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A Survey of Safety Recommendations for All-Terrain Vehicle Dealers and Track Owners in Kansas

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ABSTRACT

Introduction. All-terrain vehicles (ATVs) are associated with injury, mortality, and healthcare costs. ATV related injuries are less severe when consistent safety practices are followed, however, ATV safety regulations are varied among states. This study sought to survey Kansas ATV dealers and track owners to determine safety promotion practices.

Methods. A cross-sectional telephone survey was conducted of Kansas ATV dealers and tracks. Survey questions included promotion and sale of safety equipment, provision of ATV safety information, and respondent characteristics.

Results. Of those contacted, 32% of dealers and 31% of tracks responded to the survey. Most ATV dealers sell safety gear (70% - 100%) and all recommend safety gear to buyers and riders. All ATV tracks reported requiring helmets (100%) but were varied regarding other forms of safety gear. The majority of ATV dealers (77%) recommended safety courses, but only 31% of dealers and 40% of tracks offered courses. Eighty percent of ATV tracks and 52% of dealers felt they had a professional responsibility to educate riders/owners on safety.

Conclusions. Safety promotion by ATV dealers in Kansas consistently was recommended, but often limited to the sales of safety gear (helmets and gloves) or the provision of manufacturer provided safety materials. Further, ATV dealers reported rarely offering skills tests or safety courses to buyers. In Kansas, safety promotion at the point of sale or track level could be improved to increase public awareness of ATV safety practices. ***KS J Med 2017;10(4):76-78.***

INTRODUCTION

All-terrain vehicles (ATVs) are defined as any motorized vehicle with three or four low-pressure tires, a straddle seat, and a handle bar.[1] Models can vary in size and power with engine capabilities upwards of 400 cubic centimeters (cc), which may achieve speeds up to 70 miles per hour (mph). ATVs are used both commercially (farming and ranching) and recreationally. Commercially, ATVs are used more often by youths (younger than 16) than tractors.[2] However, recreational use has been related to more injury[2] and noted to be more dangerous than motocross[3], dirt bikes, and snowmobiles.[4]

Use of ATVs has been associated with significant injury, mortality, and healthcare cost.[5] Reported ATV related injuries include: bone fractures at or below the cervical spine, specifically femur and tibia[6], upper extremities, thoracic, peripheral nerve, and soft tissue injuries[4] and traumatic brain injuries.[4,7] A recent national review of ATV fatalities reported a rate of .32 per 100,000[8]; while Garay and colleagues[6] observed a 1.5% mortality rate among all pediatric ATV injuries in Pennsylvania. Hospital costs associated with ATV related injuries were reported upwards of $300,000, with a mean cost of approximately $33,000.[5]

Many of these injuries could be prevented by using safety equipment such as helmets, gloves, boots, goggles, chest protectors, knee pads, and elbow pads.[9] Fatalities, injury severity scores and incidence of traumatic brain injury decreased when riders wore helmets.[7,10-12] Keenan and Bratton[13] compared injuries between Pennsylvania (helmet law and road restrictions) to North Carolina (no restrictions) and observed that restrictions were associated with decreased ATV related injuries. As of 2014, the National Conference of State Legislatures[14] reported the following state laws regarding ATV use: 34 states required helmet and/or eye protection, 34 states mandated a minimum age ranging from 6 - 18 years old, 23 states required an education course. Kansas, however, had none of these laws in place regarding ATV use. The three Kansas state laws regarding ATV use include: ATVs must be titled, ATVs may not be operated on an interstate, federal, or state highway, and ATVs must be equipped with headlights and taillights.[15] Helmet use for three-wheel ATVs is in accordance with Kansas motorcycle laws: riders under 18 must wear a helmet.[16]

ATV safety may be dependent on the safety campaigns and promotion of public awareness through influential change agents associated with ATV use. Jennissen and colleagues[17] evaluated a safety awareness initiative targeting agribusinesses and found that most did or would have posted the safety material (if received). Another target for safety awareness could be where ATVs are sold (dealers) and recreationally used (tracks). Thus, this study was an exploratory study on the safety promotion and recommendations by ATV dealers and track owners in Kansas.

METHODS

Study Design and Study Population. This was a cross-sectional telephone survey of ATV dealers and track owners in the state of Kansas. A list of ATV dealers and track owners was compiled from a Google™ search of ATV dealers and tracks in Kansas. The survey consisted of predominantly yes or no questions regarding the respondents' safety promotion practices and included promotion and sale of various safety equipment (questions were specific to safety item, such as Department of Transportation (DOT) or Snell certified helmet) and provision of ATV safety information. Respondent characteristics such as ATV use and experience were included. Dealer respondents were queried regarding their experience with ATV accidents. The identified survey participants were contacted once and the dealer or track owner, or someone who was knowledgeable about the operation was requested to respond to the survey. The informed consent

process was conducted verbally and completion of the survey indicated consent. The project was approved by the Wichita State University Institutional Review Board.

Data Analysis. Data were reported descriptively using frequencies (percentages). Significance tests were conducted with the chi-square test of association and Fisher's exact statistics. The data were analyzed with SPSS for Windows, Version 23.0.

RESULTS

Survey Respondents. Thirteen of forty-one dealers participated in the survey for a response rate of 32% (Table 1). Half of respondents (7/13) reported being an ATV salesperson. Most dealers (10/13) sold ATVs as secondary products (such as car dealership) with ATV sales ranging from five to 200 annually. Few dealer respondents (2/13) reported owning an ATV; most (11/13) reported personally riding ATVs. Most respondents (11/13) reported knowing someone involved in an ATV accident.

Table 1. Characteristics of survey respondents.

	Dealers (N = 13)	Tracks (N = 5)
Personally ride ATV	11 (85)	3 (60)
Personally own ATV	2 (15)	1 (20)
Personally involved in ATV accident	8 (62)	1 (20)
Know someone in accident	11 (85)	3 (60)
Know someone disabled in an accident	4 (31)	NA
Know someone killed	3 (23)	NA
Agrees		
State laws should be stricter	3 (23)	NA
Professional responsibility to educate on safety	7 (53)	4 (80)

Note: Data are reported in frequencies (percentages).
NA = Question not asked in survey.

Five of sixteen ATV tracks participated in the survey for a response rate of 31%. Most respondents (3/5) reported being a track owner/manager. Only one of the track respondents reported owning an ATV; while three reported personally riding ATVs. Most respondents (3/5) reported knowing someone involved in an ATV accident.

ATV Dealer Safety Promotion. All ATV dealer respondents reported asking a buyer how ATVs will be utilized, but less (11/13) asked the age of the primary rider and fewer (5/13) asked about secondary riders (Table 2). Only half of dealer respondents (7/13) reported it was their professional responsibility to provide ATV safety education to buyers. Dealer belief regarding professional responsibility to educate on safety was associated with other characteristics or safety promotion significantly.

ATV Track Safety Promotion. All ATV track respondents (100%) reported requiring riders to wear helmets (Table 3). Over half (3/5) reported specific helmet requirements. Of those, all required Department of Transportation (DOT) certified and most (2/3) required Snell certified helmets. No respondents reported requiring over the ankle boots or chest protectors, but two require goggles and closed toe shoes. Two of the five track respondents also reported providing safety courses and more than half (3/5) offered additional safety information. Most track respondents (4/5) agreed it is their professional responsibility to educate riders on ATV safety; the only track respondent who did not agree did not own/ride ATVs nor knew anyone involved/killed in an ATV-related accident.

Table 2. Dealer respondents' self-reported safety promotion (N = 13).

Safety Gear	N (%)
Recommend	13 (100)
Sell	13 (100)
Sell Head Protection	
DOT or snell certified	13 (100)
Open face with shield	12 (92)
Open face without shield	12 (92)
Motocross Style	13 (100)
Sell Body Protection	
Ankle boots	10 (77)
Chest protectors	9 (69)
Gloves	13 (100)
Clothing	12 (92)
Safety Information at Purchase	
Inquire age of rider	11 (85)
Offer courses	4 (31)
Offer safety information	4 (31)
Perform skills test	2 (15)

DOT = Department of Transportation

DISCUSSION

The aim of this study was to describe ATV safety promotion (as sales or use of safety gear or provision of education) at the point of sale or track use in the state of Kansas. While all dealer respondents reported recommending safety gear and selling head protection, not all sell other safety gear such as body protection. Further, safety courses and skills tests are not commonly reported safety promotion practices at point of sale. Self-reported safety practices by participating tracks include all requiring head protection, less have requirements regarding age and size of rider to ATV. Few ATV dealer or track respondents report providing safety information or courses.

Historical studies such as Percy and Duffy[18] reporting ATV related injuries and Warda and colleagues[1] reporting safety behaviors have called for preventive and safety measures such as consistent use of safety gear, mandatory rider training, as well as consumer and dealer education. Congruently, recent literature also concluded that safety precautions can reduce injury related costs[5] and recommended preventative guidelines[6] or initiatives[10] to reduce ATV related injuries. ATV dealers and track owners may be open to displaying ATV safety information similarly to agribusinesses.[17] Public health campaigns through influential change agents, such as ATV dealers and track

owners, may serve to increase awareness of protective safety practices, such as consistent use of helmets.[4,7] Healthcare providers who treat patients using all-terrain vehicles should be aware of the scarcity of safety promotion and also consider rider safety education.

Table 3. Track respondents' self-reported safety promotion

Personal protection	n = 5*
Require head protection	5 (100)
DOT or snell certified	3 (60)
Require body protection	
Ankle boots	0 (0)
Chest protectors	0 (0)
Goggles	2 (40)
Closed toe shoes	2 (40)
Provide safety education	
Safety courses	2 (40)
Safety information	3 (60)
Enforce track safety rules	
Age limits	2 (40)
Allow multiple riders	2 (40)
Monitor size of rider to ATV	1 (20)
Limitations on engine cc	3 (60)
Provide medical personnel during races	3 (60)

*Frequency (percentage) reported.

Study Limitations. The results of this descriptive study may be limited by selection bias (Google™ search compiled list), response bias (ATV dealers and track owners in Kansas, predominantly rural state), and variability among dealers who sell ATVs and may not generalize to other dealers and track practices. Further, generalizability is limited by low response rates from both dealers (32%) and tracks (31%), however, this is the first research to assess safety promotion practices at the dealer and track level.

Future Research. Future research should delve deeper into safety promotion practices at the state and national levels. The evaluation of ATV safety programs would be valuable to determine the types of programs that are successful in preventing ATV related injuries and mortality. A quality analysis of ATV safety materials (manufacturer, house-developed, and public health promotion) may be of value to determine consumer usability.

CONCLUSION

All-terrain vehicle dealers are recommended to promote ATV safety, but typically such promotion is limited to the sales of safety gear (helmets and gloves) or the provision of manufacturer provided safety materials. Further, ATV dealers report rarely offering skills tests or safety courses to buyers. Regarding ATV tracks, helmet protection is standard, however, ATV riding practices (age of rider, size of ATV) usually are not monitored. Moreover, only about half offered safety courses or materials. In Kansas, safety promotion at the point of sale or track level could be improved to increase public awareness of ATV safety practices.

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Rural Kansas Family Physician Satisfaction with Caring for Spanish-Speaking Only Patients

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ABSTRACT

Introduction. Patient satisfaction with the care they receive can be influenced negatively by a language barrier between the physician and patient. However, there is a paucity of information regarding the consequences of a language barrier on physician satisfaction, although this barrier has the potential to decrease physician wellness. This study sought to determine if a language barrier is a source of professional dissatisfaction in family medicine physicians in rural Kansas.

Methods. In a cross-sectional study, members of the Kansas Academy of Family Physicians who practiced in the rural Kansas counties with the highest percentage of Hispanic residents were surveyed. A questionnaire was developed to determine the demographics of the physician, details regarding his or her practice, and percentage of Hispanic and Spanish-speaking only (SSO) patients in their practice. Physicians also were queried as to their level of Spanish-speaking ability, availability of certified interpreters, and their satisfaction with caring for their SSO patients.

Results. Fifty-two physicians were identified and sent questionnaires by mail. Eighteen questionnaires were completed and returned, resulting in a 34% response rate. Respondents remained anonymous. In the practices surveyed, 61% of practice settings had a Hispanic-patient population greater than 25%. Only one of the eighteen respondents had greater than 25% of SSO patients in his or her practice. A certified interpreter was used less than 25% of the time in over 75% of the clinical encounters with SSO patients. Seventy-five percent of physicians reported no difficulty establishing trust and rapport with their SSO patients. Eighty-nine percent of respondents rated their relationship with SSO patients as good to excellent, and 83% were satisfied with the care they were able to provide this group. Seventy-eight percent of respondents reported that their ability to care for SSO patients decreased or had no effect on their professional satisfaction. Seventy-eight percent of physicians also rated their overall professional satisfaction in regards to their physician/patient relationship as good to excellent. However, language barriers affected physician-patient relationships, physician satisfaction with care, and professional satisfaction.

Conclusion. Language barrier affected physician's relationships with SSO patients, led to decreased physician satisfaction with the care they provided and to decreased professional satisfaction.

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INTRODUCTION

With so much emphasis on improving physician wellness and satisfaction, it is important to determine the factors that affect these elements. RAND Health identified that an important factor influencing physician satisfaction is the physician's perception about quality of care they deliver.[1] A physician's ability to deliver high-quality patient care was an important source of his or her professional satisfaction. There are many factors interfering with a physician's ability to deliver quality care, causing frustration for the physician and leading to a decrease in physician professional satisfaction. If this frustration stems from poor communication with patients, impediments to care can be significant and outcomes can suffer. Physicians and patients both suffer when language barriers exist.

Kansas has seen an increase in the Hispanic population, especially in rural communities, over recent decades, with a 59.4% increase overall from 2000 to 2010.[2] The significant increase in the Hispanic population has led to many SSO patients seeking medical providers in these rural communities. Often, these communities do not have an on-site interpreter and may rely on a communication device or other resources, such as bilingual staff or family of the patient.

Cultural, personal beliefs, values, and language differences influence patient satisfaction.[3-5] Hispanics are more likely to report dissatisfaction with their physician relationship, have less continuity of care, and perceive poorer quality of care.[3] Patients who use an interpreter or do not have an interpreter when one is necessary are not as satisfied with the patient-provider relationship.[6] Clinicians reported that communication difficulties affect their ability to treat and connect with their patients and evidence showed that race, ethnicity, and language have a substantial influence on the quality of the physician-patient relationship.[7,8] Language barriers between physicians and patients also can reduce patient compliance and quality of care.[9]

The aim of this study was to determine if a language barrier was a source of professional dissatisfaction in family medicine physicians in rural Kansas. The authors hypothesized that rural Kansas physicians would be less satisfied caring for SSO patients. Recognition of this factor, which could affect physician wellness negatively, could be a first step in seeking resolution to the problem.

METHODS

In a cross-sectional study, fifty-two members of the Kansas Academy of Family Physicians practicing in the fifteen rural Kansas counties with the highest percentage of Hispanic residents were invited to complete a seventeen question survey. Counties with the highest percentage of Hispanic patients were Seward (59%), Ford (53%), Finney (48%), Grant (46%), Stanton (36%), Stevens (35%), Hamilton (34%), Kearney (30%), Haskell (29%), Wichita (28%), Lyon (21%), Morton (21%), Edwards (20%), Scott (18%), and Greeley (18%).[10]

A questionnaire (Appendix A) was developed to determine the demographics of the physician and details about his or her practice, including years in practice, practice setting, and percentage of Hispanic and SSO patients in their practice. Questions also were asked about the physician's level of Spanish-speaking ability, availability of certified interpreters, and the physician-patient relationship with SSO patients. Physicians were asked to rate their ability to provide care to their patients and the satisfaction with the care that they delivered. They also were asked to distinguish this from their overall professional satisfaction in regards to their relationship with SSO patients. Respondents remained anonymous.

Descriptive analysis methods were used to determine details about the survey respondents. Pearson's correlation analysis was used to assess associations between different survey response items.[11] All statistical analyses were performed using SPSS for Windows, version 23.

RESULTS

Eighteen questionnaires were returned from the 52 physicians sent questionnaires, resulting in a 34% response rate. Respondent demographics are shown in Table 1. Seventeen (94%) of the physician respondents self-identified as white and two (11%) respondents had a Hispanic, Spanish, or Latino heritage. Practice descriptions are noted in Table 2. Of the eighteen physician respondents, seven engaged in private practice (solo, small group, medium to large group), while the remainder were hospital employees or worked for a Federally Qualified Health Center (FQHC), rural health clinic, or other safety-net clinic. One respondent was retired, and his or her responses were included in the analysis.

Eleven physician practices had a Hispanic-patient population greater than 25% (Table 3). SSO patients comprised greater than 25% of the patients in only one practice (Table 4). Private practices had significantly fewer patients who identified as Hispanic or Latino [correlation analysis: $r(17) = .49$, $p = .05$] and significantly fewer SSO patients [$r(18) = .62$, $p < .01$]. A decrease in the number of patients who identified as Hispanic or Latino in the physician's clinic correlated with a more negative relationship with SSO patients [$r(17) = -.53$, $p = .02$] and a decrease in professional satisfaction caring for this population [$r(17) = -.56$, $p < .01$].

If physicians were Hispanic or Latino, their perception of their ability to care for SSO patients was not an issue [$r(18) = -.52$, $p = .03$]. Ten (56%) physicians claimed to have basic Spanish-speaking ability, six (33%) noted good to advanced Spanish-speaking ability, and two (11%) had no fluency in Spanish (Table 1).

If physicians did not speak Spanish, their perception of their professional satisfaction with SSO patients was negative [$r(18) = -.49$, $p = .04$], and, if they spoke Spanish, their perception of their ability to care for SSO patients was positive [$r(18) = .59$, $p = .01$]. Certified interpreters were underutilized during clinic visits. A certified interpreter was used less than 25% of the time in over 75% of the clinical settings (Table 5).

Table 1. Demographics of the rural Kansas family medicine physicians surveyed.

	Number (%)
Gender	
Male	13 (72)
Female	5 (28)
Age	
30 - 39	8 (44)
40 - 49	4 (22)
50 - 59	0 (0)
> 60	6 (33)
Race	
White/non-Hispanic	15 (83)
White/Hispanic	2 (11)
Asian	1 (6)
Spanish-speaking ability	
None	2 (11)
Basic ability	10 (56)
Good to advanced ability	6 (33)

Table 2. Practice description of rural physicians surveyed.

Solo practice	1
Small group practice	5
Medium to large group practice	1
Hospital employed	7
FQHC, etc.	3
Other (retired)	1

Table 3. Hispanic patients in practice.

Number (%) of Practices	% Hispanic Patients
7 (39)	10 - 25
9 (50)	26 - 50
2 (11)	51 - 75

Table 4. Percent Spanish-speaking only Hispanic patients.

Number (%) of Practices	% Spanish-speaking Only Patients
5 (28)	< 10
12 (67)	10 - 25
1 (5)	26 - 50

Table 5. Use of certified interpreter for clinical visits for Spanish-speaking only patients.

% of Encounters for All Practices Surveyed	% of Time Interpreter was Used
78	< 25
5	26 - 50
11	51 - 75
6	> 75

Physician perceptions of his or her relationship with SSO patients and this effect on professional satisfaction are compiled in Table 6. Twelve physicians (67%) reported no difficulty establishing trust and rapport with their SSO patients, and sixteen (89%) rated their relationship with SSO patients as good to excellent. A better relationship (i.e., trust and rapport) with SSO patients correlated with increased professional satisfaction for the physician provider [$r(18) = .91$, $p < .001$]. Fifteen (83%) respondents were satisfied with the care they were able to provide to their SSO patients. Seventy-eight percent of respondents (14 physicians) also reported that their ability to care for SSO patients either decreased or had no effect on their professional satisfaction, while four physicians noted an increase in their professional satisfaction. Fourteen physicians (78%) also rated their overall professional satisfaction in regards to their physician/patient relationship as good to excellent. The level of satisfaction with the care provided to SSO patients correlated with a higher professional satisfaction for the provider [$r(18) = .47$, $p<.05$].

Table 6. Physician perceptions regarding their relationship with SSO patients.

Difficulty Establishing Trust & Rapport	
Yes	4 (22)
No	12 (67)
Did not answer	2 (11)
Rating of Relationship	
Poor	0 (0)
Fair	2 (11)
Good	10 (56)
Excellent	6 (33)
Physician Satisfied with Care Provided	
Yes	15 (83)
No	3 (17)
Ability to Care for SSO Patient Effected Professional Satisfaction	
No effect	6 (33)
Decreased satisfaction	8 (44)
Increased satisfaction	4 (22)
Professional Satisfaction in Regards to Physician/Patient Relationship	
Poor	0 (0)
Fair	4 (22)
Good	8 (44)
Excellent	6 (33)

DISCUSSION

A major limitation of this study was the small number of physicians completing the survey. Repeated requests for responses and/or identifying a larger number of physicians in the fifteen Kansas counties studied may have increased the study's power; however, in a study examining questionnaire response rates from individuals Baruch and Holtom[12] noted that incentives or repeated reminders to participate in a survey did not significantly improve response rates. The authors also found the average response rate from individuals was 52.7% with a standard deviation of 20.4%. Although the number of responses in our study was less than hoped, the response rate was certainly within the predicted range for such a survey.

Although the questionnaire contained only five questions (#13-17) directly relating to physician relationships with SSO patients, the questions were deemed sufficient to gauge physician sentiments. A longer survey may have resulted in an even lower response rate. The vast majority of responding physicians established trust and rapport with SSO patients, rated their relationship with this patient cohort as good to excellent, and were satisfied with the care delivered to SSO patients. Despite its limitations, the data provided insight into rural physician satisfaction with caring for SSO patients, although the results may not be extrapolated outside of rural areas or to areas with greater resources available for SSO patients.

Private practices had significantly fewer SSO patients than other practices. Consequently, fewer SSO patients in a physician's practice were correlated with a more negative physician-patient relationship, which led to a decreased professional satisfaction overall. Understandably, those physicians who do not interact with this population of patients as often as other physicians are less comfortable with the infrequent interactions or do not have the processes in place to address this patient population's needs.[6]

If a physician had Hispanic or Latino background or spoke Spanish, his or her perception of the ability to care for SSO patients increased. Conversely, if a physician did not speak Spanish, his or her perception of professional satisfaction caring for SSO patients decreased. Use of a certified interpreter might improve physician-patient communication, but engaging the services of a certified interpreter was underutilized by the respondents in this study. Employing an interpreter could be an area of improvement in rural practices to improve the relationship with Spanish-speaking only patients and, in turn, increase physician satisfaction.

CONCLUSIONS

One of the most important factors for physician satisfaction is the delivery of high quality care to patients.[1,13] Language barriers can interfere with the quality of care a physician provides his or her patients. Language barriers not only impact physician-patient relationships, including the physician's understanding of the patient's symptoms and the patient's understanding of the physician's diagnoses and treatment recommendations, but can cause decreased physician satisfaction with the level of care provided and decreased professional satisfaction. Fortunately, the majority of the physician respondents in this study were satisfied with the care they delivered to SSO patients. However, this study also provided evidence that caring for SSO patients by physicians with limited encounters and/or no or minimal ability to converse in Spanish may be a significant source of physician dissatisfaction. Recognition of this issue and developing means to assist this group of physicians could improve patient care and physician well-being.

Given the growing Hispanic population and SSO population in Kansas, it is imperative that ways to dismantle language barriers be explored and implemented. Possible ways to address the language barrier is through increased utilization of certified interpreters, tools to start the conversation with SSO patients (Appendix B), training of minority physicians, and training in medical Spanish for physicians.[8,9]

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Keywords: language barrier, Hispanics, job satisfaction, rural health services

APPENDIX A

Questionnaire: Study on Relationships between Physicians and Spanish-Speaking Patients

The purpose of this questionnaire is to assess physician satisfaction related to the care of Spanish-speaking patients in your practice. Your answers will be kept anonymous; you will only be identified by study personnel through your demographic information and results will be presented only in the aggregate. The questionnaire should take less than 5 minutes to complete. Please return in the provided envelope. Thank you for participating in this questionnaire!

1. How do you identify your gender?
   a. Male
   b. Female
   c. Other - please explain:_____

2. What is your age?
   a. < 30 years
   b. 30 - 39 years
   c. 40 - 49 years
   d. 50 - 59 years
   e. > 60 years

3. What is your race?
   a. White
   b. Black or African American
   c. Asian/Pacific Islander
   d. American Indian
   e. Alaskan Native
   f. Other - please explain:_____

4. Are you Hispanic, Spanish or Latino origin?
   a. Yes
   b. No

5. How do you assess your level of Spanish speaking ability?
   a. None
   b. Basic: I speak the language imperfectly and only to a limited degree and in limited situations. I have difficulty in or understanding extended conversations. I am unable to understand or communicate most healthcare concepts.
   c. Fair: I speak and understand well enough to have extended conversations about current events, work, family or personal life. Native speakers notice many errors in my speech or understanding. I have difficulty communicating about healthcare concepts.
   d. Good: I speak well enough to participate in most conversations. Native speakers notice some errors in my speech or understanding, but my errors rarely cause misunderstanding. I have some difficulty communicating necessary health concepts.
   e. Advanced: I speak very accurately, and I understand other speakers very accurately. Native speakers have no problem understanding me, but they probably perceive that I am not a native speaker.
   f. Native/functionally native: I converse easily and accurately in all types of situations. Native speakers, including the highly educated, may think that I am a native speaker, too.

6. Are you trained as a M.D. or D.O.?
   a. M.D.
   b. D.O.

7. How many years have you been in practice outside of residency?
   a. < 5 years
   b. 5 - 10 years
   c. 10 - 20 years
   d. > 20 years

8. What is your current practice situation?
   a. Solo private practice
   b. Small group private practice
   c. Medium to large group private practice
   d. Hospital employed
   e. FQHC, rural health clinic, other safety-net clinic
   f. Other - please explain:_____

9. What percentage of your patients identify as Hispanic?
   a. < 10%
   b. 10 - 25%
   c. 26 - 50%
   d. 51 - 75%
   e. > 75%

10. What percentage of your Hispanic patients are Spanish-speaking only? If unsure, please estimate best guess.
   a. < 10%
   b. 10 - 25%
   c. 26 - 50%
   d. 51 - 75%
   e. > 75%

11. What resources do you have for interpretive services?
   a. Electronic device (i.e., iPad)
   b. Telephone service
   c. In person certified translator
   d. Bilingual medical personnel not certified for interpretation
   e. Family or friends of patient
   f. Other - please explain:_____

12. How often is a certified interpreter used with exclusively Spanish-speaking only patients?
   a. < 25% of the time
   b. 25 - 50% of the time
   c. 51 - 75% of the time
   d. 100% of the time

13. Do you find that having a language barrier with your Spanish speaking patients makes it more difficult to establish rapport and trust?
   a. Yes
   b. No

14. How would you rate your relationship with your Spanish-speaking only patients?
   a. Excellent
   b. Good
   c. Fair
   d. Poor

15. Are you satisfied with the care you are able to provide to your Spanish-speaking only patients?
   a. Yes
   b. No

16. How does your ability to care for your Spanish-speaking only patients affect your professional satisfaction?
   a. No affect
   b. Professional satisfaction decreased
   c. Professional satisfaction increased

17. How would you rate your professional satisfaction in regards to your physician/patient relationship with Spanish-speaking only patients?
   a. Excellent
   b. Good
   c. Fair
   d. Poor

APPENDIX B

Start the Conversation

Comenzar la Conversación/Start the Conversation	
This tool is to be used by the physician to start the conversation with a Spanish-speaking only patient while waiting for the interpreter.	
Phrase (physician speaking to patient)	**Translation**
Hola! Me llamo Doctor(a) (insert last name). **Doctor = male, Doctora = female**	Hello! My name is Doctor (insert last name).
Soy su doctor(a) hoy. Estoy esperando la intérprete.	I will be your doctor today. I am waiting for the interpreter.
Estoy usando una persona/el iPad/el teléfono para interpretación hoy. Será solo unos minutos.	I will be using a person/the iPad/the telephone for interpretation today. It will be just a few minutes.

KANSAS JOURNAL of MEDICINE

Kansas Provider Report of Adolescent Vaccinations in Their Practice

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ABSTRACT

Introduction. Kansas falls consistently below average for adolescent vaccination of meningococcal (MCV), human papillomavirus (HPV), and influenza.

Methods. For this study, the members of Kansas Chapter of the American Academy of Pediatrics were emailed a confidential electronic survey soliciting their impressions of vaccination in their practice.

Results. Of 137 providers emailed, 61 (45%) completed the survey. Thirteen providers were excluded as they did not see/vaccinate adolescents or did not complete the survey. Tetanus, diphtheria, pertussis (Tdap), and MCV vaccines were most commonly up to date with 31 (65%) and 20 (42%) respondents reporting greater than 90% immunization rates, respectively. HPV (n = 42, 89%) and influenza (n = 40, 83%) vaccines had refusal rates greater than 25% in most clinics. Most practices (n = 44, 92%) used internal electronic medical records to track vaccinations, although 29 practices (60%) utilized the state immunization information system. Providers requested vaccine-specific patient education tools, positive media coverage, staffing support, and best-practices workshops to support vaccination efforts.

Conclusion. Kansas providers may not be optimizing available resources to enhance these rates, such as Web IZ tracking and immunization reminders. Patient education supplies, specific to HPV and Influenza vaccination, potentially could increase vaccination rates.
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INTRODUCTION

Vaccines are readily available in the United States and provide an opportunity to prevent morbidity and mortality. Recommendations for adolescents by the Centers for Disease Control and Prevention (CDC) include tetanus, diphtheria, and pertussis (Tdap) vaccine at age 11 - 12 years, three doses of human papillomavirus (HPV) vaccine starting at age 11 - 12 years, meningococcal conjugate vaccine (MCV) at age 11 - 12 years with a booster at age 16 years, and influenza vaccine annually.[1] Of these recommended vaccinations, only Tdap is required by the public school system in Kansas.[2] MCV often is required prior to college attendance. Required vaccination for school attendance is effective in increasing vaccine coverage.[3,4] In part, because of the lack of requirement for HPV vaccine in Kansas schools, there is the potential for state rates to be less than that for other required vaccines.

Healthy People 2020 goals include increasing routine vaccination coverage in adolescents (ages 13 - 15 years), with targets set for each vaccine of 80%.[5] In 2015, no state met the target coverage for the HPV vaccine series.[6] HPV is the most common sexually transmitted infection and young people aged 15 - 24 years account for half of new infections each year. The HPV vaccine protects against the most virulent strains.[7] In the most recent data, 47 states met the Healthy People 2020 target for Tdap vaccine and 36 for MCV, while Kansas had the third lowest rate in the nation for HPV vaccination initiation for girls and was the fifth lowest-ranking state for MCV vaccination.[6]

Providers are key players in vaccine uptake by patients. Provider encouragement is one of the key reasons parents choose to vaccinate their children.[8,9] Likewise, provider hesitancy in vaccine safety or efficacy discourages uptake of vaccines by patients.[8] Vaccination rates vary widely across Kansas with urban centers typically having higher rates.[10] Clinical practices performing well in vaccination may have successful policies and protocols in place, but these may not be shared between practices. Methods shown to be effective in increasing adolescent vaccine uptake include patient reminder and recall systems, provider reminders, standing order sets, and immunization information systems (IIS; formally called vaccine registries).[8,11]

States are incentivized through Medicaid payment models to have an IIS; WebIZ is Kansas' IIS. The goal of IISs is to serve as a portable, complete record for the patient, which is especially important if vaccines have been received in multiple locations.[12] State IISs protect patients and enhance health and safety by supporting communication between immunization providers. IISs can integrate with the provider's electronic health record software, minimizing potential data entry errors, use information from the CDC to build decision support features, and stay current with updates from that agency.[12] Reminder/recall systems also have been shown to increase overall vaccination rates for adolescents.[7,13] These systems may originate from the particular electronic health record system or from the state IIS. Further, adolescents, including those from underserved and ethnic minority groups, are receptive to the idea of receiving health information via text messaging and are interested specifically in immunization reminders.[14,15]

Despite these strategies, barriers to effective vaccination for adolescents remain. This study aims to evaluate vaccination practices in Kansas, determine barriers to vaccination, and identify tools providers perceive would be beneficial to increase vaccination rates in adolescents.

METHODS

This was a mixed-methods cross-sectional evaluation of provider's understanding of adolescent vaccination in their practice. A survey was developed with input from pediatricians and researchers. The survey asked about practice characteristics, provider's interpretation of vaccination practices and coverage, and what resources might improve vaccination coverage.

The Kansas Chapter of the American Academy of Pediatrics (KAAP) provided a list of email addresses for their members. SurveyMonkey® (www.surveymonkey.com) was used to administer the survey, which was emailed to all 440 providers on the list with an

introductory letter explaining the study. An email reminder was sent after seven days to all providers who had not replied. A final reminder was emailed on day 14, and the survey was closed 21 days after initial contact. The survey consisted of 27 items for vaccinators and 13 items for those who identified they did not vaccinate and was estimated to take five minutes to complete. No personal data were collected with the survey responses.

Providers were excluded from the study if they did not see adolescent patients or if greater than 50% of questions were left blank. Responses were summarized using percentages. Open-ended responses were evaluated for common themes using qualitative content analysis; relevant quotes were extracted from open-ended responses. The study was approved by the University of Kansas School of Medicine-Wichita Human Subjects Committee.

RESULTS

In total, 440 emails were sent and 137 were opened. Of these, 61 responded to the survey. Five providers (8%) were excluded from analysis because they stated they did not see adolescent patients. An additional five providers (8%) were excluded as they reported not vaccinating adolescents, often relying on another community resource, such as the Health Department, to supply vaccines. Additionally, three incomplete surveys were dropped. Of those included in the analysis (n = 48), 45 providers (94%) worked in general pediatrics and 35 (73%) had been practicing more than 10 years (Table 1).

Vaccine coverage and refusal rates. Eleven providers (24%) reported at least 80% of their adolescent patients were up-to-date with all routine vaccines (Tdap, MCV, and HPV). Individually, Tdap and MCV vaccines more commonly were reported as up-to-date with 31 (65%) and 20 (42%) respondents reporting greater than 90% vaccination rates, respectively (Figure 1). Influenza and HPV vaccines were given less frequently with only four (8%) respondents and one (2%) respondent reporting vaccinating more than 90% of their patients, respectively. One provider commented, *"...parents look more to what the school districts require than what is recommended by the CDC and AAP".*

Estimated vaccine refusal rates appeared inversely related to vaccination rates, with Tdap and MCV being the least refused (less than 10% of providers reporting) and HPV being reported as refused most frequently (Figure 2). HPV and influenza vaccines had refusal rates greater than 25% in 42 (89%) and 40 (83%) clinics, respectively. Providers indicated in comments that they attempted to supply the recommended vaccinations, but often were met with resistance.

- *"We recommend HPV vaccines at all visits where the child meets age requirements and influenza vaccine during appropriate influenza season (even give influenza vaccine through June). We continue to be surprised at the numbers who refuse HPV and influenza."*
- *"While resistance to HPV is declining, the largest barrier is getting the 3 doses in."*
- *"The main negative is public perception about vaccine safety. It is slowly changing, but takes regular person-to-person communication to change the perception."*

Table 1. Characteristics of vaccinators.

Specialty		**n (%)**
	General Pediatrics	45 (94)
	Pediatric Subspecialty	2 (4)
	Family Medicine	1 (2)
Time in practice (outside of training)		
	0 to 5 years	7 (15)
	6 to 10 years	6 (13)
	More than 10 years	35 (73)
Percent of patient panel on Medicaid insurance		
	Medicaid not accepted	5 (10)
	Less than 25%	5 (10)
	25 to 50%	19 (40)
	51 to 75%	15 (31)
	Greater than 75%	4 (8)
Size of practice		
	Small (< 5 providers)	18 (38)
	Mid-sized (5 - 10 providers)	11 (23)
	Large (> 10 providers)	18 (38)
Type of practice*		
	Private practice	21 (44)
	Multidisciplinary	13 (27)
	Academic/University affiliated	12 (25)
	Rural Health Clinic	3 (6)
	Federally Qualified Health Center/Safety-net	3 (6)
	State funded clinic/health department	1 (2)
	House Call	1 (2)
	Indian Health Service	1 (2)
	Hospital-owned	1 (2)
	Faith-based	1 (2)

*Multiple responses allowed.

Vaccination Practices. All sites reported administering both Tdap and HPV. Two providers (4%) reported not administering MCV and one (2%) reported not administering influenza vaccine. Nurses most frequently administered vaccines (n = 43, 90%), physicians and mid-level providers most frequently counseled and ordered vaccines. Average time estimated counseling on vaccines was six minutes.

While 29 providers (60%) reported that they utilized WebIZ, most (n = 44, 92%) relied on their own internal electronic medical record to track vaccinations. As for reminder systems, 50% of practices (n = 24) relied on phone reminders and nearly 30% (n = 14) did not use any listed method (i.e., phone call, text message, email, mailing, service provided by vaccine manufacturer, making appointment for next vaccine, or patient portal) to remind patients when vaccines were due. One provider reported that reminders were "rarely" used,

and another stated that they were working on systems as they developed their new electronic medical record.

Providers were asked whether their practice allowed vaccines to be given to 16-year-old patients without a parent's consent; 25 practices (53%) said yes for all vaccines whereas two said yes for influenza only. Further, four providers (8%) stated their belief that minors under age 18 could not consent to vaccinations. Eight providers (17%) stated that they would first try to call the parent to get their consent, with one provider clarifying that, if they were unable to get parental consent, they would provide the vaccine without it.

All but one practice regularly provided vaccine information sheets for patients. To ensure information sheets were up-to-date, most providers (n = 27, 56%) reported the clinic waited for emailed alerts that information sheets had been updated. Three providers (6%) reported that a member of their staff (nurse or vaccine coordinator) was responsible for keeping information sheets up to date.

Thirty of the 48 practices (63%) reported that they had worked on a quality improvement project in the past five years related to vaccinations. These data were found to be unassociated with their reported vaccine coverage (Fisher's exact p > 0.2 for each).

Practices most often requested vaccine-specific patient education supplies, staffing support, and best-practices workshops to support vaccination efforts. Provider continuing education was least requested (n = 4, 8%). In open comments, seven providers (15%) requested efforts to change the parental perception of adolescent vaccination, specifically through conventional articles and social media that support comprehensive vaccination.

"The real help needed is a way to deal with internet and public news that is negative."

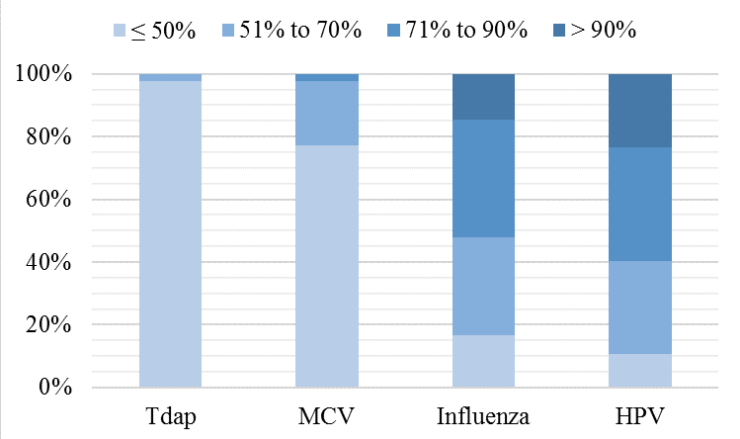

Figure 1. Provider reported vaccination rates. [Tdap: tetanus, diphtheria and pertussis; MCV: meningococcal conjugate vaccine; HPV: human papillomavirus]

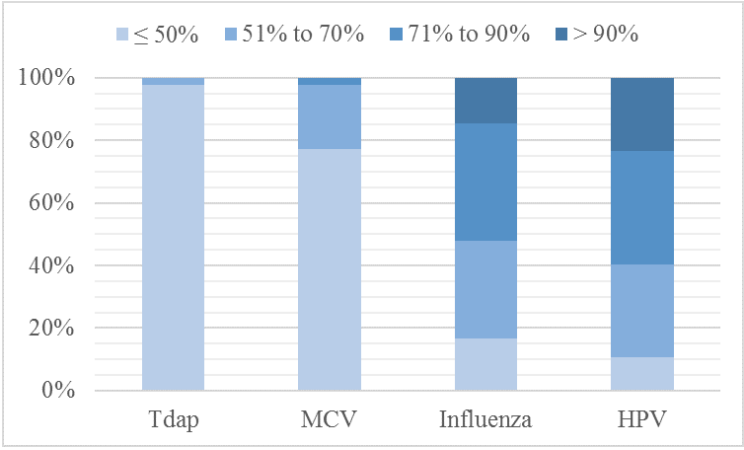

Figure 2. Provider reported vaccine refusal rates. [Tdap: tetanus, diphtheria and pertussis; MCV: meningococcal conjugate vaccine; HPV: human papillomavirus]

DISCUSSION

This study showed multiple barriers in our state affect adolescent vaccination uptake. Among these are lack of strong school vaccination requirements, the need for further patient and provider education on HPV vaccination specifically, and underutilization of WebIZ and its resources by practices. Consistent with previous literature, providers in our study reported HPV vaccination rates among the lowest of all adolescent vaccines.[6,16] Currently, Tdap vaccination is the only required vaccination for adolescent entry into Kansas public schools.[2] In addition, many local colleges require MCV vaccination for entering students. Vaccinations which are not necessary for school attendance (HPV and influenza) have the lowest perceived rate of administration in Kansas. Other barriers to vaccination uncovered in this study included the lack of utilization of the state's IIS by providers and poor uptake of vaccine reminder systems. Considering that almost a third of those surveyed did not utilize any reminder/recall system, the integrated reminder and recall system that WebIZ offers to its users could be beneficial for many providers.

Providers reported that on average they spent six minutes counseling patients. The estimation may be erroneously large depending on their interpretation of this question and response bias. When vaccines are offered and accepted there are only a few seconds of discussion. Indeed, some providers may not feel that this constitutes counseling, per se. However, providers may recall more readily instances where there is hesitancy, in which case, the process could take several minutes to identify specific questions and provide reassurance to parents.

To support vaccine efforts, providers requested staffing support, best-practices workshops, and patient educational supplies. In particular, patient education specific to HPV vaccination was requested. Vaccine-specific patient education handouts and materials that are up to date and from trusted sources support the conversation between provider and patient.[17,18] Patient education was identified as the area where most support was desired, in particular pertaining to HPV vaccination.

Providers reported frequently that their office and nursing staff were used frequently in the tracking, referral, and promotion of immunizations. As previously recommended,[19-21] continued training

of support personnel is vital to successful immunization practices. Patients encounter the office staff first, last, and more often than the provider in most instances. Receiving the same message from the staff and the provider helps to normalize the vaccine and reiterate its value and importance. Conversely, if support staff devalues a vaccine in any way, it negatively affects the patient's attitudes about vaccination and lessens the likelihood of the provider being successful in advocating for vaccine uptake. Promoting the ability of the staff to use standing orders and feel confident in their abilities can come from best practices workshops.

In addition to educating patients on the importance of vaccinations, provider support measures are needed. The WebIZ system (https://kanphix.kdhe.state.ks.us) has built-in decision support technology that indicates when a vaccine is next due. The registry can generate documents for informed consent to vaccination and can serve as official health documentation that can be used by the patient when accessing social services or for school records. Continuing medical education on reminder and recall systems, including those offered through WebIZ, could increase vaccination rates in Kansas. In addition to assisting practices providing immunizations, steps should be taken to reduce barriers for practices that do not provide immunizations. Practices which do not provide immunizations on site may represent a potential barrier, as this could be interpreted by parents as a lack of support by the provider for the immunization.

This study has several limitations. A small percent of providers opened the contact email for the survey. Of those, only 45% completed the survey which could lead to response bias. HPV rates were not collected separately for male and female patients, so the estimated rate of vaccination may be skewed (if respondents averaged both populations) or erroneously high (if respondents only reported female vaccination). In addition, the low utilization of the state vaccine registry by practices makes actual vaccination rates difficult to obtain for our state. Our data showed opportunity for improvement in uptake of these important vaccines. Finally, it is important to understand that barriers in a state with large rural communities may be different than in other regions across the country. Examination of current vaccine practices and identification of gaps is key to finding a solution that will be practical with components that easily are implemented without a large expansion of resources. When success is achieved in expanding a culture supportive of vaccines across the state, the pediatric patients will benefit and enjoy better health as they enter adulthood.

Future research should aim to understand vaccine refusal better, specifically HPV, and to identify specific tools and training for providers to mitigate parental refusal, particularly with regard to HPV and influenza vaccinations. In addition, processes should be implemented to offer comprehensive adolescent vaccination programs in Kansas. These programs should include parental and medical staff education, and ideally should be supported by health care providers, policy makers, and school systems to achieve increased vaccination rates in adolescents.

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Keywords: vaccination, immunization, adolescent, survey, vaccination refusal

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Barriers to Utilizing Medicaid Smoking Cessation Benefits

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ABSTRACT

Introduction. Smoking is the number one preventable cause of death in the United States. Under the Affordable Care Act, Kansas Medicaid covers all seven FDA-approved smoking cessation therapies. However, it is estimated only 3% of Kansas Medicaid smokers use treatment compared to the national estimate of 10%. The objective is to determine systemic barriers in place that prevent optimal utilization of Medicaid smoking cessation benefits among KU Medical Center Internal Medicine patients.

Methods. For this quality improvement project, a population of 169 Kansas Medicaid smokers was identified who had been seen at the KU Internal Medicine Clinic from January 1, 2015 - February 16, 2016. Phone surveys were completed with 62 individuals about smoking status, interest in using smoking cessation treatment options, and awareness of Medicaid coverage of treatment.

Results. Of the 62 respondents, 24 (39%) were prescribed pharmacotherapy and 41 (66%) were interested in using smoking cessation treatment. There were eight who had quit smoking. Of the remaining 54 smokers, 31 (57%) were unaware that Medicaid would cover pharmacotherapy. Of 24 participants who received a prescription for pharmacotherapy, 13 (54%) were able to fill the prescription at no cost using the Medicaid benefit.

Conclusion. The majority of respondents were interested in using smoking cessation treatment, yet three main barriers existed to using Medicaid smoking cessation benefits: physicians not prescribing treatment to patients, patients not aware of Medicaid coverage, and inadequate pharmacy filling. Improved physician and patient awareness of Medicaid coverage will facilitate more patients receiving smoking cessation therapy and ultimately quitting smoking.

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INTRODUCTION

Smoking is the leading preventable cause of death in the United States.[1] Medicaid enrollees are twice as likely to be smokers as the general population, 32% vs 17%,[2] which places a large financial burden on the Medicaid program. The cost of smoking-related disease in Medicaid patients is estimated to be more than $75 billion which is about 15% of all Medicaid expenditures. Many smokers want to quit and there are a variety of options available to them. Evidence-based tobacco dependence treatments (TDT) include individual, group, and telephone counseling, along with seven FDA-approved nicotine replacement therapies (NRT; nicotine patch, gum, lozenge, nasal spray and inhaler, bupropion (Zyban), and varenicline (Chantix)).[2-4] Despite these options for treatment, Kansas has performed poorly compared to national NRT usage since passage of the ACA. In 2013, 49,000 (35%) of Kansas Medicaid enrollees were smokers, with only 3% of those using medications.[2] Additionally, the rate of NRT utilization in Kansas from 2011 - 2013 was 0.05 prescriptions per smoker, compared with 0.20 prescriptions per smoker nationally.[2] These data placed Kansas 48th out of 50 states in terms of the frequency with which Medicaid smokers receive NRT.

Medicaid smokers often do not get help quitting due to multiple barriers including cost of treatments, prior authorization requirements, lack of awareness of options amongst Medicaid enrollees and physicians, as well as physician time constraints and perceived patients' willingness to quit.[5] As of January 2014, the Affordable Care Act (ACA) required Medicaid programs to cover smoking cessation treatment, including over-the-counter medications.[6] Previously identified barriers, such as cost to the patient of pharmacotherapy and insurance company resistance to coverage, are negated partially by the Affordable Care Act mandate for Medicaid to cover NRT at no cost to the patient. A systematic review of smoking cessation guidelines recommended that clinicians should encourage all patients interested in quitting to utilize tobacco dependence therapy to aid in cessation unless they are light smokers, adolescents, pregnant women, or smokeless tobacco users.[7]

To bridge the gap between expanded Medicaid coverage and utilization of coverage in a practical sense, the process a patient undergoes to procure and use cessation treatment must be understood. There are many potential pitfalls in the process, including lack of physician and patient knowledge of Medicaid coverage, treatment not being prescribed, lack of pharmacist knowledge of which National Drug Codes cover specific NRT, confusion at the pharmacy regarding specific product coverage, and patients' perception of NRT effectiveness and willingness to use.[5] Indeed, counselors in the tobacco treatment service at the University of Kansas Medical Center (KUMC) reported that some patients were not getting prescriptions for smoking cessation medications and others who had received prescriptions for NRT were not able to get these prescriptions filled at the pharmacy. To better understand this potential problem in the quality of smoking cessation services, we assessed current barriers to treatment from a patient perspective to identify which of these represent the principal barrier or barriers to patients obtaining and utilizing the Medicaid smoking cessation benefit and ultimately in quitting smoking.

METHODS

Participants and Setting. Using the Heron[9] system interface to the electronic health record, we identified patients 18 years or older seen in the KUMC Internal Medicine Clinic between January 1, 2015 and January 1, 2016 who were identified as smokers. From this group, we selected patients who were enrolled in Kansas Medicaid and excluded patients who were deceased or for whom English was not their primary language. One or more attempts were made to contact

each of these patients by telephone. Upon reaching a patient by telephone, the patient was provided with a brief verbal description of the project and provided their assent for participation in a brief telephone survey (Figure 1).

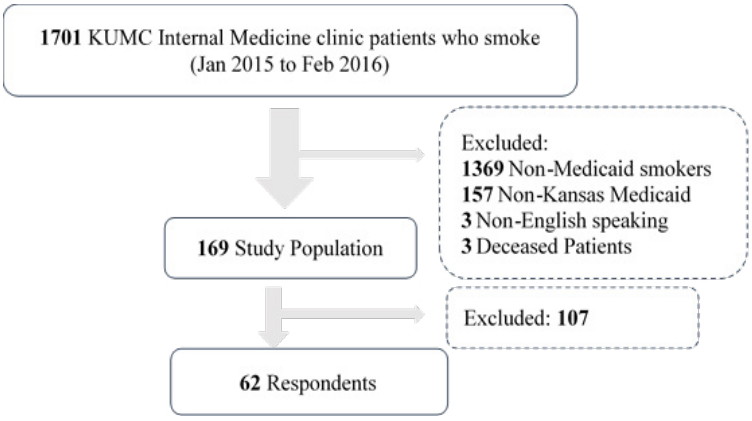

Figure 1. How patients were identified and included or excluded.

Data Collection. Demographic data were captured from the electronic health record through the HERON interface, including gender, race, and age. People who responded to the phone survey were asked whether they were interested in quitting smoking, counseled by their doctor on the benefit of quitting, interested in using treatment to help them quit, prescribed pharmacotherapy, what type of pharmacotherapy they received, if they filled their prescription, if their prescription was filled at no cost, if they used the prescription, and if the prescription helped them quit. Data collected via interviews were entered into and stored securely using REDCap electronic data capture tools hosted at the University of Kansas Medical Center.[10]

Data Analysis. The primary outcome was the proportion of KUMC Internal Medicine Medicaid enrollees who received pharmacotherapy for tobacco cessation and were able to utilize the Medicaid benefit. Secondary outcomes included the proportion of Internal Medicine Medicaid enrollees who were counseled about quitting smoking in the last year, the proportion that were prescribed pharmacotherapy, the proportion aware of Medicaid coverage of pharmacotherapy, and the proportion interested in receiving pharmacotherapy in the future. All outcomes were calculated as simple frequencies. Data analysis was conducted using Microsoft Excel after removal of all the protected health information.

This project was reviewed by the KUMC Institutional Review Board and deemed as a quality improvement project designed to improve uptake and utilization of smoking cessation pharmacotherapy.

RESULTS

Prescription and Utilization. Of the 169 smokers that met the inclusion criteria, 62 (37%) responded to the survey. The mean age of the survey respondents was 53 years. Approximately half were female (52%) and Caucasian (52%), while 45% were African American (Table 1). Of the 62 respondents, 41 (66%) were interested in receiving cessation therapy and 24 (39%) of patients had been prescribed NRT. Of the 24 patients prescribed therapy, 20 (83%) filled their prescription at the pharmacy. Of the 20 that filled their prescription, 13 (65%) took advantage of the Medicaid benefit and filled it at no cost. Also, 80% of patients prescribed therapy reported using the therapy and 38% of patients reported that the NRT prescribed aided them in quitting smoking (Table 2). When patients were asked whether they were aware that Kansas Medicaid should cover their prescription therapy only 23 (43%) of patients were aware this option existed.

Table 1. Demographics of population studied.

Male	30 (48%)
Female	32 (52%)
Caucasian	32 (52%)
African American	20 (45%)

Table 2. Results of phone survey (n; %).

Counseled by doctor on quitting	57 (92)
Interested in quitting	47 (76)
Interested in therapy	41 (65)
Prescribed therapy	24 (39)
Filled prescription	20 (32)
Filled prescription at no cost	13 (65)
Used prescription	15 (24)
Prescription aided in quitting	9 (15)

Nicotine Replacement Therapy. The nicotine patch was the number one prescribed tobacco cessation therapy representing 15 out of the 37 (41%) prescribed therapies. Varenicline was prescribed to 24% of patients and the nicotine gum was prescribed to 22% of patients. The nicotine lozenge was prescribed to only 5% of patients and bupropion was prescribed to only 2.7% of patients. Another 2.7% of patients were prescribed therapy but were unsure of the specific therapy their doctor recommended (Figure 2). The majority of prescriptions for tobacco cessation therapy were for the nicotine patch followed by varenicline and the nicotine gum; together these three represent 90% of total prescribed therapies. There were a total of 37 prescriptions for tobacco therapy given to a total of 24 patients as some patients were prescribed multiple therapies.

Pharmacy Coverage. There was variation between pharmacies on whether prescriptions were filled at no out of pocket cost to patients. Of the 37 prescriptions that were attempted to be filled, 20 (54%) were filled at no cost to the patient thus honoring the Medicaid benefit. Out of the five patients who filled their prescription at Walgreen's, four (80%) took advantage of the Medicaid benefit and paid no out of pocket cost. This is compared to one of the five patients (20%) who went to Walmart to take advantage of the Medicaid benefit. All three patients who filled their prescription at CVS took advantage of the benefit.

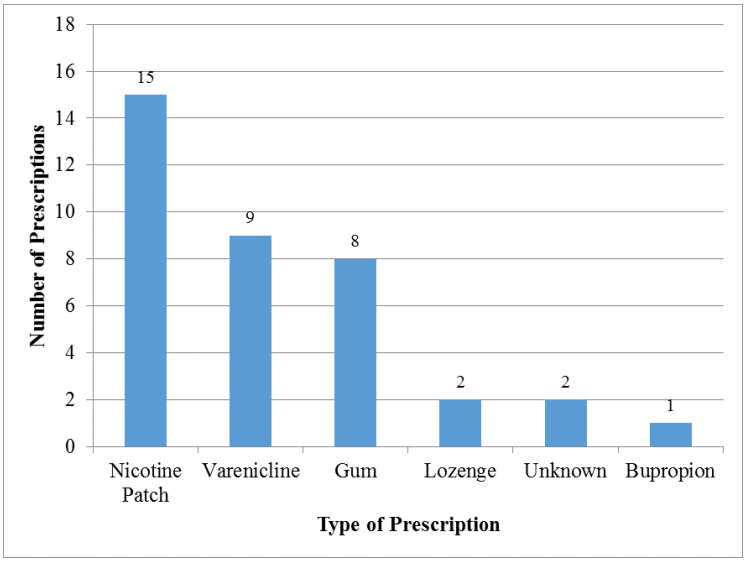

Figure 2. Types of pharmacotherapy prescribed.

DISCUSSION

Three main barriers existed for Medicaid patients interested in smoking cessation from receiving treatment. First, physicians did not prescribe therapy to all of their patients who expressed interest in cessation. Of the 41 patients interested in receiving therapy, only 24 (58%) were prescribed NRT. This is consistent with previous statistics on low prescribing practices amongst Kansas physicians to Medicaid patients.[2] Physician lack of prescribing represents the main barrier to patients interested in quitting, however, when physicians prescribe therapy, the nicotine patch and gum, along with varenicline, are the most frequent choices for therapy. Further studies will be needed to elucidate whether the low prevalence of prescribing practices is due to physician lack of knowledge of Medicaid NRT coverage or if physician time constraint due to the many underserved areas in Kansas accounts for this statistic.

Another barrier to patients receiving therapy is the fact that only 43% of patients who identify as smokers were aware that Medicaid should cover their NRT. The majority of Medicaid patients were disadvantaged socioeconomically and already struggling with the burden of high medical costs. This lack of awareness that therapy should be covered presents another deterrent to those interested in quitting. Increased physician awareness that their patients are interested in quitting and that Medicaid should cover NRT will foster more conversations with patients about smoking cessation, leading to more people quitting.

The third barrier was NRT filling by pharmacies and whether patients were able to take advantage of the Medicaid benefit. According to our survey, the rate of prescriptions that were filled at no cost to the patient was 54% with evidence that different pharmacies varied on whether they required patients to pay. A comprehensive assessment of pharmacy filling practices identifying where patients should have NRT filled would reduce patient costs and enable them to use the full benefit of Medicaid available to them.

Utilizing Medicaid's policy on tobacco cessation would cut costs to the program, as well as decrease morbidity and mortality to its enrollees. A cost-benefit study in Massachusetts analyzed the financial cost of smoking cessation per patient compared to the reduced financial cost of hospital admissions that smoking cessation provides to the state Medicaid program.[8] Every $183 spent per patient on tobacco cessation averted an average of $571 per patient on hospital admissions, equivalent to $2.21 saved for each $1 spent. This shows that states investing in cessation therapy avoid long term costs from increased patient morbidity and hospitalizations incurred from smoking. While the reduced cost to the system is one benefit, more importantly, patients who quit live healthier lives with less disease burden.[1]

There are several limitations to this study. First, surveys were self-reported by patients ,which required them to remember a conversation with their provider that could have been a year earlier. Also, patients were sampled from one tertiary care facility in Kansas which may not be representative of all Medicaid patients across the state. The response rate was 37%, which may not reflect the entire population; however, the demographics were similar between those who responded to the phone interview and the study population as a whole.

The results of the project have strong potential to direct future care of Medicaid enrollees who smoke. This information helps providers understand the state of cessation therapy being prescribed to this patient population in Kansas and inform future improvements in prescribing practices. It is also important for Medicaid patients to be aware that therapy should be covered, they should try to fill their prescription at certain pharmacies, and try multiple pharmacies before paying out of pocket. Some of the specific future interventions could include patient education through pamphlets at clinics, increased physician awareness of coverage and patient interest, and modifications of the electronic medical record to facilitate conversations in the clinic about smoking cessation therapy.

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Pediatric Farm Injuries: Morbidity and Mortality

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ABSTRACT

Introduction. Agriculture is an industry where family members often live and work on the same premises. This study evaluated injury patterns and outcomes in children from farm-related accidents.

Methods. A 10-year retrospective review of farm-accident related injuries was conducted of patients 17 years and younger. Data collected included demographics, injury mechanism, accident details, injury severity and patterns, treatments required, hospitalization details, and discharge disposition.

Results. Sixty-five patients were included; 58.5% were male and the mean age was 9.7 years. Median Injury Severity Score and Glasgow Coma Scale were 5 and 15, respectively. Accident mechanisms included animal-related (43.1%), fall (21.5%), and motor vehicle (21.5%). Soft tissue injuries, concussions and upper extremity fractures were the most common injuries observed (58.5%, 29.2%, and 26.2%, respectively). Twenty-six patients (40%) required surgical intervention. Mean hospital length of stay was 3.4 ± 4.7 days. The majority of patients were discharged to home (n = 62, 95.4%) and two patients suffered permanent disability.

Conclusion. Overall, outcomes for this population were favorable, but additional measures to increase safety, such as fall prevention, animal handling, and driver safety training should be advocated.

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INTRODUCTION

Agriculture is one of the few industries where family members often live and work on the same premises. In 2012, there were approximately 2.2 million farms in the United States.[1] An estimated 955,000 youth under 20 lived on a farm and 49% performed farm work.[2] Another estimated 259,000 nonfarm resident youth were hired to work on United States farms in 2012. This was a 12.4% increase from the 230,400 hired youth in 2009.[1,2] Due to living and working in close proximity to animals, chemicals and dangerous machinery, this puts them at increased risk for serious injury, disability, and even death.

In the United States, 45 children are injured every day and another dies every three days in an agricultural-related incident.[3] The fatal work-related injury rate for youth in agriculture is 3.6 times higher than that of all other industries, and 2.9 times higher than adult workers in all other industries combined. The Midwest region is estimated to have a higher proportion of youth on farms than any other region and, as such, is found to have the highest number of pediatric farm-related injuries in the United States.[4] Kansas is mostly a rural state and ranks seventh in agricultural production in the United States.

To date, efforts to describe the risk for injury to youth living and working on farms have largely come from Canadian populations[5-9], where a national database of farm injuries is available. Findings from these studies suggest the most common mechanisms for farm injuries are dependent on several factors. Chief among these are age of the child, developmental level, and the immediate environment (work setting vs. non-work setting).[6,10-13] These factors interact with one another to create distinct injury profiles. Prevention measures based on these profiles can provide a targeted way to reduce preventable agricultural injuries; however, the research on effective interventions is still in its infancy.[14] Furthermore, the generalizability of studies based largely on Canadian agricultural practices to the Midwestern United States is uncertain. Therefore, the purpose of this study was to describe and compare farm injuries in Kansas with international data to determine consistency and provide specific trauma information on farm-related injuries and outcomes which will be useful in the development of injury prevention measures.

METHODS

A retrospective review was conducted of all pediatric patients (<18 years of age) who presented with farm-accident related injuries at an American College of Surgeons verified level 1 trauma center between January 1, 2004 and December 31, 2013. Patients were identified and data were retrieved from the trauma registry, as well as from patient medical records. Patient data included age, gender, race, location where injury occurred (ICD-9-CM code E849.1, Farm), type of injury (blunt vs. penetrating), mechanism of injury, initial Glasgow Coma Scale (GCS) score, initial Injury Severity Score (ISS), initial vital signs (blood pressure, respiration, pulse, oxygen saturation), blood product type and total in-hospital units, alcohol and drug screen results, mode of transportation (EMS ground, fixed wing airplane, helicopter ambulance), injury details, intensive care unit (ICU) admission and length of stay, ventilatory requirements (i.e., need for ventilation and duration), need for and type of operative or procedural management, complications, hospital length of stay, disabilities, discharge disposition (i.e., home, rehabilitation, or acute care hospital), and mortality.

This study was approved for implementation by the Institutional Review Board of Via Christi Hospitals Wichita, Inc. Data from patient medical records were abstracted and summarized. Continuous data are reported as the mean ± the standard deviation or the median with interquartile range, when data are skewed. Categorical data are presented as raw counts with percentages noted parenthetically. All descriptive analyses were conducted using SPSS release 19.0 (IBM Corp, Somers, New York).

RESULTS

Sixty-five patients were identified as pediatric farm traumas. The majority was male (58.5%) and suffered blunt trauma (93.8%); the average age was 9.7 years (Table 1). Twenty-nine (44.6%) were aged 0 - 9 years and 36 (55.4%) were between the ages of 10 and 17 years. The majority of these patients were brought to the hospital via private vehicle. Many of these traumas were animal-related (43.1%), which mainly involved riding an animal such as a horse. One patient tested positive for alcohol and another for drugs. In general, patients suffered minor injuries as evidenced by the median ISS of 5.

Table 1. Study patient demographics, injury severity and mechanism, and initial vitals.

Number of patients [n (%)]	65 (100.0%)
Age, years [Mean ± SD]	9.7 ± 4.8
Male sex [n (%)]	38 (58.5%)
Race (Caucasian) [n (%)]	61 (93.8%)
Mode of transportation [n (%)]	
Private vehicle	37 (56.9%)
Ground ambulance	19 (29.2%)
Helicopter	9 (13.8%)
Injury Severity Score (ISS) [Median (25th and 75th percentiles)]	5 (4, 10)
Initial Glasgow Coma Scale (GCS) Score [Median (25th and 75th percentiles)]	15 (15, 15)
Mechanism (blunt/penetrating) [n (%)]	61 (93.8%) / 4 (6.2%)
Type of accident [n %]	
Animal-related	28 (43.1%)
Fall	14 (21.5%)
Motor-vehicle accident	14 (21.5%)
Struck	4 (6.2%)
Gunshot wound	3 (4.6%)
Machine	1 (1.5%)
Cut	1 (1.5%)
Admission vitals [Mean ± SD]	
Systolic blood pressure (mmHg)	122.7 ± 19.9
Diastolic blood pressure (mmHg)	78.2 ± 17.0
Respiratory rate (breaths per minute)	20.7 ± 7.7
Heart rate (beats per minute)	105.4 ± 25.0
Oxygen saturation (%)	98.6 ± 1.6

Concussion and loss of consciousness were relatively common (29.2% and 24.6%, respectively) while traumatic brain injury was a rare event, only occurring in two patients (Table 2). Of these patients, one was found to have a subarachnoid hemorrhage, while the second suffered multiple small parenchymal hemorrhages and a subarachnoid hemorrhage. The majority of these injuries were the result of falls and animal or motor-vehicle accidents.

The majority of injuries were musculoskeletal in nature involving soft tissue injuries (n = 38) and fractures (n = 36; Table 2). Of the soft tissue injuries, most involved abrasions or lacerations that required suturing. The most common mechanism for this injury was animal-related. One of the more significant injuries involved a degloving of a left upper extremity secondary to a motor-vehicle collision. This person ultimately required a skin graft.

As for fractures, the upper extremity (n = 17) was involved more commonly and was mostly the result of animal-related incidents (Table 2). Other fractures included lower extremity (n = 7), pelvis (n = 4), spine (n = 4), and ribs (n = 4). These orthopedic injuries accounted for the majority of surgical interventions (n = 19, 73%). Some of the more serious orthopedic injuries involved spinal fractures. Two of these patients' injuries were due to falls and required surgical intervention on the cervical and thoracic spine, respectively. Unfortunately, the patient that required surgical stabilization of the thoracic spine suffered permanent disability. Another patient with a permanent disability involved an animal-related incident that resulted in a traumatic brain injury.

Intra-abdominal injuries were uncommon (Table 2). There were four splenic injuries involving motor vehicle or animal-related trauma. Only one of these patients required intervention with embolization. Liver injuries were found in two animal-related incidents and were managed conservatively. One patient with a hollow viscus injury secondary to a gunshot wound required surgical intervention with exploratory laparotomy. This person received one unit of blood.

Table 2. Farm injury characteristics of study patients (n = 65).

Injury parameter [n (%)]	
Traumatic brain injury	2 (3.1%)
Concussion	19 (29.2%)
Loss of consciousness	16 (24.6%)
Neurologic deficit	6 (9.2%)
Spine fracture	4 (6.2%)
Spinal cord injury	2 (3.1%)
Thoracic injuries [n (%)]	
Cardiac injury	1 (1.5%)
Pulmonary contusion	4 (6.2%)
Pneumothorax	7 (10.8%)
Hemothorax	3 (4.6%)
Rib fracture	4 (6.2%)
Bilateral rib fracture	0 (0.0%)
Abdominal injuries [n (%)]	
Spleen	4 (6.2%)
Liver	2 (3.1%)
Hollow viscus	1 (1.5%)
Pancreatic/biliary	0 (0.0%)
Renal	0 (0.0%)
Other genitourinary	2 (3.1%)
Pelvic fracture [n (%)]	4 (6.2%)
Upper extremity fractures or dislocations [n (%)]	17 (26.2%)
Lower extremity fractures or dislocations [n (%)]	7 (10.8%)
Soft tissue injury [n (%)]	38 (58.5%)

Just over one-third (n = 23; 35.4%) of patients were admitted to the ICU and nine (13.8%) required mechanical ventilator support (Table 3). The average hospital length of stay was 3.4 ± 4.7 days. The majority of these patients (n = 63; 96.9%) were discharged home after their hospitalization, although two suffered permanent disability from their injuries. There were no deaths.

Table 3. Characterization of hospitalization details and disposition (n = 65).

Hospital parameter	
Intensive care unit (ICU) admission [n (%)]	23 (35.4%)
ICU length of stay, in days* [Mean ± SD]	1.2 ± 2.6
Mechanical ventilation [n (%)]	9 (13.8%)
Mechanical ventilation days* [Mean ± SD]	0.4 ± 1.8
Surgery [n (%)]	26 (40.0%)
Procedures [n (%)]	20 (30.8%)
Blood transfusion [n (%)]	1 (1.5%)
Complication [n (%)]	3 (4.6%)
Permanent disability [n (%)]	2 (3.1%)
Hospital length of stay, in days* [Mean ± SD]	3.4 ± 4.7
Disposition	
Home	62 (95.4%)
Rehabilitation	2 (3.1%)
Home with home health	1 (1.5%)
Death	0 (0.0%)

*All patients, n = 65

DISCUSSION

Agricultural injuries are difficult to research as there is no central database tracking these types of injuries. Therefore, most of the data is obtained from a Childhood Agricultural Injury Survey (CAIS) that is organized through the collaboration of the National Institute for Occupational Safety and Health (NIOSH), the U.S. Department of Agriculture, and the National Agricultural Statistics Service (USDA-NASS), or international studies.[1,4,5,7,9,13] The objective for this study was to describe the injury profiles associated with pediatric farm injuries in the state of Kansas and compare those profiles to previous literature and international studies.

The most common injuries in our population were soft tissue injuries, fractures, and concussions. Concussions were common head injuries in preadolescent farm residents/workers, with younger children (< 6 years of age) suffering the most severe head injuries.[9,15] Upper extremity fractures were the most common type of fracture in our study, which confirmed the findings from a study of fractures and amputations caused by farm equipment.[16] The leading causes of nonfatal injuries were related to falls, animals, and machinery. Horses and all-terrain vehicles were major contributors to the latter two categories. This is comparable to the extant literature.[2,8,9,17]

Earlier studies found that these injuries may stratify differently depending on age and gender.[6,9] Historically, males are injured more commonly, and this was true with our study as well; however, the leading cause of preadolescent (> 10 years) injury in females was animal related whereas machinery was the leading cause in preadolescent males.[9,15,16] Injuries from falls or jumps were most common in those under the age of 10 years. Authors have explained that the differences in injury patterns amongst these groups likely is related to how age and gender differences dictate children's environmental or work hazard exposures.[9,11,13] Children under the age of 10 are less likely to be in the immediate work environment (e.g., working with animals, machinery), but can be injured while playing on structures not intended for entertainment (e.g., a hayloft).

Long-term disability was found in 3.1% of patients compared to the national data of approximately 5%.[2,3] The injuries associated with long-term disability typically included traumatic brain injury, spinal cord injury, limb amputation, or crush injury.[2,3] No patients died in this study. However, NIOSH reported that an average of over 100 youth die annually from farm injuries.[2,3] Two major sources of fatality were crush injuries to the head, abdomen, or chest from machinery and motor vehicles, including all-terrain vehicles. The most common vehicular related fatalities involved tractors, which accounted for one-third of all deaths.[3] The third most common contributor to agricultural-related deaths was drowning.[1,17]

Farm children are put in a unique position as they live, play, and work in an environment that is surrounded by animals, chemicals, and dangerous machinery. This unique environment places them at increased risk for serious injury or disability. When children are not socially, cognitively, or physically developed enough to navigate this work environment, the potential for injury can increase dramatically.[13] Even if a child is not within or near the immediate work area, the necessity for supervision and monitoring can create less than ideal safety conditions for children and/or their parents.[12] A number of research lines have focused on injury prevention strategies. While the work is promising, authors highlighted the need for more comprehensive databases that can be used for the development and evaluation of targeted interventions. For example, NIOSH developed a comprehensive childhood agricultural injury prevention initiative.[18] A key component of this initiative was the development of "infrastructure that facilitates the use of data and research results to develop and improve prevention efforts".[18] This and other efforts to improve the safety of agriculture are imperative to the safety of our youth, especially in the areas of driver safety, animal handling and fall prevention.

While our study takes a step toward meeting the larger national objective set forth by NIOSH, it is not without limitations. First, our findings were based on a limited data set from one institution, and may not illustrate the range and frequency of farm injuries fully from all of Kansas. Secondly, our small sample size limited our ability to draw any statistical inferences beyond simple description of the frequency and type of injury. Lastly, the retrospective nature of the study design limited our ability to gather pertinent information regarding factors and/or situational circumstances that may be associated with the injuries, such as whether the youth were injured while engaged in farming activities or injured while on the farm, but not engaged in farm-related work activities. This limits, to some extent, what can be inferred about the causal events of youth farm injuries; however, earlier works on injury prevention can provide a template on how to develop appropriate interventions.

Therefore, future work in this area should focus on prospective studies using data from multiple sources serving rural Kansas.

CONCLUSION

Youth that live and/or work in agricultural settings are at an increased risk for serious injury, especially falls, injury from animals, and injuries from dangerous machinery. Continued efforts to develop and evaluate targeted injury prevention strategies should be a focus of health researchers in Kansas.

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The State of Diabetes in Kansas: A Community Centered Approach to the Treatment of Diverse Populations

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BACKGROUND

Diabetes mellitus continues to have a significant negative impact on the overall health of Americans. Current estimates of the prevalence of diabetes indicate that approximately 29 million Americans have diabetes, which is equivalent to 9% of the population.[1,2] Additionally, 28% of this population is undiagnosed, and therefore untreated. When the data are broken down by state, approximately 9.5% of Kansans have diabetes with the prevalence increasing over time.[1,2] A comparison between states reveals that Kansas ranks 22nd in the total number of diagnosed cases of diabetes mellitus.[1,2]

The prevalence of diabetes is associated with socioeconomic factors including income level, education, ethnicity, and geographic location with regards to rural or urban dwelling.[1-3] In Kansas, approximately 11% of adults with an average annual household income of less than $50,000 per year have diabetes, as compared to 6% in households earning more than $50,000 per year.[3] The incidence of diabetes is higher in people without a college degree at 9.7%, compared to those with a college education at 6.4%.[1,2] Data of age-adjusted prevalence of diabetes indicate that the number of diagnosed cases are higher among Non-Hispanic African Americans (13.2%), followed by Hispanics (12.8%), Asians (9%), and Non-Hispanic Whites (7.6%).[1,2] The greatest prevalence of diabetes among ethnic groups is found in Native Americans at 15.9%.[1,2]

Estimates of pre-diabetes prevalence, defined by an HbA1c of 5.7 - 6.4%, or fasting plasma glucose of 100 - 125 mg/dL, indicate that approximately 37% of the population age 20 and older have pre-diabetes, which equates to 86 million Americans.[1] Further review of this data indicates that 51% of the population with pre-diabetes are older than age 65.[1,4] Within this population, approximately 90% are unaware of their diagnosis.[5] Age-adjusted data reveal that prevalence among ethnic groups is similar for Non-Hispanic Whites (35%), Non-Hispanic African Americans (39%), and Hispanics (38%).[1] Approximately 15 - 30% of people with pre-diabetes will develop diabetes within five years without treatment, with 70% developing diabetes at some point during their lifetime.[1,4-7]

A comparison of diabetes prevalence by demographic location in Kansas reveals similar numbers of people with diabetes in urban populations (11.8%) as compared to rural areas (12.7%).[3] Analysis of the number of people with pre-diabetes showed similar rates among urban (3.7%) and rural (3.1%) locations.[1,2] Socioeconomic factors of lower education and income were associated with increased incidence of pre-diabetes with the highest rates noted in rural Hispanics (19.3%) and urban African Americans (22.9%).[2,3]

Diabetes Impact on Health

Diabetes has a significant impact on health with high rates of associated morbidity and mortality.[5,8] Diabetes is the 7th leading cause of death in both the United States and Kansas according to death certificate data, which is likely to be an underrepresentation of the true incidence of diabetes related deaths.[3,4] This disease is known to double the risk of death from any cause, and additionally results in a 2 to 4 fold increase in the risk of death from cardiovascular disease and stroke.[1,4,8] The risk of myocardial infarction (MI) in patients with diabetes mellitus is equivalent to the risk in non-diabetic patients with a prior MI, causing it to be considered a coronary artery disease risk equivalent.[8] In 2014, more than 14% of Kansans who have diabetes were diagnosed with a stroke or coronary artery disease, with 14.2% of this population having an MI within that year.[3] This is compared with 3% of the population without diabetes having an acute myocardial infarction.

Diabetic nephropathy is the leading cause of renal failure in the United States. In 2011, approximately 50,000 people began treatment for chronic kidney disease due to diabetes.[1,8] Population estimates of the prevalence of renal failure due to diabetes indicate that at least 229,000 people in the United States are on dialysis or have a kidney transplant.[1] Statistics from Kansas in 2014 indicated that 9.7% of patients who have diabetes have chronic kidney disease.[3] Diabetes also is the leading cause of blindness and the cause of more than 10,000 new cases of blindness in the United States each year.[1,4,8] Diabetic retinopathy affects approximately 16% of Kansans who are diagnosed with diabetes.[3] Approximately 60% of non-traumatic lower extremity amputations are due to diabetes with resultant increases in morbidity and mortality due to infection.[4]

Economic Impact of Diabetes

The economic impact of diabetes is profound, with costs associated with a diagnosis of diabetes mellitus estimated at $245 billion nationally for both health care associated costs and costs associated with reduced productivity.[1,5] Estimates of cost associated with patients that have not yet been diagnosed with diabetes or pre-diabetes total an additional $25 billion.[1,5,6] When comparing the average cost of care between people with and without diabetes, the cost for total health care spending of people who have diabetes is over twice the cost for a patient without diabetes.[1,5] The treatment of diabetes in Kansas costs an estimated 2.6 billion dollars in both direct and indirect costs.[3]

Challenges in the Treatment of Diabetes

Due to the increasing prevalence of diabetes, the majority of treatment is occurring in primary care offices around the country.[1,4] Kansas is no exception, due to the limited number of endocrinologists, who are located mainly in the major cities of Kansas. A recent focus group

facilitated by the University of Kansas Medical Center surveyed primary care physicians across the state to identify barriers to the treatment of diabetes.[9] This survey found that physicians cited training and support in the diagnosis and management of diabetes as their primary need.

The United States Preventive Services Task Force has recommended screening for abnormal blood glucose levels in primary care settings for adults ages 40 - 70 who are overweight or obese, which includes approximately 66% of the American population.[4,6] Despite this recommendation, current estimates indicate that approximately 20 - 30% of the population remains undiagnosed.[1,2,5] Data regarding the detection and treatment of pre-diabetes in primary care settings is even more concerning in that the diagnosis often is missed, with only 25% of patients receiving treatment with lifestyle modification counseling.[10,11] National estimates of in-patient hospital costs for patients with diabetes in 2001 indicated that approximately 66% of admissions could have been prevented by improved outpatient care and monitoring.[6]

This data highlights the need for improved diabetes care provided by primary care physicians and the need for a partnership with community resources. Diabetes cannot be treated in isolation and requires a team approach that includes physicians, nurse practitioners, physician assistants, nurses, diabetes educators, registered dieticians, fitness facilities, weight loss organizations, local agricultural resources, community leaders, local and state government representatives, and validated online tools and resources to help patients understand the disease and develop skills to promote overall health. This article presents different treatment modalities available to patients and physicians in different geographic settings that target diverse patient populations.

Urban Community Resources

National Diabetes Prevention Program. The YMCA of the USA, via a Health Care Innovation Award from the Centers for Medicare and Medicaid Services, developed a Diabetes Prevention Program delivered in regional networks of participating YMCAs nationwide.[12] This program operates with the goal of preventing the development of diabetes through a reduction in dietary fat, education on locus of control, and increased physical activity. The program utilizes a trained lifestyle coach to facilitate small group discussions about ways to improve the overall health of participants. Participants of the program attend 25, one-hour sessions over the course of a year with an end goal of 5 - 7% reduction in body weight and increased physical activity levels of at least 150 minutes per week. Participants are taught about healthy eating and ways to limit portion size. They additionally explore barriers to weight loss and healthy living in small group discussions. This fosters not only a sense of unity among the participants, but also helps participants learn from each other on ways to overcome challenges with healthy living and to identify personal barriers.

Results obtained from participants in the YMCA Diabetes Prevention Program (DPP) indicate that involvement in the program can result in a 60% reduction in the number of people who have pre-diabetes developing overt diabetes mellitus.[12,13] Qualification for the program includes age greater than 18, overweight with a body mass index (BMI) greater than 25, and a diagnosis of pre-diabetes by a physician. The cost associated with the program is $429.00, adjustable by income, which includes a three-month YMCA family membership. Income-based pricing and scholarships are available to participants that qualify. Modeling of initial results of the YMCA DPP program indicated that, if expanded nationally, it would prevent or delay approximately 885,000 cases of type 2 diabetes mellitus in the United States and produce savings of $5.7 billion.[12,13] The success of the YMCA's program led to the development of the National Diabetes Prevention Program (https://www.cdc.gov/diabetes/prevention/index.html), through which any organization can adapt the curriculum and achieve Diabetes Prevention Program recognition through the United States Centers for Disease Control and Prevention (CDC). Such recognition will allow an organization to bill Medicare for a DPP beginning January 1, 2018 (https://innovation.cms.gov/ initiatives/medicare-diabetes-prevention-program/).

Clinics across Kansas can partner with local Diabetes Prevention Programs, either through the YMCA or other organizations (an index of CDC-recognized programs can be found at https://www.cdc.gov/diabetes/prevention/index.html). Through this partnership, patients receive the benefits of access to a fitness facility, education about healthy eating, support from a community of people with pre-diabetes, and education about the benefits of weight loss and overall health promotion. Providers can help patients obtain the community support they need to improve their overall health and additionally receive updates from the DPP program about the patient's progress in the program to provide additional support and encouragement.

The University of Kansas Center for Internal Medicine in Wichita, Kansas has partnered with the local YMCA to refer patients into the YMCA DPP. Between July 2015 and March 2016, 261 patients within the clinic were screened with a HbA1c. Of those screened, 104 patients met the criteria and were given information about the YMCA DPP. A total of 38 patients were referred to the program with 12 patients enrolled. The average initial weight of our patient population entering the program was 252 pounds with a BMI of 41. Average initial HbA1c of participants referred to the program was 6%. Patients attended on average 74% of the classes over the duration of the one-year program. Through the YMCA DPP, patients lost an average of 4% of their initial body weight. HbA1c values at the completion of the program were unable to be attained as some patients were lost to follow-up. The results obtained from our study illustrated the importance of programs like the YMCA DPP, which result in significant reductions in the development of diabetes mellitus and improved overall health in our clinic population.

Diabetes Self-Management Program. The Diabetes Self-Management Program (DSMP) is a workshop for patients with type 2 diabetes mellitus that is facilitated by two trained peer leaders, one or both of whom have diabetes themselves.

Participants attend for 2.5 hours per week for six weeks in groups of 12 - 16 in community settings such as churches, community centers, libraries, and clinics and work through a detailed manual regarding diabetes management. A randomized, controlled trial completed in 2008 showed that six months after the workshop, participants had significant improvements in patient activation and self-efficacy, along with significant improvements in depression, symptoms of hypoglycemia, communication with physicians, healthy eating, and the ability to read food labels; most of which persisted at 12 months.[14] There were no significant changes in health care utilization or HbA1c levels, though it should be noted that HbA1c values were already in the desirable range at the beginning of the study for most participants. In Wichita, the DSMP is offered through Wichita State University's Community Engagement Institute (http://communityengagementinstitute.org/).

Elimination of Food Deserts. Recent changes in the economy have led to the unfortunate loss of many businesses throughout communities. This loss has the most profound impact on health when it results in the elimination of community grocery stores, leading to reduced access to food. This can create "food deserts" where people that were initially able to walk to the grocery store located within their community have significant challenges in being able to obtain not only healthy food, but often being able to obtain food in general.[15]

One way that practitioners can aid in the elimination of food deserts is to work with local community leaders to find ways to provide healthy food to citizens. By working with the local government representatives, public transportation might be rerouted to ensure access to a grocery store. By altering bus routes, people are able to arrive at their destinations, but have the opportunity to obtain healthy food while traveling between work and home.

In Sedgwick County, the Health and Wellness Coalition of Wichita performed an assessment in 2013 revealing the presence of 44 square miles of food desert in Wichita (http://ctb.ku.edu/sites/default/files/chapter_files/wichita_food_desert_study.pdf). The assessment was followed by the "Behaviors Behind Limited Food Access" report showing that 25% of people in Sedgwick County lacked access to healthy foods, and that their access was limited by cost, quality and quantity of available food, lack of transportation, poor store quality and characteristics, poor sources of food outside grocery stores, and a lack of personal cooking skills (https://hwcwichita.org/content/upload/files/The%20Hurdles%20to%20Healthy%20Food %20Access.pdf). The Sedgwick County local food assessment, completed in 2015, revealed that if local policies encouraged growers to provide only 5% of the fruits and vegetables available to consumers in grocery stores in Sedgwick County, it could lead to a local economic impact of $54.6 million (https://hwcwichita.org/content/upload/files/Food%20 Systems%20Assessment% 20Report%20-%20December%202015.pdf). This led to the formation of a local Food Policy Committee to work with community leaders to promote local ownership of the food supply, including strategies such as neighborhood and community gardens and deregulation of the formation of local farmers markets. By working with local farmers, community leaders can identify areas in need of access to food. This cooperation allows citizens a healthy option to obtain food and additionally helps promote local farmers and locally grown produce.

Community Exercise. A frequent challenge to health in urban areas is finding a safe place to exercise within the community. Unfortunately, many people live in areas that are not safe to walk due to challenges with infrastructure or due to local neighborhood dynamics. One way to help with this challenge is to work with local community centers to allow patients to have a safe area to walk or exercise. Many fitness facilities, including the YMCA, offer income-based pricing that can provide patients access to a safe place for exercise at a reduced cost of membership. Patients also should be encouraged to utilize air-conditioned and heated sites for exercise, including walking the mall or local retail stores to get exercise in a comfortable environment.

Additional ways that practitioners can help patients attain safe walking places in their neighborhoods are to work with local government officials to construct sidewalks in areas throughout the community. Promotion of bike paths or local walking trails can provide a safe way for people in the community to exercise. Practitioners can work with local government representatives to ensure adequate lighting and placement of emergency contact stations to alert local law enforcement officials if needed. Adults aged 30 - 64 in 8,777 neighborhoods in Southern Ontario cities (London, Ottawa, Toronto, Hamilton) were roughly 20% less likely than their peers between 2001 and 2012 to be diagnosed with type 2 diabetes if they resided in a neighborhood with a walkability index in the top quintile compared to the lowest quintile of walkability.[16]

Community organizations and churches play an essential role in the promotion of health and disease prevention by advocating healthy eating and group exercise. Practitioners that are members of these organizations play a unique role in community engagement by organizing group exercise through walks/runs to benefit charitable organizations or walking groups for socialization. In addition, these community gatherings can provide an avenue to promote health and distribute information about healthy lifestyle changes. An example of an innovative strategy in Wichita is the development of a Joint Use Agreement between Botanica (www.botanica.com), the local botanical gardens, and Health ICT (www.healthict.org), a CDC-funded organization devoted to reducing the incidence of type 2 diabetes mellitus, by which employees of certain companies can gain admittance to the botanical gardens for $1 for exercise purposes.

Weight Loss Programs. Lifestyle intervention is the cornerstone of diabetes and pre-diabetes treatment through reduced caloric intake and moderate exercise to promote weight loss in overweight and obese patients.[17,18] Weight loss programs are a viable treatment modality for not only the prevention of pre-diabetes progression to diabetes mellitus, but also to improve blood sugar levels in known diabetics. Most urban areas have dedicated weight loss

centers that utilize proprietary meal replacements for weight loss. Financially, this can be a challenge for patients, but by adding up the cost of medications, herbal supplements, physician office visits, and other weight loss modalities that patients are using at home, it may be more cost effective to engage in an organized program that combines education about eating habits, food quality, exercise, and behavioral modification.

There are numerous proprietary weight loss programs available to patients. A recent meta-analysis showed that significant weight loss has been observed in patients adhering to a low carbohydrate and low-fat diet; however, it is not necessarily the composition of the diet that determines weight loss, but patient adherence to the diet that has the most profound impact on weight loss and overall health.[19] Long-term weight loss is best achieved through programs that combine healthy eating and exercise with behavioral modification therapy.[17]

Medications can help patients augment weight loss and improve overall health.[20] These medications must be used as an adjunct to healthy lifestyle interventions for highest efficacy and maintenance of weight loss. The challenge that most providers face with medication interventions is that patients often can rely on the medications without implementation of healthy lifestyles, thereby regaining the weight lost or gaining additional weight once the medications are discontinued.[21]

Community Outreach. Community engagement in health and prevention of chronic disease is a cornerstone of any medical practice. Raising community awareness can be achieved by establishing community diabetes screening programs utilizing local clinics, hospitals, medical schools, the health department, or community organizations including local chapters of the American Diabetes Association. At these locations, patients receive low cost or no cost screening of HbA1c's and obtain additional information or referrals for further interventions and treatments if diagnosed with pre-diabetes or diabetes mellitus. HbA1c testing in urban clinics and community outreach health centers allows for greater patient population screening and identification of a substantial number of patients with undiagnosed pre-diabetes and diabetes mellitus that requires treatment.[22]

These outreach clinics can be a means to disseminate health information to lower socioeconomic populations about overall health and health promotion.[14,22,23] The location of community outreach efforts needs to be centered in areas where patients have significant barriers to care and areas where transportation is limited, to best provide access for care to those that need it most.

Local health departments are a valuable resource for community education and outreach. By partnering with local health departments, physicians are able to target at risk populations, including patients with low socioeconomic status. This partnership can provide education and facilitate connections with affordable local healthcare clinics and providers. Working with the local health department allows for the implementation of peer-based, culturally relevant education regarding nutrition and exercise paired with behavioral coaching and support. This approach significantly improved diabetes control, especially in low socioeconomic populations.[24-26]

Rural Community Resources

Available Food Sources. Community-based resources are essential to chronic disease development and prevention.[13,27] One way to prevent disease is through promotion of healthy eating. Rural communities are unique in that there is ready access to locally grown fresh food. This can be obtained from local farmers or backyard gardens. In rural communities, the population density is less than in urban living, which allows for more available land to grow food. Physicians can aid in the promotion of locally grown food through education about the benefits of natural foods and working with community leaders on outreach programs promoting locally grown food. Additionally, in rural areas, people have easier access to local diary, eggs, and meat through local farmers. This availability allows for reduced transit time of food and fewer "food miles" resulting in more nutrient dense food with fewer preservatives.[28]

An additional benefit to rural living is reduced access to unhealthy fast food.[18] In most rural communities in Kansas, very few fast food restaurants exist in the town or within a reasonable driving distance. This is beneficial in that studies have shown that the number of available fast food restaurants is correlated with BMI. These data suggest that food access plays a role in obesity and determinants of overall health. Limited access to fast food promotes cooking at home with less fried food and added sugars.

Community Exercise. Obtaining adequate physical activity can be a challenge in any setting. One way that healthcare providers can aid patients in obtaining exercise is by writing an exercise prescription.[29] Patients often do not know the level of recommended exercise or how best to implement an exercise program for the promotion of overall health. Exercise prescriptions, similar to any other prescription, explicitly written on script paper result in increased patient exercise and overall health.[29] This method of healthcare delivery gives the patient specific instructions on the method and duration (i.e., 30 minutes of walking daily 5 times per week) and gives the patient a tangible objective for improving health.

Access to exercise equipment can be limited in rural areas with an absence of community-based gyms or exercise facilities. One option to increase access is to work with local school officials to allow the public access to school gyms and exercise equipment. This accessibility can be beneficial in that it allows families to exercise together and with other community members to promote overall health throughout the community. Previous studies in people with pre-diabetes have shown that resistance training at least twice a week improves fasting blood sugar levels and delays the development of diabetes.[24]

Physicians can engage community members to establish walking or biking paths to promote exercise. Community organizations, including churches and Veterans of Foreign Wars, are an outlet for community engagement and the promotion of health and disease

prevention. Members of these organizations can engage in health promotion through organizing group exercise activities for both socialization and community outreach to benefit local charitable organizations. Community-based walks or runs can play an essential role in health promotion and community support. In addition, these sites of community gatherings can provide a means to screen for diabetes and distribute information about healthy lifestyle changes.

Group Education Classes. Access to registered dieticians and diabetes educators in small communities can be limited.[29] Practitioners can help with patient education through group education classes led by physicians, physician assistants, nurse practitioners, or other health care providers. In these sessions, it is important to address healthy eating patterns and counting carbohydrate content in foods. This approach empowers patients to learn about nutrient content in food and allows for improved dietary consumption. Additionally, these sessions can help the physician understand common barriers that patients face with healthy eating and facilitate group discussions on methods to overcome barriers. This atmosphere promotes a sense of community and provides participants with tools to live a healthy lifestyle. Group education sessions also can be a means to disseminate information about disease management and prevention of long-term complications, including retinopathy, nephropathy, neuropathy, and infection treatment and prevention.

Weight Loss Programs. Weight loss options in rural areas are similar to urban areas, but tend to be smaller groups that meet less frequently or online-based alternatives.[29] As in urban populations, the key to weight loss success depends less on the individual diet, but rather the individual adhering to the diet.[19] Weight loss programs that incorporate education about healthy eating and nutrient content of food, increased exercise, and behavioral modifications result in greater weight loss and improved long-term maintenance of weight loss.[19,30]

Physicians can aid patients with weight loss by frequent monitoring of patient progress through weekly office weight checks, phone calls, or interactions through patient portals. Incorporating motivational interviewing in the initial office visits can lead to better health and weight loss maintenance, with visit frequency tapering over time. Determining a patient's stage in the process is essential to the promotion of weight loss and will help to identify barriers to implement change.

Community Outreach. Community outreach is a cornerstone to prevention and treatment of chronic disease.[13] Physicians play an essential role in patient education and implementation of strategies to promote overall health in their communities. In rural communities, providers can work with local government officials to implement community wide health programs that focus on healthy eating, exercise, and community engagement. This outcome can be achieved by organizing walking groups to promote exercise, engagement with local famers and retailers to promote locally grown food, and working with the local media to provide education about healthy lifestyles.

Physicians can engage local schools to promote health during school hours, which often will translate to healthy living at home.[27] By working to ensure healthy meals in schools, increased physical activity, and education about health promotion, physicians can create a healthier community. Additional outreach opportunities in rural communities include screening clinics and the distribution of health literature at community events, including local high school football and basketball games. This allows for the promotion of healthy living both within the community and in surrounding communities.

CONCLUSIONS

Diabetes continues to have a significant negative overall impact on the health of Americans, especially here in Kansas. Physicians have numerous ways to engage patients to achieve a healthier lifestyle. Community outreach and a team-based approach to the treatment of diabetes are essential. By utilizing the resources in our local communities in a multidisciplinary approach, physicians will be better equipped to address the overall health of our patients. Physician advocacy is a key component to promote patient health and can serve not only as a means to engage local leaders in the promotion of population health, but also bring greater awareness to areas for improvement. By working together as a team within communities, practitioners are able to address patient needs and eliminate barriers to health promotion.

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