In This Issue

President’s Message

Commissioners Comments

Poison Control News:
Blue Bell Ice Cream Recall: Calls to Texas Poison Centers
Methyl Bromide: A Toxic Pesticide Still Used in the US

Book Review:

Original Public Health Research:
Household Pesticide Use in Colonias in Webb and Hidalgo Counties, South Texas, as Assessed Using a Pesticide Inventory

Improving Public Health in Rural Texas: Could Hispanic Providers Be the Answer?

Are Fracking Sites Associated with Increased Motor Vehicle Crashes in Texas?

A Descriptive Analysis of the Increasing Burden of Reported Chronic Hepatitis C in Liberty County, 2013

Memoriums
Henry Joe Vickery, Jr.
Marietta Crowder Walker

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President’s Message

Cindy Kilborn, MPH

The public health system faces unprecedented challenges and leadership is more crucial now more than ever before, but what kind of leadership? Clearly a change is needed, but what kind of change? A complete cultural change is required if we are to succeed. Change requires new mindsets, not just new skills. Collaboration is required. Collaboration is defined as “exchanging information and sharing or pooling resources for mutual benefit to achieve a common purpose”. Collaborative leadership has been promoted by many, including the Robert Wood Johnson Foundation and the W.K. Kellogg Foundation, as an effective way to achieve this transformation of our public health system. Key elements to approach this collaborative process are creating clarity, building trust, sharing power and influence and developing people. The Center for Creative Leadership has called this an interdependent leadership culture that should include the ability to work effectively across organizational boundaries (internal and external), openness and candor, multifaceted standards of success, and synergies being sought across the whole. Leadership does not necessarily start from the top down, and it is not just one person. It should be fluid, inclusive and necessary to transform the current public health workforce into the dynamic entity needed to meet these challenges.

This broad sweeping change is not easy, it never is. However, this readjustment is necessary. It will take patience, it will not happen overnight.

TPHA has recognized the need for this change in culture and is embracing this change by reevaluating our mission, expanding partnerships and encouraging all those involved in improving the public’s health to join us in this journey---Everyone-Everywhere-Everyday.

Everyone is “talking the talk”, our challenge now is to “walk the walk”. How are we really going to make this work? Theories about how to improve or enhance public health have been floating around now for more than 30 years. The Institute of Medicine (IOM) published “The Future of Public Health” in 1988 and at that time it was said that the public health system was in disarray. Part of the recommendations in that report was investing in the infrastructure of public health, particularly in public health leadership. Progress has been made in this area with the creation of the national Public Health Leadership Institute (PHLI) in the early 1990s. Since then the Centers for Disease Control (CDC) and the American Public Health Association (APHA) have consistently supported this program which has now implemented a network of regional leadership institutes across the country.

The IOM again evaluated the state of public health in 2002 with “The Future of Public Health in the 21st Century”. As can be imagined, the complexities of the public health system have only expanded, exponentially in some case. Among the recommendations designed to better assure healthy communities are strengthening governmental public health infrastructure, building a new generation of intersectoral or interdisciplinary partnerships, enhancing and facilitating communication within these expanded public health systems and requiring accountability from and among all sectors of public health.
Commissioner’s Comments

Legislative Session: A Refined Focus for Public Health

Kirk Cole
Interim Commissioner, Texas Department of State Health Services

With June 1 marking the end of the 84th Texas legislative session, I want to take a moment to recap the major outcomes for public health. Public health continued to receive major support from the Texas Legislature, an acknowledgment of the critical role it plays especially given recent high profile matters. Ebola, Measles, food-borne outbreaks, emergency response to flooding. It is central to our daily lives in Texas, and we continue to emphasize its distinction by sharing information about what to do to improve the health and well-being of Texans.

A key focus for the Texas Department of State Health Services this session was Sunset, an intensive review of our agency operations. The Sunset process has long been an important part of overseeing state agencies and ensuring state government operates efficiently and effectively. The review determines whether the agency needs to exist and makes recommendations for improvements. Our Sunset bills passed and are being given final consideration by the governor. The Sunset bill reassigned DSHS, but with some changes. The long-term goal of the legislation is to focus DSHS squarely on public health, which means certain parts of the agency – certain regulatory functions and client services – will be moved elsewhere. Details about those changes will be refined as we work with state leadership and the Health and Human Services Commission to implement the legislation.

Legislative support we received for public health can perhaps best be seen by looking at the numbers. The credibility and prominence public health has built over the years yielded significant benefits in the budget, with an additional $291 million in all funds (before transfers) added to our budget. Some highlights:

- $14.1 million in funding and capital for a new vital records system to manage birth, death and other vital records
- $33.6 million in state and federal funds for to better prepare for emerging and infectious diseases
- $4 million to help communities prepare for hazardous chemical events
- $10.7 million to replace the lost tobacco settlement funds, allowing the agency to help prevent tobacco use or help people quit

The governor’s signature on legislation and the budget will mark the end of a long process. Organizations across the state had a stake in making sure public health was part of the discussion at the capitol throughout the last five months.

Thanks to SB 97, vapor products will be included in current laws about minors and tobacco use, including provisions related to underage sales and possession. It also prohibits e-cigarettes on school campuses. We’ll be working to educate the public about those changes.

To help combat the abuse of synthetic drugs, HB 1212 allows us to regulate a synthetic substance on an emergency basis if it poses a threat to public health.

With Texas recently making headlines for having the first case of Ebola and containing its spread, the state has never been more focused on how to plan and respond to emerging diseases. HB 2950 codifies the Task Force on Infectious Disease Preparedness and Response as an advisory board to the governor and allows for the establishment of infectious disease emergency preparedness facilities at health-related institutions. To address first responder concerns, HB 2646 allows for the disclosure of the physical address of a person being monitored for a communicable disease to first responders who may be called to respond to the person’s location.

These are all positive developments for public health in Texas, and we’re already hard at work to implement the changes and cover new ground with emerging issues. We look forward to continuing to work with our partners as we respond to new challenges and further refine our focus on public health in Texas.

Poison Control News

Blue Bell Ice Cream Recall: Calls to Texas Poison Centers

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On March 13, 2015, an announcement was made that the Centers for Disease Control and Prevention (CDC), Food and Drug Administration (FDA), and state and local health officials were investigating an outbreak of the bacteria Listeria monocytogenes (listeriosis). Listeriosis is a serious, life-threatening illness.1 It primarily affects older adults, pregnant women, newborns, and adults with weakened immune systems.2 Symptoms of listeriosis include fever, muscle aches, diarrhea, and other gastrointestinal symptoms. The likely source of at least some of the illnesses in the outbreak in question was reported to be certain Blue Bell ice cream products. Blue Bell Creameries announced that it was removing Scoops ice cream and products made on the same production line from the market and shuttering down the production line.1

On March 23, 2015, Blue Bell Creameries announced the recall of certain ice cream cups. These products are sold to institutions such as schools, nursing homes, and hospitals but not through retail outlets.1 On April 3, 2015, the CDC recommended that consumers not eat any Blue Bell products made at the company’s Oklahoma facility and that retailers and institutions do not sell or serve them.1 This announcement was followed by numerous media stories reporting that big retailers and institutions were pulling Blue Bell products linked to the Oklahoma facility.1 On April 20, 2015, Blue Bell Creameries issued a voluntary recall of all of its products made at all of its facilities.1

This recall was of particular interest in Texas because the company originated in Brenham, Texas, and its corporate headquarters and main plant is in Brenham.

The Texas Poison Center Network (TPCN) often receives calls related to food borne disease outbreaks and food recalls.4 So it might be expected that Texas poison centers would receive calls concerning the Blue Bell recall. During March-May 2015, Texas poison centers received 112 total calls related to the recall. Forty-eight (42.9%) were calls requesting information and 64 (57.1%) were calls about

TPHA Journal Volume 67, Issue 3
concerns that someone had eaten Blue Bell ice cream and was ill or might become ill. Figure 1 shows the number of calls by date received. The first call was received the day of the first announcement on March 13. However, only six calls were received after this and the second announcement on March 23. This might be expected considering that these announcements were about recalls of Blue Bell products not sold through retail outlets and thus not likely to be of concern to the majority of the public. However, the number of calls to Texas poison centers surged in the days after the third announcement on April 3, which involved products that many of the public might consume. A similar surge in calls was received after the fourth announcement, when all Blue Bell products were recalled. Texas poison centers continued to receive calls for weeks after the fourth announcement.

Of the 64 persons where there were concerns that they might have become ill after eating Blue Bell ice cream products, 39.1% were male and 60.9% were female. Their age ranged from 15 months to 90 years with 12.5% being five years or less, 20.3% 6-12 years, 6.3% 13-19 years, 59.4% 20 years or more, and 1.6% unknown age. The most frequently reported symptoms were diarrhea (43.8%), vomiting (29.7%), nausea (21.9%), abdominal pain (14.1%), fever (12.5%), and headache (6.3%) - all symptoms reported with food borne illnesses. However, it needs to be emphasized that this does not mean that the individuals had been infected with listeriosis from eating Blue Bell products.

REFERENCES

Methyl Bromide: A Toxic Pesticide Still Used in the US
Mathias B. Forrester

In March 2015, a family of four was sickened at a Virgin Islands resort following fumigation. The family was flown to the US mainland for hospitalization. The pesticide used to fumigate inside the resort was methyl bromide.1

Methyl bromide is an odorless, colorless gas; at high concentrations it has a sweet, fruity odor.2,3 Methyl bromide is a pesticide used in the control of insects, nematodes, weeds, pathogens, and rodents.3 The chemical is primarily used in the US as a fumigant injected into the ground before crops are planted, killing most soil organisms. It is mainly used for strawberries but also used with tomatoes, peppers, grapes, nuts, and vine crops.2,4

Methyl bromide is a toxic nonspecific alkylating agent. In 1987, the US and 26 other countries signed the Montreal Protocol, a treaty requiring the phase out of methyl bromide, primarily because it depletes the ozone layer. Currently over 200 countries have signed the treaty.2,4 It is banned in the US for indoor fumigation, but the Environmental Protection Agency (EPA) grants exemptions for its use by farmers. Thus, it is still being used in the US; over 376 metric tons are reported to be used in 2015.4

Methyl bromide exposures typically occur through inhalation and skin absorption.3 Acute effects include abdominal pain, convulsions, dizziness, headaches, labored breathing, nausea, vomiting, weakness or malaise, tremor, hallucinations, slurred speech, blurred vision, and temporary blindness. Exposure to high concentration can cause central nervous system and respiratory failure.2,4 Deaths have been reported with methyl bromide exposure.5,6

Only 33 exposures to methyl bromide have been reported to Texas poison centers during 2000-2014, with the last exposure reported in 2011. The majority (90.9%) of the patients were 20 years or older and the remaining 9.1% were age 6-19 years; 69.7% of the patients were male.

Most (75.8%) of the exposures occurred by inhalation, 27.3% dermal, 15.2% ingestion, and 3.0% ocular. (An exposure might occur by multiple routes.) The most common reason for the exposure was occupational (39.4%), followed by environmental (30.3%), general unintentional (18.2%), malicious (6.1%), unintentional misuse (3.0%), and suspected attempted suicide (3.0%). Two-thirds of the exposures occurred at the patient’s workplace, 27.3% at the patient’s residence, 3.0% in a public area, and 3.0% at an unknown location.

The patient was already at or en route to a healthcare facility when the poison center was contacted in 75.8% of the cases, managed on site (outside of a healthcare facility) in 12.1% of the cases, and referred to a healthcare facility in 12.1% of the cases. The medical outcome was 15.2% no effect, 42.4% minor effect, 12.1% moderate effect, 3.0% major effect, 3.0% death, 15.2% not followed but minimal effects expected, and 9.1% unrelated effect.

The most frequently reported adverse effects were dizziness or vertigo (33.3%), headache (30.3%), vomiting (24.2%), nausea (18.2%), abdominal pain (12.1%), and ocular irritation or pain (12.1%), effects consistent with the literature.2,4

The most commonly reported treatments were fresh air (39.4%), irrigation or washing (24.2%), and IV fluids (12.1%).

In summary, few methyl bromide exposures have been reported to Texas poison centers over the last 15 years, and none in the last three years. The majority of exposures appear to be work-related. Although most of the exposures were judged to not be serious, one death was reported.
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Carol A. Galeener, PhD
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Too Hot to Handle: A Global History of Sex Education

Growing up begins when we first recognize that not only do our parents not know everything, some of the things they have told us are actually wrong. The wise child keeps his own counsel; the scholar writes a book. In this slim work, noted social scientist Jonathan Zimmerman comes of age.

In Too Hot to Handle Zimmerman tackles two assumptions of the mid-century liberal narrative that he absorbed at his mother’s knee. The first is that the United States has always lagged western European countries in teaching the young about sex. The second is related to the first. The United States lags because it is a hotbed of individualism, while western European sex education is shaped by community concerns. The author presents a compelling history challenging both of these assumptions. Despite their differing positions on these matters, in a gesture of filial respect Zimmerman dedicates the book to his mother, Margot Lurie Zimmerman, a career sex educator.

Zimmerman casts the history of sex education as part of a century-long evolution in education. The twentieth century saw an explosion of public education globally, dramatically increasing the role of the state in shaping the intellectual life and social prospects of the next generation. As the state asserted control over education, civil society gradually retreated from the task. At the same time, individuals increasingly came to express their sexual proclivities without the age-old constraints of marriage. From the second half of the century onward, the linkage of sex to parenthood became optional as well. As Zimmerman notes, the Century of the School was set on a collision course with the Century of Sex. To some this meant that the school became the preferred source of information about sex, while others decried the loss of parental control or the lack of appropriate teacher preparation to handle the task. This conflict began early and continues late, and not just in the United States.

Zimmerman divides the sex education age into four distinct eras. Each era is characterized by changes and tensions in the social environment, but also by the perceived purposes of sex education. In the first era, lasting from the turn of the twentieth century to just before World War II, the United States was, in fact, at the forefront leading the charge to bring sex education into schools. It would be a half century before Sweden, an icon of a sexually permissive society, mandated sex education in its schools.

During the first few decades of the twentieth century – termed the era of “social hygiene” – sex education supporters made the case that knowledge itself would bestow on the young the ability to bring their wayward appetites under control. Proponents also claimed that sex education was necessary to combat sexually transmitted disease. The shockingly large numbers of young men discovered during World War I conscription examinations to be infected with venereal disease made this a cogent argument to many. Coming at the issue with an entirely different motivation, those active in the early progressive movement saw sex education as a valuable tool of eugenics – the “wrong” people would be inspired to explore behavior they would not have discovered on their own. The population control argument would not disappear from the scene until eugenics was discredited, largely through its association with the German National Socialist movement. (Ironically, the Nazis had patterned their thinking in this regard after the thinking of the US eugenics movement.) Then of course there were the perennial objections of those who might agree with the desirability of sex education but who objected to locating it in schools either as an affront to parental rights or because many teachers were ill-prepared for the challenge.

The second era, from 1940 to 1964, coincided with the peak of the Cold War. Problems of venereal disease and sexual promiscuity came to be viewed as evidence of dysfunctional family life. Once again the proffered solution was sex education, this time recast in the broader scope of “family life education,” and once again US civil institutions, including the major foundations (Rockefeller, Ford, Carnegie), took a supporting role. The premise was that as families were rebuilt and strengthened through education, the resulting wave of wholesomeness would propagate outward to the wider “Family of Man.” This was to be one world-ism, one family and one country at a time, carrying the banner against the Communist enemy. But results were less than spectacular and may in fact have been hindered by the perception that America was driving the bandwagon.

The period from 1965 to 1983 marked the “sexual revolution,” a turning point in society occasioned by the development of The Pill. For the first time sex could be reliably decoupled from pregnancy. Some Western elites who were gravely concerned about the unfolding global population explosion saw sex education in the guise of “population education” as a solution to a massive collective problem. Others, particularly in the northern reaches of Europe, saw the era of The Pill as an opportunity to celebrate sex primarily as a source of individual fulfillment and pleasure. Here sex education took a decidedly individualistic and value-free bent.
The emergence of AIDS did not instigate the final era Zimmerman discusses (1984 – 2010), but it added urgency. As Zimmerman notes: “Suddenly, the question was no longer whether schools would teach about sex; it was what they would teach, and how, and to what end.” Abstinence-only education was acceptable to many with a conservative perspective, although the question of whether the right to dispense that education should be taken from parents and assigned to secular schools still had currency. Those with a liberal perspective have had to reconcile their support for two opposing values. One holds that it is a human right of the individual to be educated in sex in all its forms and aspects without a moral connotation. The other supports multiculturalism, despite the fact that many of those cultures hold differing views of who should teach sex to the young and what the moral matrix around sexual expression should be.

What Zimmerman does not discuss is, perhaps, the most cogent issue of all: where do we go from here? Two barriers to effective sex education have been a part of the discussion throughout the history of sex education: dearth of appropriately trained teachers; costs of implementation. Melissa Peskin and her colleagues at the University of Texas School of Public Health Houston addressed these issues by porting the It’s Your Game…Keep it Real (IYG) hybrid classroom and computer-based program to an all-computer 13-module format, IYG-Tech. This program set is designed for middle school eighth-graders. The approach ensures consistency of material and presentation, as well as low marginal costs of delivery. The team conducted a controlled study of IYG-Tech in largely minority middle schools in the Houston area. Results have recently been published in the Journal of Adolescent Health. The study found that those who completed most of the modules were more knowledgeable than those in the control group. Further, while survey results did not find that IYG-Tech had a significant impact on delaying sexual initiation by ninth grade, psychosocial attitudes that are associated with delay of sexual initiation such as a positive view of abstinence were significantly higher in this group than in controls. Further, students who received more lessons in the intervention group were more likely to delay sexual initiation than students who received fewer lessons in the intervention group.

Those who think that middle school is too young an audience might be shocked by the fact that in the baseline survey for the IYG-Tech study close to one in five eighth grade students reported already having had sexual initiation. If our goal is to delay sexual initiation until emotional and social skills have caught up with hormones, clearly we need an era of new approaches.

REFERENCE
Pesticides are frequently used in agricultural settings and homes in the U.S.-Mexico border area. A study in 2003 in the mid-Rio Grande Valley, Texas, found 50% of children’s hand rinse samples and 76% of house dust samples contained detectable levels of organophosphate pesticides (OPs). A study on the Arizona-Mexico border found an average of 1.4 pesticides per household among 107 households, with many stored and used inside the home.

Along the Texas-Mexico border, in 2010, 95.3% of Webb County, Texas residents and 91.0% of Hidalgo County, Texas residents were Hispanic. The percent that spoke a language other than English at home was 91.3% in Webb County and 84.9% in Hidalgo County. Approximately 64.2% of the adult population in Webb County and 61.8% in Hidalgo County have at least completed high school. In South Texas colonias, homes may consist of trailers or may be built with subsurface construction not in compliance with building codes. The homes may lack basic services, including access to water, paved roads, and electricity. Poor housing quality may facilitate pest infestations because of water leaks or holes in the structure that allow pests to enter. Colonias are also of concern due to existing health disparities, lower education levels, and limited access to environmental health information.

Most uses of organophosphates (OPs) in homes and residential gardens were phased out by the U.S. EPA between 2000 and 2005. This inventory is a timely snapshot of pesticide use following policy changes. The purpose of this pesticide inventory in colonias in Webb and Hidalgo Counties was to better understand pesticide use in Texas-Mexico border colonias, including types of pesticides used and frequency and location of application.

METHODS
Participants and Data Collection
The Texas A&M Institutional Review Board (IRB) approved this inventory (Protocol #2004-0091). Participants were required to be at least 18 years old and provide written consent. Participants were recruited using convenience sampling near the U.S.-Mexico border in a colonia in Webb County, Texas and in several small colonias in Hidalgo County, Texas. These Texas colonias were selected due to reports by the research team’s promotoras of the use of unregistered pesticides and pesticides from Mexico in homes near the U.S.-Mexico border, and because of existing relationships between the promotoras and the communities.

Visits were conducted during February and March 2007, with 40 participants in Webb County and ten participants in Hidalgo County. To assess pesticide use during the fall, 40 additional visits were conducted in Webb County in September and October 2007. Of these visits in the fall, 31 visits were to homes that had previously participated and nine were to new participants. In total there were 59 participants. Sampling in the fall was limited to Webb County due to funding constraints.

Design & Measures
The pesticide inventory form was designed based on a survey by Bass and colleagues. An inventory form was completed for each pesticide container in the home. Pesticides were defined as a chemical used to eliminate insects, animals, or plants that are in a place where they are not wanted. A pesticide container was defined as each individual container holding a pesticide. The data are reported by number of containers, rather than number of participants, to allow greater focus on the pesticides and their use. During a visit by two promotoras to each participant’s house, the promotoras asked to see all pesticide containers in the home and discussed these with the participants. For each container, the promotoras recorded data including storage information, product type, language(s) of packaging, where the pesticide was obtained, where the pesticide was applied (including whether it was used in kitchen cupboards or on kitchen surfaces where they put food), frequency of application, and the EPA registration number (a number on the label of all registered pesticides sold in the U.S. that identifies the company, the product, and the active ingredients).

Demographic data were not collected due to funding constraints. The promotoras completed 118 inventory forms in Webb County and 20
in Hidalgo County. One inventory form from Hidalgo County was unclear and was excluded from the analysis, giving a final total of 137 pesticide inventory forms (one per pesticide container) in the analysis.

The active ingredients in each container were determined as well, using the EPA registration number or another identifier of the active ingredient(s) (e.g., the Mexican label). Information was collected on active ingredients present in the containers, and on how common each active ingredient was relative to all active ingredients in each sampling round. Pesticide containers were excluded from this analysis of active ingredients if they did not have legible identifiers or if the active ingredients could not be determined. Data were also collected on active ingredients for pesticide containers that were used in kitchen cupboards or on kitchen surfaces where they put food. All analyses were done in Microsoft Excel 2010 and 2013 (Microsoft, Redmond, WA).

RESULTS

Tables 1 and 2 present the characteristics of the pesticide containers and frequency of application of the pesticides. All 137 containers were included in Tables 1 and 2. Across the three sampling rounds, there was an average of 1.5 pesticides in the home, with a range of 0 to 5 pesticides per home. Eleven (12.4 %) of the participants reported they were not currently using pesticides and did not plan to obtain pesticides (data not shown). Across the three sampling rounds, all pesticides were labeled and stored in original containers, except for the following: one container each of “Chinese chalk” (Miraculous Insecticide Chalk) and “airplane powder” (methyl parathion), and five other pesticide containers. Of the five containers of organophosphates in the homes, only one container of airplane powder was used inside the home (data not shown).

Table 3 displays the number of containers with specific pesticide active ingredients. Thirty-six active ingredients were found across all sampling rounds. Some active ingredients were found in more than one container, and some containers held a mixture of active ingredients. Out of 137 containers across all rounds, 19 had unknown active ingredients, due to missing or illegible labels. Table 4 presents the total number of occurrences of each active ingredient in the pesticide containers that were used in kitchen cupboards or on kitchen surfaces where food was placed.

DISCUSSION

This inventory provides data regarding the types of pesticides used and the frequency and location of application in colonias in two Texas counties near the U.S.-Mexico border. The most commonly used pesticide active ingredients were pyrethroids. The three most common active ingredients were permethrin, imiprothrin, and cypermethrin. Imiprothrin and cypermethrin are in many formulations together. EPA 2006-2007 market estimates show that pyrethroids were a commonly used category of conventional insecticides in the US home and garden market sector, which is consistent with the findings of this inventory.\(^8\)

Two unregistered pesticides used by the participants were airplane powder (methyl parathion) and Chinese chalk, which have been reported in previous studies.\(^3,9,10\) Based on qualitative data, six participants stated they planned to obtain Chinese chalk (three participants) or “powder for ants”, a term that is sometimes used to refer to airplane powder (three participants) (data not shown). Methyl parathion is restricted to specific outdoor commercial uses and should never be used in homes.\(^10\) Chinese chalk has variable active ingredient content and is often falsely labeled as non-toxic and safe.\(^9\) From 2000-2010, the Texas Poison Center Network recorded over 180 insecticide chalk exposures among children under age six.\(^9\)

The present inventory found that, across the three sampling rounds, 55.6% to 74.5% of pesticides were reportedly used once per month or more frequently (see Table 2). This is a concern because pesticides
Table 2. Self-Reported Pesticide Application Frequency per Pesticide Container in Colonia Households in Webb and Hidalgo Counties, South Texas

<table>
<thead>
<tr>
<th>Pesticide Application Frequency</th>
<th>Number of Containers (% of containers/round)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Webb County February/March 2007 (No. of containers=63)</td>
</tr>
<tr>
<td>Used once per month or more frequently</td>
<td>35 (55.6%)</td>
</tr>
<tr>
<td>Used once every three months</td>
<td>7 (11.1%)</td>
</tr>
<tr>
<td>Used once every six months</td>
<td>10 (15.9%)</td>
</tr>
<tr>
<td>Used once a year</td>
<td>5 (7.9%)</td>
</tr>
<tr>
<td>Usage not reported</td>
<td>6 (9.5%)</td>
</tr>
</tbody>
</table>

Table 3. Active Ingredients in Household Pesticide Containers Identified During a Pesticide Inventory in Colonias in Webb and Hidalgo Counties, South Texas

<table>
<thead>
<tr>
<th>Type of pesticide/active ingredient</th>
<th>Number of Containers (% of column total/round)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Webb County February/March 2007</td>
</tr>
<tr>
<td>Pyrethrins/pyrethroids (total)</td>
<td>55 (61.8%)</td>
</tr>
<tr>
<td>Allethrin</td>
<td>5 (5.6%)</td>
</tr>
<tr>
<td>Bifenthrin</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Cyfluthrin</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>λ-Cyhalothrin</td>
<td>4 (4.5%)</td>
</tr>
<tr>
<td>Cypermethrin</td>
<td>8 (9.0%)</td>
</tr>
<tr>
<td>Deltamethrin</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Esfenvalerate</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Imiprothrin</td>
<td>8 (9.0%)</td>
</tr>
<tr>
<td>Permethrin</td>
<td>12 (13.5%)</td>
</tr>
<tr>
<td>Phenothrin</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Preparathrin</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Pyrethrins</td>
<td>4 (4.5%)</td>
</tr>
<tr>
<td>Resmethrin</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Tetramethrin</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Tralomethrin</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Synergists (total)</td>
<td>9 (10.1%)</td>
</tr>
<tr>
<td>N-Octyl Bicycloheptene</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Dicarboximide</td>
<td>6 (6.7%)</td>
</tr>
<tr>
<td>Piperonyl Butoxide</td>
<td>6 (6.7%)</td>
</tr>
<tr>
<td>Organophosphates (total)</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Acephate</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Coumaphos</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Disulfoton</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Other pesticides (total)</td>
<td>23 (25.8%)</td>
</tr>
<tr>
<td>n-Alkyl Dimethyl Benzyl Ammonium Chlorides</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Boric acid</td>
<td>5 (5.6%)</td>
</tr>
<tr>
<td>Brodifacoum</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Bromadiolone</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Bromethalin</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Calcium Hypochlorite</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Carbachyl</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>n-Diakyl Methyl Benzyl Ammonium Chlorides</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>n,n-Diethyl-Meta-Toluamide (DEET)</td>
<td>2 (2.2%)</td>
</tr>
<tr>
<td>Diphenacine</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Fipronil</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Hydramethylnon</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Indoxacarb</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Pyriproxyfen</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Warfarin</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Overall total</td>
<td>89</td>
</tr>
</tbody>
</table>

*Some containers had more than one type of active ingredient and therefore may appear in more than one category.  
b19 containers were excluded because the active ingredients were unknown, due for example to missing or illegible labels.
may not degrade quickly inside homes. In all three rounds, approximately 30% of pesticide containers in the participants’ homes were reportedly used in kitchen cabinets or on kitchen surfaces where they put food, with liquid sprays the most commonly applied in these two locations (see Table 1). A study in Arizona found the percent of household pesticides used by families in dish/cookware cupboards and food cupboards was 16% and 12%, respectively. A study in a colonia near Laredo, Texas found 18.5% of families applied pesticides in food cupboards and 44.4% applied pesticides in dish cupboards in the summer, compared to 3.7% and 14.8% in the winter, respectively. The EPA recommends pesticides should never be applied on food preparation surfaces.

The results indicate additional research is needed along the Texas-Mexico border regarding the frequency of pesticide use indoors, particularly on food surfaces, and the extent of unregistered pesticide use. The study found that across the three sampling rounds, 21.1% to 41.8% of the containers used in the two communities had Spanish labels (see Table 1). With the large Spanish-speaking population in Texas, it is advisable to require that all pesticides sold in Texas have Spanish labelling.

A limitation of this inventory is that participants were asked to show promotoras pesticide containers and answer questions. This may have resulted in self-report bias or recall bias because participants may not have reported all pesticides or may have misreported information. The small sample size, particularly in Hidalgo County, may not have reported all pesticides or may have misreported information. A different area or population could have resulted in self-report bias or recall bias because participants may have been biased by discussion about pesticides during spring visits. It is possible some containers may have been counted twice in these revisited homes in Webb County. To limit the impact of multiple counts, the data from each sampling round are presented separately. Lastly, health education training regarding pesticides had been offered in these areas prior to the inventory, which may have influenced pesticide use.

ACKNOWLEDGEMENTS
We thank Dr. Rossanne Philen for providing the initial questionnaire. Many thanks to the promotoras and participants. Funding was provided by EPA Award No. X4-96608801-0.

REFERENCES
Improving Public Health in Rural Texas: Could Hispanic Providers Be the Answer?

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ABSTRACT

Background

With the implementation of the Affordable Care Act, concern exists that the healthcare system does not have a sufficient primary care workforce to handle the anticipated influx of newly insured. One way the federal government is addressing the shortage is through funding the National Health Service Corps (NHSC). NHSC offers loan repayment assistance in exchange for working in underserved communities. Purpose: The primary purpose of this study was to determine what factors contributed to providers remaining in underserved communities after loan repayment obligation. Methods: One hundred and forty NHSC Loan Repayors (LRPs) were surveyed. The survey collected demographic data and assessed employment satisfaction, preferred recruitment/retention strategies, and intentions after completing their service obligation. Results: Sixty-six participants returned the survey. Ethnicity was a significant factor in the choice of practice location. Of the Hispanic LRPs, 93% stated they were either likely or very likely to practice in an underserved rural community as compared to 58% of their Non-Hispanic counterparts. Conclusion: If Hispanic practitioners intend to practice in underserved rural communities, graduating more Hispanics could narrow the shortage of primary care practitioners in rural communities.

INTRODUCTION

According to the Department of Health and Human Services, as of June 19, 2014, there were 6,100 designated Primary Care Health Professional Shortage Areas (HPSA). Primary Care HPSAs are based on a physician to population ratio of 1:3,500. In other words, when there are 3,500 or more people per primary care physician, an area is eligible to be designated a primary care HPSA. In Texas there are 947 Primary Care HPSAs, which represents 16% of the overall U.S. shortage.2,3

The implementation of the Affordable Care Act (ACA) will further complicate access to primary care. Because Primary Care Providers (PCPs) are often on the front lines of healthcare delivery, having a sufficient number of providers to meet the needs of underserved communities is a public health priority. One major concern is how a healthcare system that has an insufficient primary workforce to meet current needs will handle an influx of nearly 71 million additional individuals, with at least 30 million of those obtaining private or public coverage under the ACA.4,5

The ACA provided approximately $290 million to the National Health Service Corps (NHSC) to increase primary care providers in underserved communities by offering loan repayment assistance to providers and scholarships to health profession students in exchange for working in underserved communities, an attractive incentive that allows providers to choose practice locations in underserved areas and provides a way to reduce the financial burden of student loans. Established in 1972, the NHSC was created to help underserved communities across the nation receive primary medical, oral, mental, and behavioral healthcare.6

With funding from the American Reinvestment and Recovery Act (ARRA), the NHSC provided funding to the 36 State Primary Care Offices (PCOs) to conduct a two-year program to examine the retention of NHSC healthcare providers in underserved communities; Texas participated as one of the states in this project. Activities were implemented to gain insight into how to better support NHSC clinicians in such a way that will increase retention of healthcare clinicians in underserved communities.

Population and Methods

In order to address health inequity and health profession shortages areas, governmental agencies and organizations have traditionally used health careers education-to-practice pipeline programs such as the Health Careers Opportunity Program (HCOP) and Area Health Education Centers (AHEC).7,8 These programs address healthcare provider shortages and mal-distribution by introducing health careers to students during middle and high school. These programs provide support and encouragement throughout a student’s health-career training with the ultimate goal of building a strong and more racially, ethnically, and geographically diverse healthcare workforce.

The Texas Primary Care Office contracted Texas AHEC East (TAE) to coordinate a statewide program, Retention and Evaluation Activities (REA), using the Texas AHEC network as a community-based approach to providing personalized support to NHSC Loan Repayors and Scholars. Program evaluations included assessing ARRA-funded NHSC Loan Repayors and Scholars. Program evaluations included assessing ARRA-funded NHSC Loan Repayors and Scholars propensity (inclination or willingness to work in underserved communities) as well the effectiveness of current retention strategies their clinical sites utilize. Assessing retention of NHSC providers and the impact of education-to-practice programs like AHEC is fundamental to understanding what works and how to improve retention rates of primary care practitioners in rural areas.

Sample

The sample was 140 ARRA-funded NHSC Loan Repayors (LRPs) and their NHSC-approved clinical sites. Survey instruments were distributed via ground mail in the summer of 2012. This was followed up with phone call reminders. Potential respondents were advised that their individual contribution would remain anonymous and that the data would only be used in the aggregate. Program evaluations were collected via 1) the regional AHEC coordinator or 2) returned directly to the Texas AHEC East Program Office via email, fax, or mail. Of the 140 participants eligible to participate, 66 (46%) participants completed and returned the Retention and Evaluation Activities (REA) evaluation.
Survey Design
The survey was exempted by the University of Texas Medical Branch Institutional Review Board (IRB) because program evaluation does not warrant full IRB approval. The survey was specifically designed for LRPs. The REA survey for the LRP collected demographic data including age and ethnicity and assessed employment satisfaction, preferred recruitment/retention strategies, and intentions after completing their service obligation.

Questions for overall satisfaction and retention intentions used a 5-point Likert scale to rate or rank the appropriate questions. Furthermore, this evaluation also assessed preferred recruitment and retention strategies, work experience, and community involvement. It is important to note that no formal validity or reliability testing was done on this survey. However, questions were developed based on concepts, terms, and themes from the following assessment tools: Community Impact Assessment designed by Emily Kennedy, an NHSC intern with the Texas Primary Care Office; a primary care survey retention/recruitment assessment tool developed by Texas AHEC East; and the NC Community Practitioner Annual Questionnaire developed by Dr. Don Pathman.

Analysis
Data was entered into SPSS version 20. Statistical analysis, which comprised descriptive statistics and bivariate associations, were conducted using SAS version 9.2. Bivariate comparisons of the LR survey data assessed specific associations of retention intentions with ethnicity, age, marital status, job satisfaction, and community satisfaction. For categorical variables, a Fisher’s exact test was conducted. Spearman’s correlation was used for ordinal level variables. A value of 0.05 was used for the alpha value.

RESULTS
Of the 66 LRP respondents, 55% were still completing their NHSC service obligations. Non-Hispanics comprised 73% of the LRP respondents. Seventy-four percent of the LRP respondents were female, and the largest number of the respondents (66%) were in the 30-39 year age category. Physician Assistants represented the largest discipline, 24%, followed by Physicians, 17% (Table 1). Overall, 89% of LRPs were satisfied with their NHSC experience.

To assess LRPs’ intentions after completing their service obligations, respondents were asked a series of questions including: how likely they were to remain in their current practice, how likely they were to remain in their current community, how likely they were to practice in a rural underserved community, how likely they were to practice in an urban underserved community, and how likely they were to remain in Texas. Answers were given on a 5-point Likert Scale. Results revealed that approximately 79% of the LRPs indicated they would remain in Texas. Furthermore, about 57% of LRP respondents stated they were either likely or very likely to remain at their current practice, and about the same percentages were either likely or very likely to remain their current community. Only 8% were either unlikely or very unlikely to remain in Texas and only 13% were either unlikely or very unlikely to remain in their current community. With respect to underserved communities, only 14% were either unlikely or very unlikely to remain in an underserved community. All retention intentions are summarized in Table 2.

Ethnicity was a significant factor (FET = 0.0198) in a LRP’s choice of practice location. Of those responding, 93% of the Hispanic LRPs stated they were either likely or very likely to practice in an underserved rural community compared with 58% of their Non-Hispanic counterparts (Table 3).

DISCUSSION
With this sample of LRPs, ethnicity was associated with an increased intention to practice in rural underserved areas. In particular, 93% of Hispanics intended to practice in underserved rural community, compared to 58% of non-Hispanics.

For the growth of the primary care workforce, the intention of Hispanic providers to remain in rural areas post their loan repayment obligation was a significant finding for several reasons. Most importantly, even though gains have been made, a limited number of Hispanics are still graduating from medical school and nurse practitioner and physician assistant programs and entering practice. According to data in the Association of American Medical Colleges (AAMC) 2012 “Diversity in Medical Education Report,” graduation rates for Hispanics have remained stable since 2002.9 Physician Assistants (PAs) had much lower graduation rates with only 7.8% of the 2012 graduating classes of PA reporting those of Hispanic, Latino, or Spanish origin (Table 2).10 Currently, 180,230 nurse practitioners (NP) are present in the U.S., of which 9,713 are in Texas. Reports by the Kaiser Foundation indicate that only 11% of nurse practitioners are minority nurses. Thus, nationwide there are only 19,825 minority nurses and in Texas only 1,068.11

If Hispanic practitioners intend to practice in undeserved rural

Table 1. Demographic characteristics of respondents (N=66)

<table>
<thead>
<tr>
<th>Category</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>74%</td>
</tr>
<tr>
<td>Male</td>
<td>26%</td>
</tr>
<tr>
<td>Service obligation</td>
<td></td>
</tr>
<tr>
<td>Completed</td>
<td>45%</td>
</tr>
<tr>
<td>Completing</td>
<td>55%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>27%</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>73%</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>2%</td>
</tr>
<tr>
<td>20-29</td>
<td>9%</td>
</tr>
<tr>
<td>30-39</td>
<td>66%</td>
</tr>
<tr>
<td>40-49</td>
<td>14%</td>
</tr>
<tr>
<td>50-59</td>
<td>6%</td>
</tr>
<tr>
<td>60+</td>
<td>3%</td>
</tr>
<tr>
<td>Discipline</td>
<td></td>
</tr>
<tr>
<td>Physicians assistants</td>
<td>24%</td>
</tr>
<tr>
<td>Primary Care Physician</td>
<td>17%</td>
</tr>
<tr>
<td>Dentist</td>
<td>14%</td>
</tr>
<tr>
<td>Psychologist</td>
<td>14%</td>
</tr>
<tr>
<td>Nurse Practitioner</td>
<td>12%</td>
</tr>
<tr>
<td>Licensed Professional</td>
<td></td>
</tr>
<tr>
<td>Counselor</td>
<td>12%</td>
</tr>
<tr>
<td>Dental Hygienist</td>
<td>4%</td>
</tr>
<tr>
<td>Licensed Clinical Social Worker</td>
<td>3%</td>
</tr>
</tbody>
</table>
Table 2. Summary of retention intentions (N=66)

<table>
<thead>
<tr>
<th>Question</th>
<th>Very unlikely</th>
<th>Unlikely</th>
<th>Undecided</th>
<th>Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>How likely are you to remain in Texas?</td>
<td>6%</td>
<td>2%</td>
<td>9%</td>
<td>27%</td>
<td>52%</td>
</tr>
<tr>
<td>How likely are you to remain in your current community?</td>
<td>8%</td>
<td>5%</td>
<td>20%</td>
<td>35%</td>
<td>32%</td>
</tr>
<tr>
<td>How likely are you to practice in an underserved community?</td>
<td>6%</td>
<td>8%</td>
<td>23%</td>
<td>32%</td>
<td>23%</td>
</tr>
<tr>
<td>How likely are you to remain in your current practice?</td>
<td>11%</td>
<td>3%</td>
<td>21%</td>
<td>24%</td>
<td>33%</td>
</tr>
<tr>
<td>How likely are you to practice in a rural community?</td>
<td>0%</td>
<td>17%</td>
<td>14%</td>
<td>21%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Note: Of those who had completed their obligation site, 93% were retained.

Table 3. How likely are you to practice in underserved rural communities? (N=59)

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Very unlikely</th>
<th>Unlikely</th>
<th>Undecided</th>
<th>Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>0</td>
<td>0%</td>
<td>7%</td>
<td>22%</td>
<td>71%</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>0</td>
<td>24%</td>
<td>18%</td>
<td>20%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Note: FET p-value = 0.0198. The seven respondents not indicating ethnicity were excluded from the analysis.

communities, graduating more Hispanics could be a way to narrow the shortage of PC practitioners in rural communities. Health careers education-to-practice pipeline programs can be instrumental in increasing the number of Hispanic healthcare providers. Education-to-practice pipeline programs such as the Health Careers Opportunity Program (HCOP) and Area Health Education Centers (AHEC) can address healthcare provider shortages and mal-distribution by introducing health careers to Hispanic students during middle and high school and providing support and encouragement throughout their health career training. The ultimate goal of these programs is building a stronger and more racially, ethnically, and geographically diverse healthcare workforce.

One critical factor influencing the numbers of Hispanics entering medical school and nurse practitioner and physician assistant programs is the issue of financing education. With the rising costs of education, students rely on several sources to fund their education. Between student loans, credit cards, and money owed to family members, all students who graduated in 2013 faced an average $35,200 in college-related debt. Hispanics were more likely to graduate from undergraduate programs with debt than were their White and Asian counterparts. About 36% of Hispanics have student loan debt compared to 34% of Asians and 32% of Whites. This is debt that a typical Hispanic student has accumulated even before entering costly medical school or nurse practitioner and physician assistant programs.

In order to make sure that debt is not a deterrent for Hispanics to practice in rural areas, loan repayments programs offered by governmental agencies are essential. These programs allow Hispanic providers, many of whom come from rural and/or disadvantaged backgrounds, to select a practice location at which they feel connected to the community, share similar cultures, and will continue to practice long into the future.

**Limitations**

The evaluation tool was developed based on concepts, terms, and themes from the following assessment tools: Community Impact Assessment designed by Emily Kennedy, an NHSC intern with the Texas Primary Care Office; a primary care survey retention/recruitment assessment tool developed by Texas AHEC East; and the NC Community Practitioner Annual Questionnaire developed by Dr. Don Pathman. It is unknown if some or all of these tools are valid. As the analysis was purely descriptive in this current study, inferences to the population at large cannot be made. Furthermore, the significant associations found in this study did not account for potentially confounding variables; thus, the results may not be free of bias. Careful attention must be made in the interpretation of these results. However, they do provide information about the effectiveness of REA among LRPs and point the direction for further research.

The study is based on a small number of participants. Future areas for research involve expansion to survey additional LRPs.

Participation rates for clinical sites were considerably lower than expected. The inability to contact Prisons and Immigration facilities due to lack of administrative support negatively impacted AHEC's ability to successfully engage this group. Despite the relatively large number of LRPs eligible to participate in the REA project, most AHEC staff were already familiar with NHSC LRPs and clinical sites in their service areas. Irrespective of this, maintaining momentum throughout the entire project proved to be more challenging than anticipated. Considering participation was voluntary, we were pleased with level of LRP participation and the rate of return.

**ACKNOWLEDGEMENTS**

This research was funded in part by the Texas Primary Care Office. The findings and conclusions in this article are those of the author(s) and do not necessarily represent the official position of the Texas Primary Care Office.
The Dr. Ron J. Anderson Thinking Progressively for Health Award: Announcement and Call for Applications

The Texas Public Health Association is pleased to announce the Dr. Ron J. Anderson Thinking Progressively for Health (TPHA) Award (formally the Thinking Progressively for Health Award). This award was renamed to honor the late Dr. Ron J. Anderson and the innovative ideas and practices he established for the public health profession. It rewards excellence and innovation in current public health practice across the state of Texas.

About the Award:
1. Recipient will receive a $400 cash award and the Dr. Ron J. Anderson Public Health Innovation Award plaque
2. Recipients’ projects will be highlighted in the Texas Public Health Association Journal published after the Annual Education Conference.
3. Submissions should demonstrate how their nominee has:
   - Identified creative solutions, large or small in scope, that have made a significant and positive difference in public health.
   - Suggested new ways to improve the quality of services or programming.
   - Identified novel approaches for completing work more effectively or efficiently.
   - Identified new ideas, solutions, or directions.
   - Worked to develop new approaches for problem solving.
   - Planned effectively for the successful implementation and long-term success.

Award Criteria:
Nominees should clearly demonstrate the following about their project:
1. Improvement in: Efficiency, Productivity, Cost-Savings, Extraordinary achievement of health and well-being (individual or community)
2. Originality: Indicate if new idea or a redesign of an established concept and uniqueness (unique to an agency, the field of public health, etc.)
3. Impact: What fundamental changes in public health practice/delivery will result? How will it impact the target community?
4. Measurability: Measurable impact (i.e. number of beneficiaries, assessment of attitude or behavioral changes, clear policy changes, etc.)
5. Applicability: Describe generalizability to the greater public health profession and the changes made in public health practice/process.

Application Process:
Nominees should submit a written narrative addressing all of the above criteria and any supporting documentation that is relevant to the project being nominated. Narrative should also include all information in the “cover sheet information” section below. Please submit all applications no later than 5 PM on December 18th. Nominations should be submitted electronically to Melissa.Oden@untbhc.edu. Please see our website ‘Awards’ page at www.texaspha.org. Questions about the application or the application process should be directed to Dr. Melissa Oden, TPHA President-Elect, 817.334.0734, Melissa.Oden@untbhc.edu.

Cover Sheet Information Must Include the Following:
- Name of Nominee
- Contact information: phone and e-mail address
- If this is a team or group project: Include name of team or group contact person, Team or Group Member Names and Credentials
- Abstract Describing Innovation (no more than 250 words)

Name/Title of Innovation
Mailing address

REFERENCES
Are Fracking Sites Associated with Increased Motor Vehicle Crashes in Texas?

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Email: trueblood@aph.tamhsc.edu

ABSTRACT

Hydraulic fracturing or fracking is becoming common throughout the United States as the demand for oil increases. However, fracking is a controversial and hot topic due to potential environmental and human health concerns. One concern is the impact that fracking sites have on motor vehicle crashes due to the increased traffic and population in local communities. This project aimed to determine if fracking sites are associated with an increase in motor vehicle crashes in Texas. Due to increased traffic requirements to build and maintain fracking sites, the project hypothesized that counties with increased fracking site growth would also experience an increase in the reported number of motor vehicle crashes.

A thematic map was produced with publicly available data to outline the location and changes in motor vehicle crashes compared to the fracking site growth by county in Texas (n=254). The thematic map showed a spatial association between fracking growth and growth of motor vehicle accidents; this association has a correlation coefficient of $r=0.34$. This project found areas that had increasing numbers of fracking sites, typically also had an increased number in the total number of motor vehicle crashes.

BACKGROUND

In recent years, hydraulic fracturing or fracking has increased throughout the state of Texas and the United States due to increased demands for natural gas, as well as from advancements in the oil and gas industry.\textsuperscript{1} Fracking sites require many resources, which include large amounts of water, industrial equipment, personnel, and transportation vehicles.\textsuperscript{2} Due to the resources being used and the process of fracking, many opponents believe that fracking has many environmental and human health consequences.\textsuperscript{3,4} Environmental consequences include contamination of drinking water and air pollution.\textsuperscript{5,6} Possible human health effects include skin, eye, and sensory organs; respiratory; gastrointestinal and liver; brain and nervous system; immune; kidney; cardiovascular and blood; cancer; mutagenic; and endocrine disruptors.\textsuperscript{4}

A concern that has recently come to the public’s attention is the perceived increase risk of motor vehicle collisions due to increased populations and vehicles in rural areas due to fracking.\textsuperscript{5} An October 2014 National Public Radio (NPR) feature story discussed the association of fracking and motor vehicle accidents illustrating that this issue has entered the public’s consciousness.\textsuperscript{5} The specific NPR story discussed reasons as to why fracking would be associated with increased motor vehicle accidents. These reasons include, trucks traveling down roads that are not designed for large commercial vehicles, congested roads in rural areas, and fatigued drivers.\textsuperscript{5} The NPR story discussed a personal story of someone who lost a family member due to a motor vehicle accident with a fracking truck, as well as presented statistics on motor vehicle accidents in Texas.\textsuperscript{7} In regards to large commercial vehicles, the New York State Department of Environmental Conservation (NYSDEC) estimates that per fracking site there are 895 to 1,350 truck-loads required to move material around.\textsuperscript{6}

Motor vehicle accidents have become a serious public health issue in Texas, where traffic fatalities between 2009 and 2013 increased by 7.7 percent.\textsuperscript{3,7} In addition, during this same time period motor vehicle fatalities associated with commercial vehicle crashes have increase by 30.8%.\textsuperscript{7,8} A recent study by Graham et al. (2015) found that counties in Pennsylvania with heavy drilling experienced a 15-23% increase in motor vehicle crashes and an increase by 61-65% of heavy truck crash rates in areas with fracking.\textsuperscript{9} During drilling months, the researchers also found a 5-23% increase in motor vehicle crash rates.\textsuperscript{9}

Currently, there is limited research looking at the potential relationship between fracking and motor vehicle crashes. There is also no existing research focused specifically on the risk of motor vehicle crashes that Texans face as fracking becomes increasingly practiced throughout the state. The purpose of this project was to determine if fracking sites are associated with increased motor vehicle crashes by county in Texas (n=254). The project hypothesized that as fracking sites increase there is an association with an increase in the total number of reported motor vehicle crashes.

METHODS

The project was unfunded and utilized publicly available datasets for the analysis. The data used were either provided at the county level or aggregated to the county level for analysis. The data utilized for the project included: data from the Texas Department of State Health Services (DSHS)\textsuperscript{10} supplied county level data on the population, Texas Motor Vehicle Crash Statistics from 2006 to 2013 from the Texas Department of Transportation (TXDOT)\textsuperscript{11} which made available for use all reported motor vehicle crashes, and Submitted Driller’s Reports Well Locations from the Texas Water Development Board (SDRDB TWDB).\textsuperscript{12,13} The Texas Department of Transportation defines motor vehicles crashes through two definitions. First, motor vehicle as automobiles (any type), bus, school bus, motorcycle, fire engines, trucks, vans, and construction, farm, and industrial machinery that is moving.\textsuperscript{14} Second, crashes are defined as any event that produces injury, death, or damage.\textsuperscript{14} Next, all of the wells were included in the analysis and not divided based on provided classification.

The data were first downloaded from their respective sources and cleaned by deleting any duplicate well locations and by removing any variables unnecessary or unrelated to the project using Microsoft Excel 2013 (Microsoft, Redmond, WA) and then formatted to be utilized in ArcMap 10.2.2 (ESRI, Redlands, CA). To create thematic maps, multiple equations...
were used to calculate the Motor Vehicle Crash Rate, Motor Vehicle Crash Growth Rate, and the Fracking Site Growth Rate with the available variables and population data (See table 1). Thematic maps were first produced to outline the locations and changes in motor vehicle crashes and fracking sites between 2006 and 2013; this mapped the motor vehicle crash growth rate with the fracking site growth rate to determine if the two were spatially associated. It should be noted that motor vehicle crash rates are per 100,000 to allow for clarity and ease of understanding within the thematic maps. The projection used was Texas Centric Mapping System Albers Equal Area. Motor vehicle crash rate growth was classified using 4 classes with natural breaks; whereas fracking growth rate was classified using 4 classes with quantile classification. The data produced and compiled in ArcMap 10.2.2 were exported to Microsoft Excel 2013 where correlation was then calculated to determine if fracking growth was associated with motor vehicle crash growth rate using the regression data analysis feature.

RESULTS
The thematic map demonstrated that the motor vehicle crash growth rate and the fracking growth rate by Texas counties from 2006 to 2013 are spatially associated (see Figure 1). Many counties with increased fracking growth rates also had an increase in motor vehicle crash growth rates. This association can be seen in the Northern and Southern counties in Texas. This association is not seen in the band that runs northeast through central Texas, near San Antonio and Austin. The findings of the thematic map were supported by the correlation calculation in Microsoft Excel (see Figure 2). The correlation calculation, r=0.34 was statistically significant with p-value <0.001.

Discussion and Conclusion
The results of this project determined that the motor vehicle crash growth rate from 2006 to 2013 is associated with the fracking site growth rate during the same time period. This finding was statistically significant based on p-value <0.001. The area of Texas in Figure 1 that does not show this association is an area that has previously shown reduced numbers of fracking sites compared to the rest of Texas. The project found that fracking and motor vehicle crashes have a weak positive correlation which is supported by the findings of Graham et al. (2015). This is one of the first projects looking at fracking and motor vehicle accidents in the United States and Texas; we
hope the project’s findings spark additional research to better understand the implications of fracking and motor vehicle crashes.

This project had several limitations. The analysis was done at the county level which may impact the conclusions of the study. Future research should attempt to analyze data at a smaller geographic area because using county level data may distort the study’s conclusions due to many potential confounding variables. In addition, there are limitations with the data sources utilized. First, a data limitation was that only reported crashes were included in the motor vehicle crash data which means minor crashes may not have been included in our analysis. Another issue with the motor vehicle crash data is that the available data do not specify if a commercial vehicle was involved in the accident, the time of day, reported cause of the accident, or the specific location of the accident. Third, the Submitted Driller’s Report Database is not a monitored database. Individuals are not required to report locations, and the locations in the database are not verified.

Despite these limitations, the project was able to determine an association between fracking and motor vehicle crashes exist. The findings of this project support that additional research is needed to better understand the implications of the development and management of fracking sites on motor vehicle crash rates, such as increased population sizes and increased traffic associated with fracking sites that may result in increased motor vehicle accidents.

ACKNOWLEDGEMENTS
We thank Dr. Jennifer Ross and Annamarie Bokelmann for their guidance on this project.

REFERENCES
A Descriptive Analysis of the Increasing Burden of Reported Chronic Hepatitis C in Liberty County, 2013
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ABSTRACT
Background: From 2010 to 2013, the Texas Department of State Health Services (DSHS) observed an increase in reported chronic Hepatitis C (HCV) infections in Liberty County each year.

Methods: In order to better understand this trend, we identified records of laboratory-confirmed chronic HCV cases reported to DSHS in 2013. We attempted structured telephone interviews regarding HCV risk factors for all identified case-patients and conducted two sets of analyses using Epi Info 7.1.2; Analysis I described the characteristics among case-patients diagnosed within Liberty County, and Analysis II compared the characteristics between case-patients diagnosed within versus outside of Liberty County.

Results: Of the 140 reported cases, 86 were reached for interview, and 32 were excluded from Analysis I based on residence at diagnosis. Males constituted over half of the case-patients (57%), and the majority (62%) were non-Hispanic Whites. Ages of the case-patients ranged from 18-84 (mean = 54). The most common risk factors included having more than 5 sexual partners (60%), tattoos (57%), incarceration (56%), contact with someone with HCV (43%), and injection drug use (35%). Prevalence of risk factors such as tattoos, body piercings, and injection drug use was found to statistically differ by age. In Analysis II (N=86), the main significant finding was that case-patients diagnosed outside of Liberty County were less likely to be currently residing within Liberty County.

Conclusion: There is a need to better understand the effects of age and mobility of this population on HCV infection in Liberty County, and to promote avoidance of unhealthy practices through community educational campaigns.

BACKGROUND
Hepatitis C virus (HCV) infection is the most common blood-borne infection and a significant public health issue1. HCV infection can result in long-term health problems, such as liver damage or liver failure, is the leading cause of cirrhosis and liver cancer, and is the most common reason for liver transplantation in the United States2. Before widespread screening of the blood supply began in 1992, HCV was commonly transmitted through blood transfusions and organ transplants, which contributed to high HCV infection rates among the baby boomer generation3. Today, people are more commonly infected as a result of sharing needles or syringes, needle-stick injuries in healthcare settings, and transmission from mother to child, and less commonly through sharing personal care items or having sexual contact with someone with HCV. Chronic HCV infection affects 3.2 million persons in the United States1. However, this estimate does not account for those who are unaware of their positive HCV status; the Centers for Disease Control and Prevention (CDC) estimates that up to 50% of those infected are unaware of their infection1. This discrepancy presents a challenge to public health surveillance, prevention, and control of this high burden condition in the United States.

The Texas Department of State Health Services Health Service Region 6/5 South (DSHS HSR 6/5S) oversees public health activities for 16 counties in southeast Texas and provides local health department services to seven of these rural counties. Chronic HCV infection is not a reportable condition in Texas; however, cases are still reported to DSHS HSR 6/5S, and in higher numbers compared with all reportable conditions. Since acute HCV is a reportable condition, DSHS HSR 6/5S receives all HCV test results, as reporters do not typically make the distinction between acute and chronic at the time of reporting. Each case is then investigated according to Texas’s case criteria, which leads to acute infection being ruled out in the great majority of cases. The result is a fair number of chronic HCV reports compared to other reportable conditions. Liberty County, one of the seven rural counties within DSHS HSR 6/5S, was identified during a data review to have the highest rate of newly reported cases of chronic HCV infection compared to the other six counties for 2013. Furthermore, the number of cases had increased each year since 2010 compared with the other counties; the rate increased from 87.3 per 100,000 population in 2010 to 182 per 100,000 population in 2013, with an average annual rate of increase of 28%4.

This was an unexpected finding since the condition is not reportable and because once HCV cases are deemed chronic, the investigation typically does not continue. These facts lead to incomplete demographic and risk factor information, as it is not consistently captured for most cases. Even though chronic HCV in Liberty County is only tracked through passive surveillance, its burden is significant to the county4. To better understand the reasons for this unexplained trend within Liberty County, we conducted enhanced retrospective surveillance of all cases of chronic HCV reported out by various hospitals and private laboratories in 2013 to examine the risk and sociodemographic factors among these cases.

METHODS
We extracted all records of laboratory-confirmed cases of chronic HCV infection in Liberty County that were reported between January 1, 2013 and December 31, 2013 from Texas’s electronic disease surveillance system. A laboratory-confirmed case of chronic HCV was defined as having HCV genotype results or having positive HCV RIBA, HCV RNA, or anti-HCV test results with a signal-to-cutoff (S/C) ratio pre-
dictive of the true value. We manually reviewed the data records to ensure duplicate cases were removed and to confirm that laboratory test results met the case criteria. If a case was anti-HCV positive but no S/C ratio was provided, the case was excluded as testing for antibodies to the virus alone is not considered confirmatory. Besides laboratory confirmation, we verified whether the case’s residence fell within Liberty County.

Three attempts were made by phone call to contact each of the case-patients identified. A detailed questionnaire was used to administer structured telephone interviews, including questions regarding socio-demographic information, risk factors, co-morbidity characteristics, and the case-patient’s health care experience in relation to HCV infection. The questionnaire was developed with the goal of identifying prevalent risk factors and describing the population and its health behaviors.

Two sets of analyses based on residence of the case-patients were conducted in order to assess potential differences among these populations. Residence at the time of diagnosis was used as a proxy for residence at the time of infection, which has limitations that will later be explored. Analysis I, which aimed to examine the characteristics of case-patients who had potentially acquired their infections within Liberty County, included only case-patients who had resided within Liberty County at the time of diagnosis. Risk and socio-demographic factors were stratified by two age groups based on the mean age (≤54 years old versus > 54 years old).

Analysis II aimed to examine differences between case-patients who potentially acquired their infections within Liberty County versus those who had presumably acquired their infections outside of Liberty County (case-patients who had resided outside of Liberty County when first diagnosed). Risk and socio-demographic factors were stratified by these two groups. Case-patients were placed into one of these two groups based on their responses to the questionnaire. Each case-patient was asked, “When did you first learn of your positive HCV status, and where were you living at that time?” Although the place of residence at the time of diagnosis typically does not have anything to do with contracting the disease, it is what assigns a case to a particular jurisdiction. Since case-patients could not be certain where they initially contracted the virus, we used the closest information provided – residence at diagnosis – as a proxy. The purpose of this classification was to divide the groups in such a way as to reveal any potential differences related to risk and socio-demographic factors in Liberty County versus outside the area. Therefore, the results should be interpreted as preliminary since equating residence at time of diagnosis and residence at infection is ultimately an assumption that may not reflect complete accuracy.

For both sets of analyses, we used Epi Info 7.1.2 to analyze the data and calculated frequencies for all variables. The two-tailed Yates corrected chi-squared test was used to assess statistical differences between comparison groups, and a p-value of <0.05 was used as a threshold.

RESULTS
Of the 154 case records that were extracted from the database, 140 were identified as meeting the laboratory criteria. Of these, 86 case-patients completed interviews (61% completion rate). Those who did not complete interviews (39%) either possessed phone numbers that were disconnected (15%), never answered the phone (15%), declined interviews (5%), had incorrect phone numbers listed (3%), or were deceased (1%). For Analysis I, 54 case-patients who self-reported diagnoses within Liberty County were included, and for Analysis II, the remaining 32 case-patients who had reported being diagnosed outside of Liberty County were included as well.

For Analysis I, males constituted over half of the case-patients (57%), and the majority (62%) were non-Hispanic Whites. Ages of the case-patients ranged from 18-84 (mean = 54). The most common risk factors for chronic HCV infection included having more than five sexual partners (60%); tattoos (57%); incarceration (56%); having contact with someone with HCV infection (43%); and injection drug use (35%) (Table I). Incarceration was defined as spending a period of time longer than 24 hours in jail. A complete list of the risk and socio-demographic factors evaluated in this study is displayed in Table I. Forty percent of the case-patients reported having 16 or more lifetime sexual partners and 23% reported having been diagnosed or treated for a sexually-transmitted disease (STD). Other notable risk factors reported by case-patients were surgeries prior to 1992 (33%); blood transfusions prior to 1992 (24%); accidental sticks or punctures with a sharp object that may have been contaminated with human blood (17%); and body piercings (15%). Body piercings included piercings of any site other than the ear lobes.

Some risk and socio-demographic factors among case-patients were found to be statistically different when stratified by age group. Case-patients at or below the mean age (≤54 years) showed higher frequencies of tattoos (p-value = 0.003), body piercings (p-value = 0.04), and smoking (p-value = 0.05) than case-patients above the mean age. Additionally, although not statistically significant, case-patients older than 54 years showed a higher frequency of injection drug use (45%) compared with those ≤54 years (22%) (Figure I). Despite this finding’s lack of statistical significance, it represents an identifiable trend that warrants further investigation in a study with a larger sample size.

Analysis II compared the characteristics between case-patients diagnosed within versus outside of Liberty County. The main significant finding was that case-patients diagnosed within Liberty County were more likely to be currently residing within Liberty County (p-value = 0.001). Case-patients diagnosed outside of Liberty County were more likely to report being White (p-value = 0.01) and current smokers (p-value = 0.02). We did not find statistical difference in any HCV risk factors between these two groups.
Table I: Number and percentage of case-patients diagnosed in Liberty County exhibiting risk and socio-demographic factors, 2013 (N=54)*

<table>
<thead>
<tr>
<th>Risk and Socio-Demographic Factors</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Most common risk factors</strong></td>
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<tr>
<td>5+ sexual partners (N=45)*</td>
<td>27</td>
<td>60</td>
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<tr>
<td>Tattoos</td>
<td>31</td>
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<tr>
<td>Incarceration</td>
<td>30</td>
<td>55.6</td>
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<tr>
<td>Contact with HCV+ individual (sexual, household, needle)</td>
<td>23</td>
<td>42.6</td>
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<tr>
<td>History of injection drug use (IDU)</td>
<td>19</td>
<td>35.2</td>
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<tr>
<td><strong>Other Risk Factors</strong></td>
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<td></td>
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<tr>
<td>16+ sexual partners (N=45)*</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>Surgery prior to 1992</td>
<td>18</td>
<td>33.3</td>
</tr>
<tr>
<td>Blood transfusion prior to 1992</td>
<td>13</td>
<td>24.1</td>
</tr>
<tr>
<td>Diagnosed/treated for sexually-transmitted disease (STD) (N=52)*</td>
<td>12</td>
<td>23.1</td>
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<tr>
<td>Accidental stick/puncture</td>
<td>9</td>
<td>16.7</td>
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<tr>
<td>Body piercings</td>
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<td>14.8</td>
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<tr>
<td>Clotting factor concentrates prior to 1987 (N=53)*</td>
<td>2</td>
<td>3.8</td>
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<tr>
<td>Hemodialysis ever</td>
<td>1</td>
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<tr>
<td><strong>Demographic Factors</strong></td>
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<tr>
<td>Gender - Male</td>
<td>31</td>
<td>57.4</td>
</tr>
<tr>
<td>Gender - Female</td>
<td>23</td>
<td>42.6</td>
</tr>
<tr>
<td>Race - White (N=53)*</td>
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<td>62.3</td>
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<tr>
<td>Race - Black (N=53)*</td>
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<td>34</td>
</tr>
<tr>
<td>Race – Other (self-identified) (N=53)*</td>
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<td>3.7</td>
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<td><strong>Employment Status</strong></td>
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<td>Employed</td>
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<tr>
<td>Unemployed</td>
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<td>25.9</td>
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<tr>
<td>Retired</td>
<td>5</td>
<td>9.3</td>
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<tr>
<td>Disabled</td>
<td>21</td>
<td>38.9</td>
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<tr>
<td><strong>Marital Status</strong></td>
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<tr>
<td>Married (N=53)*</td>
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<td><strong>Highest Level of Education Reached</strong></td>
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<td>&lt; High School (N=53)*</td>
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<tr>
<td>High School/GED (N=53)*</td>
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<td>41.5</td>
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<tr>
<td>Some college (N=53)*</td>
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<td>15.1</td>
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<tr>
<td>4-year college degree (N=53)*</td>
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<td>7.6</td>
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<tr>
<td><strong>Health Care/ Health Behaviors</strong></td>
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<td>Currently seeing provider</td>
<td>23</td>
<td>42.6</td>
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<tr>
<td>Received HCV education, literature, or counseling</td>
<td>30</td>
<td>55.6</td>
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<tr>
<td>Ever received treatment</td>
<td>11</td>
<td>20.4</td>
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<tr>
<td>Currently receiving treatment</td>
<td>3</td>
<td>5.6</td>
</tr>
<tr>
<td>Currently insured (N=52)*</td>
<td>43</td>
<td>82.7</td>
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<tr>
<td>Current smoker (N=53)*</td>
<td>24</td>
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<tr>
<td>Current consumer of alcohol (N=53)*</td>
<td>16</td>
<td>30.2</td>
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<tr>
<td><strong>Co-morbidities</strong></td>
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<tr>
<td>Other health conditions besides HCV</td>
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<tr>
<td>Hypertension</td>
<td>26</td>
<td>48.2</td>
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<tr>
<td>Type II diabetes</td>
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<tr>
<td>Renal disease</td>
<td>1</td>
<td>1.9</td>
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</tbody>
</table>

* Specifies the number of respondents (N) to certain fields where N <54. Reasons for N <54 included refusal to answer the question or stating the answer as “Unknown.” N=54 for all other risk and socio-demographic factors.
DISCUSSION
The results were instrumental in generating a preliminary picture of the population described and its risk factors. Analyses demonstrated that many of the known risk factors for HCV infection were exhibited in the population residing in Liberty County in 2013, with some at higher frequencies. For example, the frequencies of tattooing (57%), body piercings (15%), smoking (45%), and injection drug use (35%) in Liberty County were the same or higher than the national frequencies of these same factors: tattooing, 24%; body piercings, 14%; smoking, 19.6%; and injection drug use, 1.5%.

Although the use of residence at diagnosis as a proxy for place of acquisition of infection has limitations, it was a method to begin exploration of the role of population migration in transmission for current residents of Liberty County. Analysis I showed that in terms of HCV infection and age, younger and older populations may have acquired HCV differently, as evidenced by the differences in tattooing, body piercings, and injection drug use (not statistically significant) between age categories. This information underscores the relevance of a generation gap as a potential predictor of behavior and highlights the need to target interventions accordingly. Future studies could benefit from separating a larger data set into smaller age categories in order to assess whether certain risk factors are more highly associated with particular age demographics.

In Analysis II, case-patients diagnosed outside of Liberty County were less likely to be currently residing within Liberty County, indicating that some of the case-patients had only lived in Liberty County for a short time (after being diagnosed and before moving to their current residence). The role of mobility and migration cannot be truly ascertained by this study for this population, but each may play a role in HCV transmission. It is known that the population of Liberty County is transitory. Further exploration into this factor may lead to steps that can be taken to prevent infection in currently uninfected residents.

Although there was no way to accurately assess knowledge regarding HCV, nor was this the objective of the study, there was a discrepancy in the accuracy of information regarding HCV infection among case-patients. Even when case-patients reported feeling educated about the disease, they were sometimes unaware of their status, did not understand the complications or consequences of having the disease, were unsure of how it could be contracted, or did not know how they could spread it to others. Six case-patients diagnosed within Liberty County (11% of those interviewed) were unaware or uncertain of their infection, even though they recalled being tested for the virus. While risk and socio-demographic factors were captured for these case-patients, other populations, such as those not yet diagnosed, were not represented. This study brings to light the need to promote education and awareness of HCV infection and the avoidance of unhealthy practices in the community; however, targeted interventions should not be limited to addressing only part of the risk population.

Another limitation of the study was its small sample size. The challenge of conducting retrospective surveillance in a rural area was one contributing factor. Case-patients included in this study were a hard-to-reach population. Not only were the case-patients moving from place to place, making them...
unreachable by telephone, but they often had very limited access to health care. Some case-patients reported needing the quality of care of specialists in Houston but that transportation was an obstacle. Sometimes seeing these doctors was not a possibility depending on the case-patient’s health insurance. Still, others did not follow up with their doctors in Liberty County after diagnosis for unknown reasons. All of these factors contributed to fragile patient-doctor relationships, which decreased the probability that providers could maintain current contact information for case-patients. The sensitive nature of information requested, which contributed to several refusals to participate, was another element that diminished the sample size; 7 case-patients declined interviews. Finally, the subset of case-patients for analysis was further reduced in order to examine differences between the two analysis groups based on residence at time of diagnosis.

Despite these challenges, the 54 case-patients examined for risk and socio-demographic factors in Analysis I were essential in providing preliminary hypotheses for the increasing rates of chronic HCV infection in Liberty County. Moreover, the inclusion of 32 additional case-patients in Analysis II enabled the recognition and assessment of the mobility of this population and its potential effect on HCV transmission. To validate these results and build upon detected behavioral trends, further studies with larger sample sizes are recommended; the differences between risk factor prevalence in chronic HCV infected patients in this study and in national data may have been attributed to the small community interviewed. This study emphasizes the role of analyses of local community demographics when designing interventions and educational materials for different populations. As a rural locale with a transitory population, our findings suggest that DSHS HSR 6/5S should target public health interventions broadly to the entire community by enhancing awareness of the many known HCV risk factors exhibited by this population through educational campaigns.

ACKNOWLEDGMENTS
The authors would like to thank the many gracious and cooperative health care providers in southeast Texas who fielded requests for information, as well as all of the case-patients who, through the completion of sensitive interviews, made this project possible.

FOOTNOTE
\[\text{Since these data were collected as part of routine epidemiological surveillance and analysis, no IRB review was required or requested.}\]

REFERENCES
The Texas Public Health Association Remembers Two of its Public Health Heroes

**HENRY JOE VICKERY, JR.**  
*August 20, 1933 – May 15, 2015*

Henry Joe Vickery, Jr., better known as “Joe” Vickery passed away May 15, 2015 from complications following heart surgery in February. Joe was born in Anniston, Alabama and moved to Texas City in 1947. He was a graduate of Texas City High School where he won a football scholarship to the University of Mississippi. Joe and his loving wife, Dolores were married for 47 years. They had seven children, seven grandchildren and three great grandchildren.

Joe went to work for the Galveston County Health District in 1956 and retired in 1993. As the Director of the Environmental and Consumer Health Department he wrote and got passed the first Onsite Sewerage Facilities Ordinance in the State of Texas which put into effect requirements for septic systems and septic tank installers. He also wrote ordinances governing retail food stores, private water wells, swimming pools and food establishments in Galveston County. He spent many years working on a State approved animal shelter for Galveston County and in 1993 the animal shelter in Texas City was completed and the Commissioners’ Court named it the “Joe Vickery Animal Shelter.”

Joe was an active member of the Texas Environmental Health Association, the Texas Public Health Association and the Texas Association of Municipal Health Officials where he served for many years as the Director of the Eastern Section.

Joe was a life member of the Marine Corps League. He authored the Marine Corps League “Fallen Marine Program” in 2002. This program honors all fallen marines and was adopted by the State Department as their official honor service. It has since been adopted by departments and hundreds of detachments all over the world. He has led honored services for over 400 fallen marines in the Galveston County area. He was presented The Unsung Hero Award in 2011 by the Galveston Daily News for his efforts.

Joe loved all sports and he played tennis, racket ball, semi-pro football and golf. At one time he carried a golf handicap of 71.5 with his lowest score being a 59. He had 3 holes-in-one and shot in the low 70’s well into his late 70’s.

Joe was an active member of the First Baptist Church in Texas City. He loved to travel with friends and believed laughter was holistic medicine. He welcomed a good story and never missed a chance to share one.

Joe was an adviser and friend to Dr. Mark Guidry, chief executive officer of the Health District for more than 13 years. Dr. Guidry said “Joe is a cornerstone in the history of the Health District. He had an unparalleled understanding of the regulations, environmental health and animal services.”

Joe worked very hard and was a leader in Galveston County and in environmental health. He will be missed.

**MARIELLA CROWDER WALKER**  
*January 15, 1927 - June 8, 2015*

Dr. Crowder-Walker was born in Lattimore, North Carolina to Forrest and Nellie Crowder, and married the love of her life, Dr. Kerfoot P. Walker, Jr. in June, 1957. Together they had three children, Kerfoot P. Walker, III (Pete), Amelia Nell Walker Proctor (Amy) and Dr. Christopher Warren Walker (Chris). She went home to be with Christ, her Lord and Savior, on June 8, 2015.

Marietta was educated through high school in Lattimore public schools and received a Bachelor of Science in General Science from Wake Forest College. She received a Master of Science in Biochemistry and after four years of applying and being rejected for medical school because she was female, was accepted and received a Doctorate of Medicine from Bowman Gray School of Medicine. Marietta’s post graduate internship was at University of Alabama Medical School, Birmingham, AL with work done in the Hillman Clinics and the University Hospitals. Changes to the intern assignment schedule allowed her to meet Kerfoot.

The Walkers moved to Dallas and both finished Internal Medicine residencies at the Dallas Veterans Hospital. In 1960, they moved to Tyler and after five years of intense motherhood, she accepted the position of Smith County Public School Health physician. She rapidly advanced in the American School Health Association and presented innovative school health programs to the national convention in New York. She became the Medical Director of the Tyler Smith County Health Department eventually aspiring to Medical Director of Region 7, Texas Department of Health. She oversaw the expansion of state health care into an intricate health service system for needy women and children throughout Region 7 from the Red River to the Gulf of Mexico. She continued in this position until her retirement in 1995.

The Walkers applied to the Southern Baptist Foreign Mission Board in their early 30’s, only to be turned down because they were “too old;” thus began a lifetime of independent Christian mission trips. In 1968, she and the family drove from Tyler to Mexico City for the 1968 Summer Olympics and the following year they traveled through Mexico to the country of British Honduras (now Belize) to establish a government-sanctioned free medical clinic for the entire Toledo District. Since then they have frequently traveled around the world sharing God’s love through medical care.

Marietta was instrumental in opening The Holt House for widows and widowers, served as a member of the Board of Directors of Christian Women’s Job Corp and YWAM, and numerous other organizations. She has been a member of Green Acres Baptist Church since moving to Tyler and she taught Sunday school to young married women for many years. In 2009, she was inducted into The Doctor Luke Society by Bethesda Health Clinic in honor of her years of service to the Lord through her medical profession.

Dr. Crowder-Walker will be missed by many including, her husband, two sons, a daughter, 12 grandchildren, two great grandchildren, two brothers and their families.
TPHA HONORARY LIFE MEMBERS

1948 V. M. Ehlers*
1949 George W. Cox, MD*
1951 S. W. Bohls, MD*
1952 Hubert Shull, DVM*
1953 J. W. Bass, MD*
1954 Earle Sudderth*
1956 Austin E. Hill, MD*
1957 J. V. Irons, ScD*
1958 Henry Drumwright
1959 J. G. Daniels, MD*
1960 B. M. Primer, MD*
1961 C. A. Purcell*
1962 Lewis Dodson*
1963 L. P. Walter, MD*
1964 Neil Faulkner*
1965 James M. Pickard, MD*
1966 Roy G. Reed, MD*
1967 John T. Warren*
1968 D. R. Reilly, MD*
1969 James E. Peavy, MD*  
1970 W. Howard Bryant*
1970 David F. Smallhorst*
1971 Joseph N. Murphy, Jr.*
1972 Lola Bell*
1972 B. G. Loveless*
1973 Barnie A. Young*  
1974 Ardis Gaither*
1975 Herbert F. Hargis*
1975 Lou M. Hollar*
1976 M. L. McDonald*
1977 Ruth McDonald
1978 Maggie Bell Davis*
1978 Albert Randall, MD*
1979 Maxine Geeslin, RN
1979 William R. Ross, MD*
1980 Ed L. Redford*
1981 W. V. Bradshaw, MD*
1981 Robert E. Monroe*
1982 William T. Ballard*
1983 Mike M. Kelly, RS
1983 Hugh Wright*
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