-2014 Zika outbreak in French Polynesia estimated that the risk of microcephaly due to ZIKV infection in the first trimester of pregnancy was 0.95% (95% confidence interval, 0.34 to 1.91), on the basis of eight microcephaly cases identified retrospectively in a population of approximately 270,000 people with an estimated rate of ZIKV infection of 66%.2 In the current outbreak, thousands of cases of infants with suspected microcephaly or other developmental anomalies of the central nervous system that may . . .
Full Text Link http://www.nejm.org/doi/full/10.1056/NEJMp1605367?query=featured_zika

Rasmussen SA, Jamieson DJ, Honein MA, Petersen LR. Zika Virus and Birth Defects--Reviewing the Evidence for Causality. N Engl J Med. 2016 May 19;374(20):1981-7. doi: 10.1056/NEJMsr1604338. Epub 2016 Apr 13.
The Zika virus has spread rapidly in the Americas since its first identification in Brazil in early 2015. Prenatal Zika virus infection has been linked to adverse pregnancy and birth outcomes, most notably microcephaly and other serious brain anomalies. To determine whether Zika virus infection during pregnancy causes these adverse outcomes, we evaluated available data using criteria that have been proposed for the assessment of potential teratogens. On the basis of this review, we conclude that a causal relationship exists between prenatal Zika virus infection and microcephaly and other serious brain anomalies. Evidence that was used to support this causal relationship included Zika virus infection at times during prenatal development that were consistent with the defects observed; a specific, rare phenotype involving microcephaly and associated brain anomalies in fetuses or infants with presumed or confirmed congenital Zika virus infection; and data that strongly support biologic plausibility, including the identification of Zika virus in the brain tissue of affected fetuses and infants. Given the recognition of this causal relationship, we need to intensify our efforts toward the prevention of adverse outcomes caused by congenital Zika virus infection. However, many questions that are critical to our prevention efforts remain, including the spectrum of defects caused by prenatal Zika virus infection, the degree of relative and absolute risks of adverse outcomes among fetuses whose mothers were infected at different times during pregnancy, and factors that might affect a woman's risk of adverse pregnancy or birth outcomes. Addressing these questions will improve our ability to reduce the burden of the effects of Zika virus infection during pregnancy.
Full Text Link http://www.nejm.org/doi/full/10.1056/NEJMsr1604338?query=featured_zika

Society for Maternal-Fetal Medicine (SMFM) Publications Committee. Ultrasound screening for fetal microcephaly following Zika virus exposure. Am J Obstet Gynecol. 2016 Jun;214(6):B2-4. doi: 10.1016/j.ajog.2016.02.043. Epub 2016 Feb 19.
Microcephaly is a condition in which the size of the head is smaller than expected for age. This condition in fetuses and infants has been associated with the recent outbreak of Zika virus. Due to this association, the Centers for Disease Control and Prevention (CDC), American Congress of Obstetricians and Gynecologists (ACOG), and Society for Maternal-Fetal Medicine (SMFM) have suggested prenatal ultrasound evaluation for fetal microcephaly in pregnant women who have been infected or potentially exposed.[1, 2] However, the diagnosis of microcephaly by prenatal sonography is not always straightforward. Given the complexity of prenatal diagnosis of microcephaly, the purpose of this document is to review the ultrasound criteria for the diagnosis following exposure to the Zika virus.
Full Text Link http://www.ajog.org/article/S0002-9378%2816%2900343-4/abstract

Zika and neurological disorders

Broutet N, Krauer F, Riesen M, Khalakdina A, Almiron M, Aldighieri S, Espinal M, Low N, Dye C. Zika Virus as a Cause of Neurologic Disorders. N Engl J Med. 2016 Apr 21;374(16):1506-9. doi: 10.1056/NEJMp1602708. Epub 2016 Mar 9.

Zika virus infections have been known in Africa and Asia since the 1940s, but the virus's geographic range has expanded dramatically since 2007. Between January 1, 2007, and March 1, 2016, local transmission was reported in an additional 52 countries and territories, mainly in the Americas and the western Pacific, but also in Africa and southeast Asia. Zika virus infections acquired by travelers visiting those countries have been discovered at sites worldwide. Aedes aegypti mosquitoes are the principal vectors, though other mosquito species may contribute to transmission. The virus was found to be neurotropic in animals in experiments conducted in the 1950s, and recent experiments have shown how it can cause neural-cell death. A rise in the incidence of Guillain–Barré syndrome, an immune-mediated flaccid paralysis often triggered by infection, was first reported in 2013 during a Zika outbreak in French Polynesia. An increase in the incidence of microcephaly, a clinical sign that can be caused by underdevelopment of the fetal brain, was first reported in northeastern Brazil in 2015, after Zika virus transmission had been confirmed there. These reports of excess cases of Guillain–Barré syndrome and microcephaly led the World Health Organization (WHO) to declare a Public Health Emergency of International Concern on February 1, 2016, and to recommend accelerated research into possible causal links between Zika virus and neurologic disorders.[1]

Full Text Link http://www.nejm.org/doi/full/10.1056/NEJMp1602708?query=featured_zika

Carteaux G, Maquart M, Bedet A, et al. Zika Virus Associated with Meningoencephalitis. N Engl J Med. 2016 Apr 21;374(16):1595-6. doi: 10.1056/NEJMc1602964. Epub 2016 Mar 9.

Zika virus (ZIKV) is currently spreading widely, while its clinical spectrum remains a matter of investigation. Evidence of a relationship between ZIKV infection and cerebral birth abnormalities[1,2] is growing.[3] An increased incidence of some peripheral nervous syndromes among adults was reported during outbreaks in French Polynesia[4,5] and Brazil,[1,2] but no formal link with ZIKV infection was shown. We describe a case of central nervous system infection with ZIKV that was associated with meningoencephalitis in an adult.

Full Text Link http://www.nejm.org/doi/full/10.1056/NEJMc1602964?query=featured_zika

Reiter P. Control of Urban Zika Vectors: Should We Return to the Successful PAHO/WHO Strategy? PLoS Negl Trop Dis. 2016 Jun 1;10(6):e0004769. doi: 10.1371/journal.pntd.0004769. eCollection 2016.

We assume that the urban vectors of the virus are Aedes aegypti and Ae. albopictus. They are also the principal vectors of urban dengue and chikungunya, in which case the spectacular increase in the global prevalence and incidence of both diseases[1] is harsh condemnation of our current control strategies. The stark truth is that over the past 50 years no country anywhere in the world (with the possible exception of Singapore) can claim sustained suppression of transmission of these viruses[2].

Full Text Link http://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0004769

Vector control of mosquitos

Bodner D, LaDeau SL, Biehler D, Kirchoff N, Leisnham PT. Effectiveness of Print Education at Reducing Urban Mosquito Infestation through Improved Resident-Based Management. PLoS One. 2016 May 12;11(5):e0155011. doi: 10.1371/journal.pone.0155011. eCollection 2016.

Improving resident-based management and knowledge of mosquitoes is often an integral component of integrated mosquito management, especially in urban landscapes with considerable mosquito habitat on privately owned lands. This study tested the effectiveness of print education materials at reducing urban mosquito exposure through improving resident knowledge of, and attitudes towards, mosquitoes and mosquito management in Washington DC, USA. There was a specific focus on the removal of water-filled containers that are utilized by the developmental stages of the two most common vector species in the region, Aedes albopictus and Culex pipiens. Households in six neighborhoods that varied in socio-economic status were administered knowledge, attitude, and practice (KAP) surveys in 2010 and 2012, and had their yards surveyed for container habitats and immature mosquitoes (larvae and pupae) in 2010, 2011, and 2012. Half the households (intervention, n = 120) received education materials in 2011 and 2012 to yield a before-after control-intervention (BACI) design. Unexpectedly, residents in intervention households were more likely to show decreased concern for mosquito-borne illnesses than residents in control households, which did not receive materials. Moreover, there was a greater probability that control households reduced containers in 2012 than intervention households, particularly when they had low numbers of baseline (2010) containers. Irrespective of control, reductions in containers were associated with decreased abundances of immature mosquitoes. Overall, our findings suggest that print education materials may have unintended negative effects on resident attitudes and household management of mosquito production. We recommend that mosquito control agencies need to carefully consider their content of print messages and the effectiveness of strategies that passively convey information with little or no engagement with control professionals.

Full Text Link http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0155011

Healy K, Hamilton G, Crepeau T, Healy S, Unlu I, Farajollahi A, Fonseca DM. Integrating the public in mosquito management: active education by community peers can lead to significant reduction in peridomestic container mosquito habitats. PLoS One. 2014 Sep 25;9(9):e108504.

Mosquito species that utilize peridomestic containers for immature development are commonly aggressive human biters, and because they often reach high abundance, create significant nuisance. One of these species, the Asian tiger mosquito Aedes albopictus, is an important vector of emerging infectious diseases, such as dengue, chikungunya, and Zika fevers.

Integrated mosquito management (IMM) of Ae. albopictus is particularly difficult because it requires access to private yards in urban and suburban residences. It has become apparent that in the event of a public health concern due to this species, homeowners will have to be active participants in the control process by reducing mosquito habitats in their properties, an activity known as source reduction. However, limited attempts at quantifying the effect of source reduction by homeowners have had mixed results. Of note, many mosquito control programs in the US have some form of education outreach, however the primary approach is often passive focusing on the distribution of education materials as flyers. In 2010, we evaluated the use of active community peer education in a source reduction program, using AmeriCorps volunteers. The volunteers were mobilized over a 4-week period, in two areas with approximately 1,000 residences each in urban Mercer and suburban Monmouth counties in New Jersey, USA. The volunteers were first provided training on peridomestic mosquitoes and on basic approaches to reducing the number of container habitats for mosquito larvae in backyards. Within the two treatment areas the volunteers successfully engaged 758 separate homes. Repeated measures analysis of variance showed a significant reduction in container habitats in the sites where the volunteers actively engaged the community compared to untreated control areas in both counties. Our results suggest that active education using community peer educators can be an effective means of source reduction, and a critical tool in the arsenal against peridomestic mosquitoes.
Full Text Link http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0108504

Tribute to the Memory of Past TPHA members

Information submitted by other TPHA members and Compiled by Editor
Please contact txpha@aol.com with memorials you may wish to include in future issues.

L. Kay Bartholomew Eldredge, Ed.D., M.P.H., passed away Feb. 10, 2016, in Houston, after a battle with cancer. She was professor and distinguished teaching professor in the Department of Health Promotion and Behavioral Sciences at UTHealth School of Public Health. Bartholomew Eldredge was known as an excellent teacher and mentor and for developing the influential "Intervention Mapping," a systematic framework for planning and implementing theory- and evidence-based health programs, which has been adopted at schools of public health across the United States and the world. She worked in the field of health education and health promotion after graduating from Austin College in 1974, first at a city-county health department and later at Texas Children's Hospital and Baylor College of Medicine. She joined the faculty of the UTHealth School of Public Health in 1995. As associate dean for academic affairs from 2009-2015, she was instrumental in shaping the school's academic policy. While at the School of Public Health, Bartholomew Eldredge developed "Intervention Mapping," now considered the go-to method for evaluating health problems, and partnered with Maastricht University, the Netherlands—extending the international reach of the approach. In the classroom, she pioneered teaching techniques, including her innovative use of the "flipped classroom," to prepare public health graduates to integrate theory and evidence into the development, adaptation, and evaluation of health promotion interventions. Bartholomew Eldredge received numerous awards for teaching excellence. Bartholomew Eldredge earned her M.P.H. degree from UTHealth School of Public Health and an Ed.D. degree in educational psychology from the University of Houston College of Education. Her tireless efforts to support health promotion and promote excellence in education, earned her the respect and admiration of her colleagues, and helped advance the field of public health. As a member of the Texas Public Health Association, she often contributed her expertise by participating in seminars and training sessions offered to members. She will be greatly missed by all.

C. Mills Reeves, Jr., longtime TPHA and public health supporter passed away on Tuesday, May 3, 2016 surrounded by his family at the age of 74. He was born in Houston to Charles and Bette Gene Reeves. He lived a full and wonderful life. Growing up in San Antonio, he attended Woodlawn Elementary, Horace Mann Junior High, and then graduated from Jefferson High School in 1960. He attended Sam Houston State Teachers College as a walk-on football player. Being the scholar that he was, he finished his studies in one semester. Mills went to work for his father in the family pesticide business, Public Health Equipment & Supply Company, Inc. He retired in 2003 but stayed active in the business until 2011 earning many accolades. He was the proud 2006 recipient of an industry award, The Fratis L. Duff, M.D. Memorial Award. He was proficient in Spanish and used it in his daily business dealings. Mills spent 18 years with SFOA as a football official for high school and college from 1961 to 1976. He was a member of the San Pedro Presbyterian Church since 1976; the Elks Lodge in New Braunfels since 1973 and was an original member of the S.O.B. Lunch Group. He coached his son, Charlie, in little league sports. They enjoyed hunting and fishing together. He never missed an event for his grandchildren. Mills wrote the playbook on FUN. Whether you knew him as Mills, Chango, Dad, or EIO, he was one of a kind and had a larger than life personality. He is survived by his wife of 55 years, Judith "Judy" Reeves; daughter, Robin Reeves Baker and husband, Jim; son Charlie Reeves; grandchildren, Lauren Reeves, Carley Good, Devan Baker and Mills Baker; great-grandchildren, Charleigh Adair Jacobs and William Ozley Good; sister, Susan Schwarz; brothers, John Reeves (Charlene), Mike Reeves (Leslee) and Randall Reeves (Sherri); aunts, Litzie Sauer and Marion Reeves; numerous nieces and nephews.

Edith A. Ehlers Mazurek, TPHA honorary life member, passed away on May 9, 2016. Edith A. Ehlers was born on April 15, 1917, in Austin to Victor Marcus and Edith Amberg Ehlers. Her father, Vic Ehlers actually started TPHA many decades ago. Her sister, Marian, was married to Doc Ballard, TPHA member and Regional Engineer in PH Region 7 under Dr. Crowder. Edith earned a Master of Science degree in Chemistry from The University of Colorado, Boulder. She immediately began a career with the Fort Worth Public Health Center. After 47 years of service, she retired in 1987 after as laboratory director. She was honored for her work with Dr. John J. Andujar in developing a simplified blood test for syphilis that is used today. Edith was a member of the Woman's Club/Club Fidelite. It became her home away from home after retirement. She was preceded in death by her husband of 54 years, Joe Mazurek. Survivors: Daughter, Pamela Nelson and her husband, Philip; grandchildren, Mike Nelson and his wife, Jennifer, and Michelle Rocket and her spouse, Marsha; great-grandchildren, Lauren and Emma Nelson; and sister, Marion Ballard.

Car Seat Safety, Not as Easy as 1-2-3: Car Seat Misuse in North Texas

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ABSTRACT

Objective: While national car seat usage is up, children continue to ride unrestrained, especially in the South. Additionally, the percentage of caregivers who have difficulty with a correct installation remains high at 75-85%. This article reviews the child passenger safety program run by The Safety Source-Injury Prevention Service at Children's Medical Center Dallas and reports on the 2013 car seat use and misuse data found at their inspection stations.

Methods: For each child seat inspected in 2013, a technician completed the Safe Kids Worldwide Child Passenger Safety Checklist. Researchers reviewed 530 forms and extracted specific data points.

Results: Of the children present, 78.6% were riding incorrectly or arrived unrestrained. The majority of seats had more than one error. Errors were significantly related to the type of car seat, with children in infant carriers almost 5 times more likely to be in an improperly installed seat. The most common error was with the harness, followed by using the seat belt to anchor the seat. Nearly all children were in the right seat for their age and weight however, about 6% of children graduated to the next seat prematurely.

Conclusions: Despite advances in educating caregivers about proper installation with an increased focus in social and print media, our findings mirror long-standing national installation error rates of over 75%. Quantitative findings narrow down key areas of concern, such as difficulty with the harness and issues of premature car seat graduation, which can then be addressed using a mixed-methods approach.

Keywords: child passenger safety, car seat errors, car seat graduation

INTRODUCTION

"When I'm fighting to install one into my car by myself, the process invariably involves instruction manuals (for my car seat and my car), YouTube installation videos (necessary since my manuals seem to be written in Pirahã), ample cursing, and me punching the car seat".[1]

The complexity of correctly installing a car seat creates significant barriers for caregivers, as illustrated above. Additionally, car seats and automobiles both have different requirements, restrictions, and allowances for appropriately securing a car seat, often referring to the other manual for answers, and further adding to confusion. Moreover, most car seat manuals are written at a 7th to 12th grade reading level, potentially compounding the difficulties in comprehending technical information.[2]

The importance of a correct installation cannot be overstated. Car crashes are the leading cause of death among children worldwide.[3] In the United States, 673 children are seriously injured and six children have fatal outcomes due to car crashes daily.[4] Car seats are designed to limit and control the body's rate of deceleration during a crash, spreading the crash forces over a wide area of the body and protecting the most vulnerable areas such as the brain and spinal cord.[5] While car seats can significantly mitigate fatal injuries by up to 71% in infants and 54% in toddlers,[3,4] two major issues compromise children's safety within automobiles: correct use and correct installation.

At a national level, car seat usage has increased. Visual inspection in 2011 found that 91% of children under the age of eight were using a safety restraint system; a statistically significant increase from 2010.[6] However, in the South, child restraint use was far below other regions of the United States,[6] and Texas had the most child deaths in the country due to riding unrestrained.[7]

While caregivers have increased their overall use of child restraints, national installation error rates hover between 75-85%.[8,9] Correct usage involves four steps: 1) selection, including the right seat for the child's age, height, and weight; 2) direction of the child in the car, either rear- or forward-facing; 3) location of the child in relation to other passengers and air bags; and 4) installation, including the harness, seat angle, and securing the seat in the car by either the Lower Anchors and Tethers for Children (LATCH) system or by the vehicle's seat belt system.

Children graduate to the next stage of car seat based on their age, height, and weight, with upper height and weight restrictions varying by seat manufacturer. The four types of seats are infant carriers, convertible seats, combination seats, and booster seats. Infant carriers can only be installed rear-facing and are generally used for young infants. Convertible seats are installed rear-facing until the child reaches a certain height or weight, and then forward-faces until the maximum height/weight limit is reached. Combination or forward-facing seats have a 5-point harness, are only installed forward-facing, and can be used as a belt positioning booster when the harness height/weights are reached. The belt-positioning booster seat is for older children who have outgrown their combination seat, but are not tall enough to have the shoulder portion of a lap and shoulder belt fit appropriately across their torso and hips. Booster seats are often used for children who weigh between 40 and 100 pounds, and have upper use limits based on age and/or height. All parents and caregivers should refer to the car seat owner's manual recommended height, weight, and age guidelines, as these vary across manufacturers.

The current best practice guidelines from the National Highway Traffic Safety Administration (NHTSA), Safe Kids Worldwide, and the American Academy of Pediatrics (AAP) recommend keeping children rear-facing as long as possible, and then in a forward-facing seat with a 5 point harness as long as possible. Caregivers are instructed to use booster seats from when they outgrow the 5-point harness until the child can fit properly in a lap and shoulder belt, around 8 years old or until they are 4'9" tall per Texas law.

Hands-on installation education by a Certified Child Passenger Safety Technician (CPST) is recommended by safety organizations such as NHTSA, Safe Kids Worldwide, and the AAP. This article reviews the child passenger safety program run by The Injury Prevention Service at Children's Medical Center Dallas, the flagship hospital of Children's HealthSM, and reports on car seat use and misuse data found at their inspection stations.

POPULATION AND METHODS

Children's Medical Center Dallas is a Level 1 Pediatric Trauma Center, the fifth-largest pediatric hospital, and the second busiest pediatric emergency room in the nation.10 The Injury Prevention Service has provided car safety education to the community since 2004, serving 600-800 families annually. Nine members of the current team are certified technicians, with six trained in the safe transport of children with special needs. Recurring car seat inspection stations are operated at three hospital locations as well as 6-7 community events per year.

For each child seat inspected in 2013, a technician completed the Safe Kids Worldwide Child Passenger Safety Checklist. The checklists were reviewed by certified instructors at the close of each consultation and then scanned and filed electronically at the end of each day. Researchers reviewed each form and extracted specific data points related to the accuracy of the installation of the car seat or proper harnessing upon arrival to the inspection site. All ages were calculated in months for standardization purposes.

Statistical analysis used descriptive statistics, t-tests and Analysis of Variance (ANOVA) for means comparisons between groups, Chi-square analysis for group comparisons with categorical variables, and Mann-Whitney U tests for median comparisons. The misuse proportions between different types of car seats were also tested. P-value <.05 was used as significance level. All statistical analyses were conducted using SPSS version 18.0 (Chicago, IL) and Stata 13 (College Station, TX).

RESULTS

In 2013, a total of 741 seats were checked. Each form was reviewed for accuracy and completeness; 211 forms were excluded for various reasons including inability to validate accuracy and missing data points. The remaining 530 forms were used for analysis.

Eighty-seven caregivers (16%) came to the inspection station before their baby was born. Of the 443 children who were present at the fitting station, their ages ranged from 0-108 months (9 years) with an average age of 30 months. The Injury Prevention Service provided new car seats to over half of the children served (57.7%, n=306). Criteria to obtain a new car seat included seat expiration, manufacturer recalled, or a known or unknown crash history. Moreover, new seats were provided if the child had outgrown their current seat.

Table 1 describes the major installation findings. Of the 530 seats included in analysis, only 16% were correctly installed, and almost 60% of the seats installed had one or more error. Seventy-four children (14%) arrived unrestrained and 32 (6%) parents brought an uninstalled seat, with most of the latter new parents seeking installation help for their unborn baby. Thus, of the 443 children present, 78.6% had an installation error or arrived unrestrained.

Table 2 illustrates the errors found from the seats installed incorrectly; most seats had more than one error. The most common error was with the harness; two-thirds of inspected seats had a harness that was too loose, the retainer clip was in the wrong position, or the harness was not in the correct harness slots for the car seat's direction. The second most common error (65.1%) occurred in securing the seat to the car with the seat belt system. Almost half of seats installed incorrectly had an angle error; most of these were with infant carriers. Ninety-three (29.8%) seats were expired, 70 (22.4%) had an error with the lower anchor system, 37 (11.9%) were installed facing the wrong direction, and 36 (11.5%) were recalled as a result of a defect or malfunction in the seat.

Table 1. Installation Findings (n=530)

Incorrect	312 (58.9%)
Correct	85 (16%)
Unrestrained	74 (13.9%)
Uninstalled	32 (6%)
Unknown	27 (5.1%)

Table 2. Installation Errors (n=312)

Harness	206 (66%)
Seat belt	203 (65.1%)
Angle	141 (45.2%)
Expired	93 (29.8%)
Lower anchors	70 (22.4%)
Direction	37 (11.9%)
Recalled	36 (11.5%)

Harness errors were significantly associated with the age of the child ($p<0.05$), with younger children more likely to be improperly harnessed. With every year gained in age, the risk of harness error decreased by 17%. The mean age of children with a correct harness was 27.4 months (median 24 months) whereas the mean age with an incorrect harness was 22.2 months (median 16 months).

Of the 295 caregivers who installed their seat using the seat belt system, 92 (31.2%) used it correctly. Of the 122 caregivers who installed their child's seat with the lower anchor system, 52 (42.6%) used it correctly. Some caregivers installed the seat with both systems and some installed with neither, both of which are incorrect installation methods.

Looking at installed seats only, the type of car seat was significantly associated with whether or not it was installed correctly ($p<.001$). Of the 312 seats incorrectly installed, 94 (30%) had one error, 118 (38%) had two errors, and 100 (32%) had three or more errors. Infant carriers installed without a base were found to have the most errors, with only 7.3% installed correctly and 68% with 3 or more errors. Caregivers had the easiest time with the booster seat; whereby almost half (49%) were successfully installed. The convertible and combination seats were similarly error-free at 28.6% and 25.7%, respectively.

The infant carrier seat has a significantly higher misuse rate ($p<0.05$), with 87.2% incorrectly installed (Table 3). Forward-facing seats had the next highest misuse rate, with 80.4% incorrect. Finally, over half of booster seats were installed incorrectly (54%).

Table 3. Frequency of Improper Installation by Seat Type (N=396)

	Incorrect	Correct	Total
Infant Carrier	143 (87.2%)	21 (12.8%)	164
Convertible	59 (77.6%)	19 (22.4%)	76
Combination	82 (80.4%)	20 (19.6%)	102
Booster	27 (54%)	23 (46%)	50

Of interest are when caregivers turn children from rear to forward-facing, when children graduate to the next car seat, and whether that graduation is appropriate for the child's age and weight. The technician form does not document whether children were riding rear or forward-facing in each seat type, however we examined child age and weight to see when they are graduating to the next seat. Table 4 compares our observed car seat use patterns with best practice suggestions and average car seat weight limits. Of note, children graduated into a combination seat and a belt positioning booster seat too early for their age and weight.

Finally, Chart 1 illustrates the kind of car seat children arrived in by their age, with those in the wrong seat or unrestrained highlighted. Of the 198 children 23 months and younger, 123 (62.1%) were in an infant carrier, 42 (21.2%) were in a convertible, 13 (6.6%) were in a combination, 1 was in a booster (0.5%), and 19 (9.6%) arrived unrestrained. Of the 120 children 24-47 months old, 4 (3.3%) were in an infant carrier, 31 (25.8%) were in a convertible, 60 (50.0%) were in a combination, 8 (6.7%) were in a booster, and 17 (14.2%) arrived unrestrained. Of the 117 children 48-95 months old, 9 (7.7%) were in a convertible, 36 (30.8%) were in a combination, 40 (34.2%) were in a booster, and 32 (27.4%) arrived unrestrained. Of the 8 children 96-108 months old, 4 (50%) were in a booster and 4 (50%) arrived unrestrained. Based on this data, 20.3% of children were in the wrong seat or not in a seat at all.

DISCUSSION

Despite advances in educating caregivers about proper installation with an increased focus in social and print media,[4] our findings mirror national misuse and installation error rates of over 75%.8,9 Caregivers had the most difficulty with the harness overall, and this was significantly related to age of the child, with caregivers of younger children more likely to make mistakes. A recent study also shows that when combined, errors with the retainer clip, poor threading of the harness, and loose harness strap are the most frequently observed mistakes.[18] It may be that caregivers do not want to tighten the harness straps on infants with the fear of cinching it too tight and harming the infant. Also, chest surface area is much smaller in infants, possibly creating difficulty in positioning the retainer clip at the correct height. Further research is needed to understand caregivers' decision-making and interaction with the harness so that education may be tailored to their experiences.

Using the seat belt system to install the car seat was the second most common error. In fact, compared to caregivers who used the lower anchor system, the seat belt system proved more difficult to use correctly. While the lower anchor system was designed to be more user friendly,[11] both ways of installing the seat were used incorrectly over half the time by caregivers in our sample. While parents who used the lower anchor system had fewer installation errors, these findings were not statistically significant.

Children with lower weights were more likely to be in seats that were improperly installed. Not surprising, infant carriers, especially those without a base, were found to have the highest degree of error. This is likely due to the added difficulties of the harness, proper angle, and achieving a tight installation using the seat belt system; the lower anchor system cannot be used without the base. While designed to be used without a base, caregivers should be aware that the majority of infant carriers installed in this way had three or more installation errors and extra care should be taken. Given our findings show that the majority of infant carriers are improperly installed, there is extra need for targeted education for caregivers with younger children.

Notably, whether the child is in the right seat for their age, height, and weight is essential. We found that in general, the majority of children (80%) were in the right seat for their age and weight, as outlined by best practice guidelines. Our form did not allow us to know whether a child was rear- or forward-facing in a convertible seat, but findings indicated that 83% of children less than 2 years were in a seat that allowed them to be rear-facing with 62% in a rear-facing only seat. While most state laws regulate rear-facing until one year old, all best practice guidelines recommend a rear-facing preference until the child reaches the age of two because children who ride this way suffer significantly less injuries than children who face forward, especially in side impact crashes.[12] Research also shows that premature graduation of children to booster seats or seat belts are associated with an increase in head, face, and abdominal injury.[8] Therefore best practice guidelines recommend that caregivers be conservative when graduating their child to the next seat.[14]

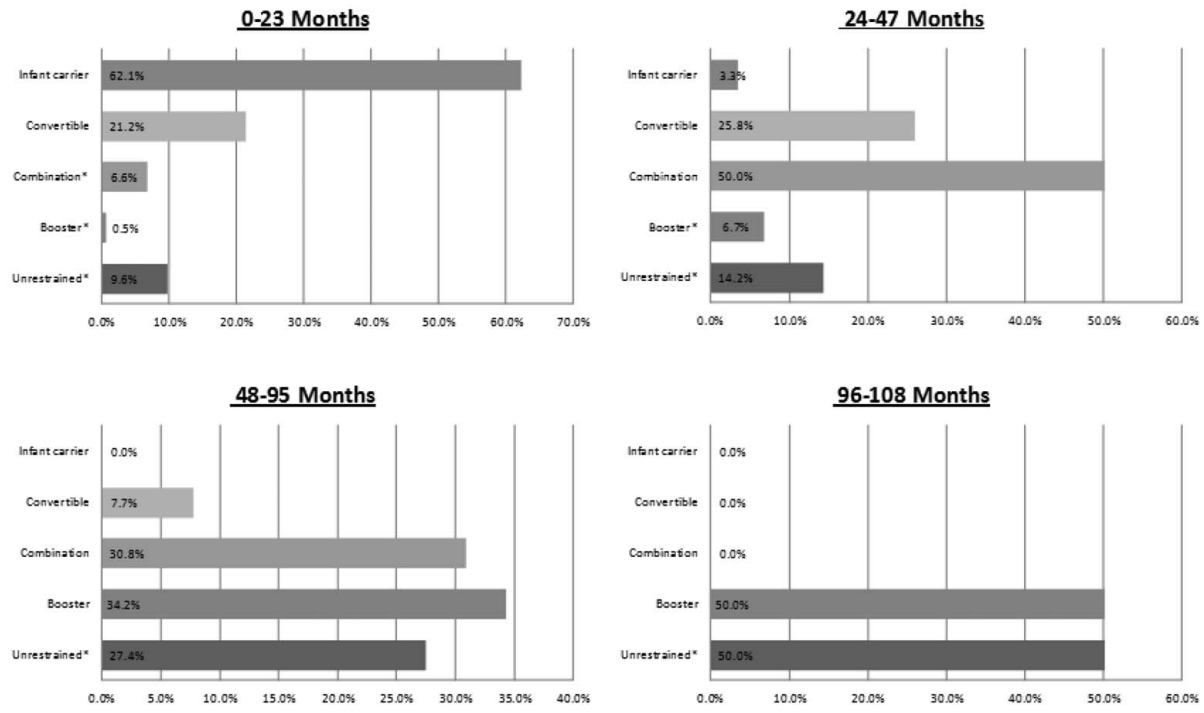
Finally, children in the South have significantly lower restraint use overall when compared to other regions; 14% of children in our sample arrived unrestrained, mirroring NHSTA's data

Table 4. Car Seat Use by Age and Weight

	Age (months)			Weight (lbs)		
	Mean	Range	Suggested	Mean	Range	Seat Limits
Infant carrier	8.9	0.1-24	0-24	19.1	5-38	4-30
Convertible	23.5	1-60	0-24/ 24-48	27.5	8-41	5-65
Combination	37.1	2*-84	48-96	33.9	12*-55	25-80
Booster	60.9	23*-108	96-108	47.0	22*-100	40-100
Unrestrained	43.4	1-96	never	37.2	8-84	never

*children outside of the recommended age and weight guidelines

Chart 1. % Car Seat Use by Age



*children outside of the recommended age guidelines

from 2011.[6] These children tended to be four years and older, but this was a problem for children of all ages.[15] The importance of providing free or very low cost seats for families in need is essential, given these alarming trends.[16] Future research should also concentrate on the reasons why older children ride unrestrained and how to best educate parents on the importance of booster seats.

Finding that the misuse rate has not changed significantly in the past 20 years strongly suggests that more research is needed to successfully target caregivers' experiences with car seats.[8,17] Quantitative results such as those presented in this article narrow key areas of concern, such as difficulty with the harness and issues of premature car seat graduation, which can then be addressed using a mixed-methods approach. Qualitative data collection is valuable in answering key questions about how to reach caregivers with effective education. As such, there is opportunity for new directions in research on the relationship between caregiver and the car seat. What prompts caregivers to get their seat checked by a certified technician? And what are the primary concerns of caregivers regarding child passenger safety? Simultaneous efforts must also continue in the enforcement of traffic safety laws and the development of new regulations, such as booster seat laws in all states.

Limitations

Several limitations are found within this study. This study is based upon forms completed by persons other than the researchers. Every effort was made to include only forms that were deemed accurate and complete. As with retrospective research, the forms did not contain important details such as the direction of children in convertible car seats which could have supported further analysis. Further, while our sample included children from 112 zip codes throughout the Dallas-Fort Worth Metroplex, our findings may not be generalizable to other regions. Finally, the sample was drawn from caregivers who voluntarily attended a fitting station, showing prior interest in car seat safety. This potentially lends itself to selection bias as the families included in this sample may represent a specific subset of the population instead of a representative sample of the general population in the area.

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Evaluation of an Autism and Developmental Milestones Promotora Training Guide as a Teaching Tool for South Texas Community Health Workers

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ABSTRACT

Background: The latest Centers for Disease Control and Prevention prevalence estimate of Autism Spectrum Disorders (ASD) is 14.7 per 1,000 children aged eight years, roughly 30% higher than the prevalence reported in 2012. However, the prevalence of ASD among Hispanic children, including children in South Texas, continues to be much lower than national estimates for non-Hispanic White children. The possibility of underdiagnosis of ASD among Hispanic children remains a concern and may be attributed to a lack of culturally competent healthcare providers. To address inadequate access to healthcare among Hispanic communities, promotoras or community health worker (CHW)-based outreach has proven effective at increasing awareness on general health practices. A three-phase 'train-the-trainer' program was developed using the Developmental Milestones Promotora Training Guide as the main component. The objective of the first phase was to evaluate the use of the Training Guide to educate CHWs in South Texas on normal developmental milestones and recognize ASD warning signs.

Methods: Fifty-eight CHWs from two South Texas counties attended the training. The participants completed pre- and post-test assessments, and a paired t-test was conducted to ascertain mean percent-correct responses. The outcome of interest was a significant difference within participants in their mean percent correct responses between their pre- and post-tests.

Results: A statistically significant difference ($n=58$, $p<0.0000$) was found between mean percent correct responses of the pre-test (mean (M)= 60.49, standard deviation (SD)= 16.41) and post-test (M= 73.56, SD= 18.15).

Discussion: The Promotora Training Guide is an effective tool for increasing knowledge among South Texas CHWs regarding developmental milestones and ASD warning signs. Certification and training curriculums for CHWs should include this guide to enable CHWs to help Hispanic families recognize developmental delays, thereby improving the health outcomes of affected children by allowing for earlier detection, diagnosis, and therapy.

BACKGROUND

The prevalence of Autism Spectrum Disorders (ASD) is rapidly increasing among all children in the United States. The Centers for Disease Control and Prevention (CDC) currently estimates that ASD affect 1 in 68 American children, or 14.7 per 1,000 children aged eight years (95% CI: 14.3–15.1).[1] This recent estimate is approximately 30% higher than those reported in 2012, which identified 1 in 88 children being affected with ASD.[2]

Although the national prevalence of ASD continues to increase, Hispanic children have persistently been reported to have lower prevalence of ASD compared to non-Hispanic White children. The prevalence of ASD among Hispanic children, including children in South Texas, is estimated at 10.8 per 1,000 children (95% CI: 10.0–11.6) compared to non-Hispanic White children at 15.8 per 1,000 children (95% CI: 15.2–16.3).[1] Various nationwide studies of children with ASD have confirmed that Hispanic children have significantly lower prevalence of ASD compared to non-Hispanic White children.[3,4] Also, there are fewer ASD diagnoses in schools with higher rates of Hispanic children.[5]

Several theories attempt to explain the lower rates of ASD among Hispanic children compared to non-Hispanic White children. These theories attribute the discrepancy to underdiagnosis, inadequate access to culturally competent healthcare, beliefs about developmental disorders, lack of knowledge regarding normal childhood development, and a protective factor known as the "Hispanic paradox." The Hispanic paradox posits that Hispanics experience similar or better health outcomes compared to their non-Hispanic counterparts even though Hispanics have lower average income and education.6 The possibility of underdiagnosis of ASD among Hispanic children is supported by data that show Hispanic children are less likely than non-Hispanic White children to have health insurance, more likely to live in households that fall below the poverty line, more likely to lack a regular source of medical care, and more likely to lack access to specialty care – factors that impede early diagnosis and timely treatment.[7]

Furthermore, Hispanic families with children with ASD report unique challenges that complicate access to culturally competent care. Studies have shown that many Hispanic families had never heard of ASD or had little information about it, assumed that ASD warning signs were normal, had concerns regarding communication barriers with their providers, and found it difficult to raise their concerns about their child's development with clinicians due to the stigma, embarrassment, rejec-

tion from family and community, and caregiving burden that developmental delays impose on families.[8,9] Hispanic parents are also significantly less likely to report that their provider spent enough time with their child and was sensitive to their values compared to non-Hispanic White parents, leading to the conclusion that racial and ethnic disparities in healthcare quality seems to have remained unchanged over time.[10] Therefore, there is an enormous need to educate Hispanic communities on normal developmental milestones and warning signs for ASD for prompt diagnosis and treatment.

The use of promotoras, or community health workers (CHWs), is effective at increasing knowledge of general health practices among ethnic minorities in a culturally competent manner.[11,12] CHWs, who often reside within the same community they serve, understand to a greater degree the concerns and values of their neighbors, and are able to bridge the cultural gap between healthcare professionals and underserved communities. Health education using CHWs has proven effective in areas such as diabetes and asthma control among Hispanics. Still, not many studies have used a similar approach to train CHWs on identifying developmental delays and ASD warning signs.

Discussions with CHWs in South Texas prior to this project revealed that CHWs often feel unprepared to answer questions from members of their community regarding health issues they have not had training for. Also, CHWs receive training regarding prevalent diseases among Hispanics, but few receive any training on developmental issues, such as ASD. Therefore, the primary goal in developing an educational intervention was to train CHWs in early childhood development and delays, which in turn, would help mitigate the discrepancy in ASD prevalence between Hispanic and non-Hispanic White children.

The Hispanic Autism Research Center (HARC) developed a "train-the-trainer" program consisting of three phases: the first phase consists of an educational intervention for CHWs, the second phase consists of home visits by a subset of the CHWs who completed the training, and the third phase consists of focus groups to ascertain successes and areas of improvement for the curriculum. The purpose of the first phase was to evaluate the use of the Developmental Milestones and the Warning Signs of Autism: Promotora Training Guide,[13] developed by the Organization for Autism Research (OAR), as a tool to educate CHWs in two South Texas counties (Cameron and Hidalgo counties) to recognize normal developmental milestones and identify developmental delays and warning signs of ASD during their routine home visits.

POPULATION & METHODS

The data and results of this report cover the first phase of the pilot project. The Internal Review Board at University of Texas Health Science Center San Antonio reviewed and approved implementation of this training.

Participants and Recruitment

CHWs from two community-based participatory research sites, Proyecto Juan Diego in Cameron County and the South Texas Promotora Association in Hidalgo County, were invited to participate. The budget allowed for recruitment of 60 CHWs, of which 58 participated in the training. Demographic information was collected with data collection surveys, which inquired about participants' ethnicity, sex, age, county of residence, highest level of education, and years serving as a CHW (Table 1). Of the 58 participants, 57 identified being Hispanic and the majority identified as female and 40 years old and older. Both counties were represented almost equally, about one-third of participants had up to a high school education, and over half had less than five years experience serving as a CHW, with almost 13% having served more than 15 years as a CHW.

Intervention

The first phase of the project included the Training Guide as the primary teaching component, and the content was delivered in the form of a workshop. The Training Guide is comprised of three sections (Table 2). The first section provides background information for the training facilitator and tips for preparing and administering the training; the second section includes the learning material in five distinct modules; and the third section includes all of the relevant handouts and activities. To evaluate the effectiveness of the Training Guide in increasing knowledge in developmental milestones and warning signs for ASD, the study team quantified participant performance by means of a pre-post test analysis. The eight-hour training session was held in the auditorium of the Regional Academic Health Center in Harlingen, Texas, and was delivered in Spanish by three presenters. All relevant teaching materials, including the Training Guide, were printed in English

Table 1: Demographic characteristics of community health worker training participants (N=58), 2012

Demographic Characteristic	N	%
Ethnicity	58	100.00
Hispanic	57	98.28
Other	1	1.72
Sex	55*	100.00
Male	4	7.27
Female	51	92.73
Age (years)	58	100.00
18-29	5	8.62
30-39	2	3.45
40-49	19	32.76
50 or older	32	55.17
County of Residence	55*	100.00
Cameron	29	52.73
Hidalgo	26	47.27
Highest Level of Education	56*	100.00
Less than High School	3	5.36
High School	19	33.93
Technical School	16	28.57
License	2	3.57
College	12	21.43
Post-Graduate	4	7.14
Years serving as a CHW	56*	100.00
5 or less	33	58.93
6 to15	16	28.57
More than 15	7	12.50

* Indicates missing data due to blank responses

Table 2: Table of Contents of the Developmental Milestones and the Warning Signs of Autism: *Promotora* Training Guide

Content	Length of session, where applicable (Minutes)
Part One: Background Information for the Facilitator	
Goals and objectives	
Use of *promotoras* in health promotion programs	
Recruiting *promotoras*	
Scheduling the training event	
Preparing for the training event	
Mastering the material and facilitation tips	
Part Two: Training Sessions	
Introductory Session	15
Session 1: Introduction to Developmental Milestones	45
Session 2: Developmental Milestones	45
Session 3: Outreach During a Health Fair	45
Session 4: Outreach during Clinic Visits	45
Session5: Referral Information and Review	60
Supporting Materials	
Flip Chart Headings	
Agenda and Objectives	
Fact Sheet: Autism Spectrum Disorders	
Milestone Matching	
Outreach Approach for Short Encounter	
Health Fair Scenarios	
Clinic Visit Scenarios	
Referral Information	
Ethical Pledge	
Certificate of Completion	

and Spanish. Continuing education credits were awarded to participants after successful completion of the training.

Data Collection

Participants completed a pre-test questionnaire before the training and a post-test questionnaire with the same questions immediately after the last lesson was delivered. The pre- and post-test responses were collected on individual questionnaires with a corresponding participant ID number. The content-specific questions in the pre- and post-tests were adapted from a questionnaire also developed by the OAR and modified by the HARC to assess understanding of the topics covered in the training. The questionnaire can be seen in Appendix I.

Data Analysis

The primary outcome of interest was a statistically significant difference within participants in their mean percent correct responses of their pre- and post-tests. The mean percent correct scores were calculated for each participant's pre- and post-test and a paired t-test was conducted using the percent correct responses. A significantly higher mean percent correct score in participants' post-tests compared to the pre-tests may reflect the effectiveness of the workshop and the Training Guide. To appreciate differences or similarities in performance by county, pre and post-test means were stratified by county (Table 3). Lastly, to determine if longer experience as a CHW affected the results, participants' years serving as a CHW were stratified by county (Table 4). The data were analyzed using Stata version 13 (College Station, TX: StataCorp LP).

RESULTS

The results revealed a statistically significant difference between the pre-test (mean (M)= 60.5, standard deviation (SD)= 16.4) and post-test (M= 73.6, SD= 18.2) scores (t(57 d.f.)= 5.7, p= 0.0000004), with the post-test mean scores being significantly higher than the pre-test mean scores. When stratified by county, Cameron County participants had a pretest mean of 63.5% and post-test mean of 74.1%, whereas Hidalgo County participants had a pre-test mean of 58.7% and post-test mean of 73.1% (Table 3). When looking at years of experience, of those from Cameron County, 15 participants had five or less years serving as a CHW and 12 had greater than five years serving as a CHW, whereas those from Hidalgo County, 18 participants had five or less years serving as a CHW and eight had greater than five years serving as a CHW (Table 4). Additional survey results are as follows: 56 out of 56 (100%) participants agreed that it is important for Hispanic parents to learn about childhood developmental milestones; 34 (58%) participants know someone with a child who has been evalu-

Table 3: Participants' Pre and Post Test Results by County of Residence (N=55*), 2012

	Overall (N=55)	Cameron Co. (N= 29)	Hidalgo Co. (N= 26)
Pre-Test Mean	60.5%	63.5%	58.7%
Post-Test Mean	73.6%	74.1%	73.1%

* Indicates missing data due to blank responses

Table 4: Participants' Years Serving as a community health worker by County of Residence (N=53*), 2012

	Cameron Co. (N= 27)	Hidalgo Co. (N= 26)
≤ 5 years	15	18
> 5 years	12	8

* Indicates missing data due to blank responses

ated for developmental delays; and 10 (17%) participants previously participated in a childhood developmental milestones training.

DISCUSSION

The results from Phase I of this project reveal that the OAR's Promotora Training Guide is an effective teaching tool for increasing knowledge among CHW in South Texas regarding childhood developmental milestones, ASD, and their warning signs. The post-test data mean was significantly higher than the pre-test data mean, indicating that after the training, participants' knowledge of the subject matter was much higher than their own baseline knowledge, by 13% on average. That is, the training resulted in a significant increase in participants' knowledge of developmental milestones, ASD, and their warning signs.

The results of this study also show that, when stratified by county of residence, participating CHWs differed slightly in their pre-test scores, yet performed similarly in their post-test scores. The slight difference in pre-test performance between counties could be attributed to variations in experience, i.e., more participants from Cameron County reported having more than five years of experience serving as CHWs compared to Hidalgo County participants. These results indicate differences in baseline knowledge of normal childhood development and ASD warning signs between these two counties, which could suggest differences in baseline knowledge across all counties within the state. However, the similar post-test results demonstrate that the training was effective in not only improving overall participant knowledge, but improving them to the same level, that is, a post-test county mean between 73.1-74.4%.

With an increase in CHW knowledge regarding developmental milestones, ASD, and their warning signs, this curriculum may provide the background needed for CHWs to teach parents and families in their communities to identify developmental delays that may necessitate further investigation by healthcare providers. Equipping CHWs with the tools necessary to disseminate information about normal childhood development and delays may also contribute to decreasing the underdiagnosis that may be occurring in Hispanic populations. Research has consistently shown that CHWs are effective at increasing general health knowledge among ethnic minorities.[6] CHWs also influence behavior change by providing tools and emotional and social support to the families they educate.[14] Overall, CHWs are effective in many realms of patient education, including chronic disease self-management, asthma, and healthy homes education to Hispanic families.[15,16]

In Texas, CHWs are certified by the Texas Department of State Health Services after successful completion of the Community Health Worker Training and Certification Program.17 Since Texas offers a statewide certification process, implementation of this training and inclusion of the Training Guide into the certification curriculum may serve to increase awareness of developmental milestones, ASD, and their warning signs among all CHWs in the state. The potential of this training and the Training Guide as a teaching tool should not be limited to Texas, given that CHWs provide patient education to many underserved communities across the nation.

In this first phase of the pilot study, we equipped CHWs with knowledge about normal childhood development, ASD, and public health outreach tools that will be applied to the Hispanic families they serve in South Texas. Trainings for CHWs on developmental milestones have been implemented in various cities across the United States, but to our knowledge no data exist about such trainings in South Texas. Thus, this is the first time this type of training is provided to CHWs in South Texas. Another strength includes the data that were collected directly from Hispanic CHWs, as this reflects the population they serve in South Texas. In addition, the second and third phases of the pilot study were implemented to determine whether the CHWs who completed the training successfully increased the knowledge of the subject matter in the families they serve and collect qualitative data from CHWs regarding the training and dissemination of the information they learned.

Limitations of the first phase include a small sample size of CHWs who completed the training, which may limit the generalizability of these results. Also, the Developmental Milestones Promotora Training Guide is not readily available online, but can be attained by contacting the OAR directly at http://www.researchautism.org. Another limitation is the use of a questionnaire that had not been validated for this purpose. Developing a validated questionnaire for pre- and post-testing, including availability of professional translating services for translation of the questionnaire, will help to ensure that questions are adequately presented to the training participants. Future endeavors should address these limitations and replicate the use of the OAR's Training Guide as the primary teaching tool for CHW trainings in different Hispanic communities across the nation. The first phase of our pilot study demonstrated that OAR's Training Guide could be used as an effective teaching tool to increase the knowledge of CHWs, with the overarching goal of improving the health outcomes of children affected with developmental delays and ASD by allowing for earlier detection, diagnosis, and therapy.

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Competing interests

None declared.

Ethics approval

Internal Review Board of the University of Texas Health Science Center San Antonio

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APPENDIX I: Questions for "Developmental Milestones: Recognizing the Warning Signs of Autism" Pre- and Post-Test

Instructions: Please circle the correct answer for each of the following.

1. Which of the following is true about conducting outreach during a health fair?
   a. You should spend as much time with one family as needed
   b. Your role is to diagnose developmental delays
   c. You will provide brief information to families with small children
   d. You should not provide referral information if requested
2. With what age are the following three developmental milestones associated?
   - The child can use several single words
   - Does simple pretend play
   - Points to interesting objects

   a. 2 years
   b. 18 months
   c. 7 months
   d. 3 years
3. Autism is caused by:
   a. Differences in the brain
   b. Parenting style
   c. Vaccinations
   d. A virus
4. Developmental delays…
   a. Are nothing to worry about
   b. Are more common in girls
   c. Are more common in Latino populations
   d. Can indicate a more serious problem
5. Please put the following 5 steps of the health fair outreach approach in the correct order. (Mark a 1 next to the first step, a 2 next to the second step, and so forth.)
   - Define "developmental milestone" __
   - Ask a question about the age of the child __
   - Provide the magnet __
   - Link the age of the child to a relevant milestone __
   - State that knowing milestones is important for identifying delay
6. Which developmental disability occurs in one out of 88 births and affects more boys than girls?
   a. Vision loss
   b. Chicken Pox
   c. Autism
   d. Mental retardation
7. What is the role of the "flipbook" in conducting outreach?
   a. To give to the family as an ongoing reference
   b. To record the number of encounters you have
   c. To file the brochures that you pick up during the health fair
   d. To serve as a presentation tool
8. Which of the following statements is FALSE?
   a. Sharing a lot of personal information can help with outreach
   b. Statements made to a family during outreach should be nonjudgmental
   c. All the information you learn during outreach should be kept private
   d. The name and address of a person you speak to should not be written down
9. With what age are the following three developmental milestones associated?
   - The child shows affection for playmates
   - Uses 4 and 5 word sentences
   - Plays make-believe

   a. 1 year
   b. 3 years
   c. 3 months
   d. 5 years
10. A parent tells you that her 2 year-old son had been able to say 3 or 4 different words, but now doesn't speak at all. What is the most important thing to tell her?
    a. Boys tend to speak later than girls
    b. A developmental screening can determine if there is a serious problem
    c. Language is a key developmental milestone
    d. Every child develops differently, so there is no need for concern

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