ABSTRACT

Background
Conduct a comprehensive survey of FASD knowledge, skill, and attitudes regarding recognition, diagnosis, treatment, and prevention among family physicians in the Midwest.

Methods
A 35 question survey on FASD recognition, diagnosis, treatment, and prevention was sent to a random sample of 1,000 active members of the AAFP from Missouri and the 5 surrounding states.

Results
Twelve percent of participants returned surveys. The mean age was 44 years, 64% were male, 86.3% were Caucasian, and 43.6% were from rural areas. The survey revealed that the great majority of family physicians possess general knowledge about FAS and the effects of alcohol on children, including the importance of early diagnosis and reducing secondary disabilities. However, the survey revealed significant deficits when it came to recognition and diagnosis of FAS, with the great majority of family physicians uncertain about the facial dysmorphism features associated with FAS. In addition, the majority had not made or referred a child for the diagnosis of FAS during the past year, and if they had made the diagnosis, they had not used an evidence-based protocol to do so. Significant barriers to making the diagnosis of FAS were identified, including inadequate training and the belief that better qualified specialists were available to make the diagnosis. Regarding treatment, a significant majority of family physicians had not received any clinical training in the care of children with FAS, and those who had received training felt it was only of fair quality. Regarding prevention, only 12.8% of family physicians asked when seeing a new pediatric patient if the child was exposed to alcohol in utero. Finally, many family physicians reported that education materials on FASD were not available in their area, and many believed the presence of these educational resources would be extremely helpful if they were available.

Conclusions
While family physicians possess a general knowledge base about FAS, FASD, and alcohol use during pregnancy, significant knowledge deficits exist in the area of prevention, diagnosis, and treatment, and significant barriers make completion of these tasks difficult in practice. Inadequate clinical training in medical school, residency, and continuing education venues may be a prime reason why these deficits occurred.

Key Words: fetal alcohol syndrome, alcohol, pregnancy, teratogen, family practice

Prenatal exposure to alcohol is one of the leading preventable causes of birth defects, mental retardation, and neurodevelopmental disorders in children in this country, with fetal alcohol syndrome (FAS) being the most prominent example. Streissguth and colleagues have documented that the prevalence of FAS and other fetal alcohol spectrum disorders (FASD)
was 3% in a cohort of women giving birth in a Seattle area hospital.\textsuperscript{19} FASD is the term used to describe all alcohol related fetal effects, including alcohol related neurodevelopmental disorders, other birth defects, stillbirths, and miscarriages. The prevalence of other FASD, except FAS, is estimated to be four times that of FAS.\textsuperscript{20} Based upon these studies, approximately 1 in 33 children in the U.S. are affected by alcohol exposure in utero.

Despite the high prevalence of alcohol damage to children, the significant effects of alcohol on children’s growth and development, and the fact that all FASD cases are preventable, the prevalence of women drinking during pregnancy remains high at 12.8% in 1999, with the prevalence of binge or heavy drinking increasing over the decade of the 90’s, (3.3% for heavy drinking and 2.7% for binge drinking in 1999 versus 1% for both in 1991).\textsuperscript{21} In order to lower the prevalence of alcohol damaged children, family physicians and other healthcare professionals can play an essential role by delivering preventive messages regarding alcohol use during pregnancy to women of childbearing age.\textsuperscript{22-24} Effective preventive messages from family physicians can “prime the pump,” causing patients to think about their lifestyle and stimulate the beginning of a behavioral change process.\textsuperscript{25} These prevention messages have been shown, at least among physicians, to relate to their own knowledge, beliefs, and attitudes about the particular health problem of concern.\textsuperscript{26} Additionally, as early diagnosis is a protective factor for secondary disabilities in children with FASD,\textsuperscript{27} family physicians and other healthcare professionals can play a vital role in recognizing, diagnosing, and treating FAS and other FASD in children as early as possible.

As leading providers of health care to women of childbearing age and children, family physicians play a central role in FASD prevention, recognition, diagnosis, and treatment. Unfortunately, previous surveys of family physicians have not been comprehensive and sample sizes have been limited, but these studies do suggest that many knowledge and skill deficits, and barriers to care exist among family physicians as they try and prevent, recognize, diagnose and treat FASD.\textsuperscript{26-30} The most recent survey showed that on a ten item, peer-reviewed FAS competency questionnaire, only 40% of questions were answered correctly, with first and fourth year medical students achieving a higher score on the ten item FAS competency scale than family physicians.\textsuperscript{31} The authors of this survey concluded that rather than lack of interest or time, family physicians might not address vital FASD prevention, recognition, diagnosis, or treatment issues when caring for women of childbearing age or their children due to not feeling competent in addressing alcohol-related issues with these populations.

In 2002, Saint Louis University, the University of Missouri-Columbia, the Missouri Institute of Mental Health, and the Saint Louis Arc united to establish the Midwest Regional Fetal Alcohol Syndrome Training Center (MRFASTC). As one of its first projects, this group sought to determine if similar knowledge deficits, discomfort with certain key skills, and resource barriers existed among family physicians in our six state region (Missouri, Arkansas, Oklahoma, Nebraska, Iowa, and Kansas). As MRFASTC’s primary mission is to educate health care professionals on FASD prevention, recognition, diagnosis, and treatment in our six state area, we felt this information would yield vital data as to the educational needs of our target population. Our hypothesis was that many knowledge, attitudes, and skill deficits and resource barriers exist for family physicians in taking care of alcohol-related issues in women of childbearing age and their children.

**METHODS**

The mailing addresses of a random sample of 1,000 active members of the American Academy of Family Physicians (AAFP) were obtained for Missouri and the five surrounding states from the AAFP (Iowa, Kansas, Oklahoma, Arkansas, and Nebraska). The AAFP selected the random sample using a computer algorithm. A sample size of 1,000 was selected in order to have a good chance of obtaining a final cohort of over 100 surveys for analysis that would have 80% power of producing an 8-10 percentage point confidence intervals for most responses. The MRFASTC investigators, in conjunction with other FAS regional training centers investigators (from University of California, Los Angeles,
Midwest family physicians’ knowledge and attitudes about FAS, FASD and alcohol use during pregnancy

Morehouse-Meharry, and the University of Medicine and Dentistry of New Jersey), designed a standard survey for health care professionals based upon surveys previously conducted by the CDC on obstetricians and gynecologists.32 Out of this sample of questions, 35 questions were selected by MRFASTC investigators on FAS epidemiology and natural history, issues related to alcohol consumption among women of reproductive age, diagnosis and treatment of children with FAS, FAS-related training and education, and sociodemographic questions. Our 35-question, five page survey was piloted with practicing family physicians in the Department of Community and Family Medicine at Saint Louis University. Our protocol was approved by the SLU Institutional Review Board, #12775, 7/3/3.

One copy of the survey with a cover letter signed by the director of MRFASTC was sent to family physicians in our sample through the mail in early 2004. Physicians were provided with the rationale for the survey and asked to complete the survey and return it within two weeks. No incentive payment was provided, and no follow up surveys were sent if participants failed to return the original survey.

Once surveys were received, data was entered by a project secretary into a Microsoft Excel spreadsheet, which was then transferred into a SAS database. SAS was then utilized to calculate response means for each question. Due to the sample size, statistical analysis of subgroups was not conducted.

RESULTS

One hundred and seventeen surveys were returned for a response rate of 12%. The mean age of our family physician sample was 44 years, 64% were male, 86% were Caucasian, and 44% were from rural areas. Regarding general knowledge about FAS, the great majority of family physicians knew that prenatal alcohol exposure is a risk factor for irreversible CNS damage and understood that early diagnosis of FAS can reduce secondary disabilities (Table 1).

TABLE 1 Results of FAS General Knowledge Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Ideal Response</th>
<th>% Who Gave Ideal Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAS occurs at similar rates in all socioeconomic groups</td>
<td>Disagree</td>
<td>65.8%</td>
</tr>
<tr>
<td>FAS occurs at similar rates among all racial/ethnic groups</td>
<td>Disagree</td>
<td>68.4%</td>
</tr>
<tr>
<td>The diagnosis of FAS stigmatizes children and their families</td>
<td>Disagree</td>
<td>9.4%</td>
</tr>
<tr>
<td>Early diagnosis of FAS can reduce secondary disabilities</td>
<td>Agree</td>
<td>92.3%</td>
</tr>
<tr>
<td>The effects of alcohol on fetal development remain unclear</td>
<td>Disagree</td>
<td>62.4%</td>
</tr>
<tr>
<td>Prenatal alcohol exposure is a risk factor for irreversible CNS damage</td>
<td>Agree</td>
<td>99.1%</td>
</tr>
<tr>
<td>Children with FAS generally achieve successful independence as adults</td>
<td>Disagree</td>
<td>43.6%</td>
</tr>
<tr>
<td>A child exposed to alcohol in utero is unlikely to have sustained CNS damage if facial dysmorphology required for an FAS diagnosis is absent</td>
<td>Disagree</td>
<td>83.4%</td>
</tr>
</tbody>
</table>

*Percent agreed represents those who strongly agreed or somewhat agreed with the question, while the percent disagreed represents those who somewhat disagreed or strongly disagreed with the item.
The great majority also knew that CNS damage can occur in the absence of the typical facial features of FAS. A majority felt that the effects of alcohol on fetal development are clear and understood that FAS occurs at different rates in different socioeconomic groups and in different racial/ethnic groups; although about a third of the sample did not give the preferred response to these questions. A minority of the sample realized that children with FAS generally do not achieve independence as adults, and a very small minority of the sample felt that a diagnosis of FAS does not stigmatize children or their family, but leads to the mobilization of resources which increases improves outcomes in children with FAS. The answers to these two questions suggest that most family physicians have overly optimistic beliefs about the outcomes associated with FAS; however, at the same time, they overestimate the social impact of the diagnosis of FAS on children and their families.

Regarding clinical problems associated with FAS, the great majority of family physicians were aware that birth defects/malformations, low birth weight, long term emotional problems, and Attention Deficit Hyperactivity Disorder were associated with FAS (Table 2).

**TABLE 2 Clinical Problems Associated with FAS**

<table>
<thead>
<tr>
<th>Clinical Problem</th>
<th>Ideal Response</th>
<th>% Who Gave Ideal Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth defects /malformations</td>
<td>Yes</td>
<td>94.9%</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>Yes</td>
<td>95.7%</td>
</tr>
<tr>
<td>Withdrawal symptoms at birth</td>
<td>No</td>
<td>41.3%</td>
</tr>
<tr>
<td>Long term emotional problems</td>
<td>Yes</td>
<td>85.5%</td>
</tr>
<tr>
<td>Addiction</td>
<td>No</td>
<td>67.5%</td>
</tr>
<tr>
<td>Attention Deficit Hyperactivity Disorder</td>
<td>Yes</td>
<td>62.4%</td>
</tr>
</tbody>
</table>

However, a significant number incorrectly felt that withdrawal symptoms at birth and infant addiction were also a part of FAS. Regarding FAS facial dysmorphology, a significant minority (42% for both findings) of family physicians did not realize that a short palpebral fissure or a smooth philtrum were associated with FAS (Table 3). However, a large majority did realize that full lips were not associated with FAS. Unfortunately, only a minority of family physicians realized that a large intercanthal distance was not associated with FAS.

**TABLE 3 Facial Dysmorphology**

<table>
<thead>
<tr>
<th>Facial Feature</th>
<th>Ideal Response</th>
<th>% Who Gave Ideal Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short palpebral fissure</td>
<td>Yes</td>
<td>58.1%</td>
</tr>
<tr>
<td>Full lips</td>
<td>No</td>
<td>90.6%</td>
</tr>
<tr>
<td>Smooth philtrum</td>
<td>Yes</td>
<td>58.1%</td>
</tr>
<tr>
<td>Large intercanthal distance</td>
<td>No</td>
<td>42.7%</td>
</tr>
</tbody>
</table>

A majority of family physicians (56%) realized that the best time to make the diagnosis of FAS is early childhood, as that is when the features are most easily recognized; however a minority of family physicians (39%) thought that the diagnosis was most easily made at birth. To determine if a woman is engaging in at-risk drinking, family physicians need to know the definition of heavy and binge drinking for women when they are pregnant and when they are not.33

**TABLE 4 Definition of heavy drinking for women**

<table>
<thead>
<tr>
<th>Definition of heavy drinking</th>
<th>Non pregnant %</th>
<th>Pregnant %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 7 drinks/week</td>
<td>12%</td>
<td>82.3%</td>
</tr>
<tr>
<td>7 drinks/week</td>
<td>12%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Greater than 7 drinks/week</td>
<td>75.1%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

*Heavy drinking in women is defined as greater than seven drinks/week, regardless of pregnancy status.35*

Table 4 displays what family physicians felt was the definition of heavy drinking when a woman is not pregnant and when a woman is pregnant. The majority of family physicians were correct in defining heavy drinking in the non-pregnant state as greater than 7 drinks/week, although 18% felt the definition of heavy drinking was more than 14 drinks/week in the non-pregnant state. When a woman became pregnant, most family physicians...
reduced the number of drinks per week it takes to be defined as heavy drinking to less than 7 drinks/week, even though the formal definition of heavy drinking for a pregnant woman is still greater than 7 drinks/week. Regarding binge drinking, only a minority of family physicians were able to correctly identify binge drinking as 5 or more drinks/occasion in the non-pregnant state, with 3.5% identifying the correct definition of 5 or more drinks/occasion in the pregnant state (Table 5).

**TABLE 5** Definition of binge drinking for women who are not pregnant and who are pregnant*

<table>
<thead>
<tr>
<th>Definition</th>
<th>Not Pregnant %</th>
<th>Pregnant %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 drinks/occasion</td>
<td>57.3%</td>
<td>96.4%</td>
</tr>
<tr>
<td>5 drinks/occasion</td>
<td>27.4%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Greater than 5 drinks/occasion</td>
<td>14.6%</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

*Binge drinking in women is defined as greater than four drinks on any one occasion during the past month regardless of pregnancy status; although recently, that definition was changed to greater than three drinks on any one occasion by an NIAAA consensus conference.²⁻³⁻³

As with heavy drinking, family physicians greatly overestimated the amount of alcohol it takes to constitute a binge in the pregnant state with the great majority feeling that less than 5 drinks per occasion constituted binge drinking in the pregnant state. In fact, 45% believed binge drinking occurred if a pregnant woman drank 2 or more drinks/occasion. Some authorities do believe that in the non-pregnant or pregnant state, binge drinking is defined as drinking 4 or more drinks/occasion in less that 2 hours.²⁴ According to that more stringent definition of binge drinking, 33% of family physicians correctly identified 4 or more drinks/occasion as binge drinking in the non-pregnant state, whereas 6% correctly identified it in the pregnant state. In the non-pregnant state, 75% of family physicians felt binge drinking was higher than 3 or more, whereas in the pregnant state, 73% of family physicians felt that binge drinking was 2 or less drinks per occasion. Fifty-eight percent (58%) of family physicians felt that the proportion of women who consume any alcohol during pregnancy has decreased over the past decade, whereas, in reality, it has remained unchanged (24% of family physicians were able to correctly identify this trend). Additionally, 48% of family physicians felt the proportion of women who are heavy drinkers during pregnancy has decreased over the past decade, whereas 44% felt that the proportion of women who engage in binge drinking has decreased during the past decade.

Unfortunately, the proportion of women who are heavy drinkers or binge drinkers during pregnancy has actually increased over the past decade, this fact was correctly identified by 15% of family physicians for heavy drinking and 21% of family physicians for binge drinking. Thus, most family physicians are unaware of the consumption patterns of pregnant women and how they have changed over the past decade.

Regarding diagnosis and treatment of children with FAS, only 12% of family physicians had made the diagnosis of FAS in the past year, and only 14% had referred a patient for confirmation of the diagnosis during the past year. Only 4% of family physicians utilized an evidence-based diagnostic schema for FAS in their practice, with the American Academy of Pediatrics guidelines being selected by all who answered this question in the affirmative. The top two reasons for not making the diagnosis of FAS in their practice identified by family physicians were more specific training was needed to make the diagnosis (62%) and better qualified specialists were available to confirm the diagnosis (71%).

Regarding where family physicians received their training in the clinical features of FAS, 78% identified that they did receive some clinical training regarding the clinical features of FAS. Fifty-six percent of family physicians received some training on the clinical features of FAS in medical school, 43% received some training in residency, and 26% received some training in continuing education. Unfortunately, the majority of family physicians (60%) only rate that training as fair in quality, with 17% rating it poor.

Only 36% of family physicians had received training on the care of children with FAS. Most family physicians received training on the care of

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children with FAS in residency, 48%, while almost equal numbers receiving some training on the care of children with FAS in medical school (33%) and continuing education (35%). Once again, most family physicians rate this training as only fair in quality (65%), with 17% rating it poor. In terms of other aspects of clinical training, only 21% of family physicians received training in family support for children with FAS, only 21% of family physicians received training in an interdisciplinary team evaluation of children with FAS, and only 19% received training in community resources for children with FAS and their families. Most of this advanced clinical training was received during continuing medical education, and once again, most family physicians only rated this training as fair.

**TABLE 6** Availability of FAS Training

<table>
<thead>
<tr>
<th>Training Activity</th>
<th>% Who Rated that Training as Unavailable</th>
<th>% Who Rated that Training as Helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional continuing medical education conference on FAS</td>
<td>57.3%</td>
<td>92%</td>
</tr>
<tr>
<td>Internet based learning materials</td>
<td>23.9%</td>
<td>93%</td>
</tr>
<tr>
<td>On-site training for yourself and others who work with you</td>
<td>65.8%</td>
<td>76%</td>
</tr>
<tr>
<td>CD-ROM based self-study materials</td>
<td>46.2%</td>
<td>87%</td>
</tr>
<tr>
<td>Video-based self-study materials</td>
<td>50.4%</td>
<td>83%</td>
</tr>
<tr>
<td>Audio cassette based self-study materials</td>
<td>47%</td>
<td>73%</td>
</tr>
<tr>
<td>Informational pamphlets for children with FAS and their family</td>
<td>47%</td>
<td>96%</td>
</tr>
<tr>
<td>Compendium of community-based resources for children with FAS</td>
<td>60.7%</td>
<td>90%</td>
</tr>
<tr>
<td>Multidisciplinary FAS diagnostic team</td>
<td>59%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Next, we asked family physicians to tell us whether certain types of FAS related training and education materials were available in the community, and whether they would find those types of educational materials helpful or not (Table 6). The most available training activities were internet-based learning materials and CD-ROM based self-study materials. Regional continuing medical education conferences and FAS on-site training for physicians and those who work with them, a compendium of community-based resources for children with FAS and multidisciplinary FAS diagnostic teams were largely unavailable resources for most family physicians.

The most helpful educational resources were identified as regional continuing medical education conferences on FAS, internet-based learning materials, informational pamphlets for children with FAS and their families, a compendium of community-based resources for children with FAS, and multidisciplinary FAS diagnostic teams being rated as helpful by greater than 90% of family physicians.
DISCUSSION

This regional survey of family physicians in the Midwest documented that most family physicians possess general knowledge about FAS and the effects of alcohol on children, including the importance of early diagnosis in reducing secondary disabilities in children with FAS. Most family physicians knew the major clinical problems associated with FAS, including long-term behavioral problems; although, they also incorrectly attributed withdrawal symptoms and addictions to FAS. However, when it came to recognition and diagnosis, the great majority of family physicians were not clear on the facial dysmorphology features associated with FAS, had not made or referred a child for the diagnosis of FAS during the past year, and if they made the diagnosis, did not use an evidence-based protocol to do so. The majority of family physicians identified significant barriers to making the diagnosis of FAS in their practice, including training and the fact that better qualified specialists were available to make the diagnosis.

A significant minority of family physicians had not received any training in the clinical features of FAS and a significant majority had not received any clinical training in the care of children with FAS, with those who receive that training feeling it was only of fair quality. Lastly, many family physicians felt that necessary educational materials were not available in their areas, with many claiming such educational resources would be extremely helpful if they became available.

In terms of prevention, only 12.8% of family physicians, when seeing a new pediatric patient, ask the parent if her or her child was exposed to alcohol in utero. Additionally, when asked about the definition of heavy and binge drinking in the pregnant and non-pregnant state, there was significant variability in what family physicians felt was heavy or binge drinking in the pregnant or non-pregnant state, suggesting that most family physicians do not know the definition of at-risk drinking either in the pregnant or the non-pregnant state. The absence of clear understanding of the definition of at-risk drinking for women limits the ability of family physicians to identify and counsel those women who engage in at-risk drinking. Another significant barrier to diagnosis identified in this study was the fact that only 36% of family physicians have received training in the care of children with FAS. Although speculative, it may be that family physicians who do not know how to properly care for children with FAS are uncomfortable making the diagnosis, believing that making the diagnosis would lead to a situation in which they would not know how to prescribe appropriate treatment. The fact that the majority of family physicians feel that the diagnosis stigmatizes children and their families also may be a significant barrier to family physicians recognizing and diagnosing children with FAS and FASD.

Lack of training in FAS prevention, recognition, diagnosis, and treatment also emerged as a problem among family physicians in this survey. Only 56% of our respondents received medical school training on the clinical features of FAS, and only 33% of these family physicians received training in medical school on the care of children with FAS. Residency and continuing medical education also generally failed to provide clinical training and care of children with FAS. In addition, family physicians rated their training in FAS as only fair, with a minority rating it as poor, regardless of venue. These findings suggest a significant improvement in medical school, residency, and continuing education training is necessary to improve family physicians’ performance regarding FAS prevention, recognition, diagnosis, and treatment.

Equally troubling was the fact that many family physicians felt that educational resources were unavailable in their local areas if they wanted to receive more training on FASD. Many of these educational resources were rated as helpful if they were present, and thus probably would be utilized by family physicians in order to learn more about this important problem.

Although troubling, these findings should be recognized as preliminary. The low response rate may mean that there may be a significant selection bias that is influencing our results. Additionally, although our survey results were very similar to the mean age and gender distribution of family physicians nationally (mean age: 45 years, 68% male), it is really unknown whether the results of this survey can be generalized to other regions of the country. The percentage of Caucasian family physicians and family physicians
practicing in rural areas was higher than the average for actual AAFP members (59% Caucasian, 25% rural).34 Because of the troubling nature of these findings; however, we do feel that these survey results lend support to the idea that a national survey of family physicians should be conducted on their knowledge, attitudes, skills, and training regarding FASD.

Our survey results of family physicians are similar to surveys of other physicians and health professionals groups that reveal significant knowledge, skill, and attitude deficits about FASD and alcohol exposure during pregnancy, as well as many barriers that preclude health professionals from providing appropriate preventive, diagnostic, and treatment approaches to women of childbearing age.28,32

A recent survey conducted by investigators at the Centers for Disease Control of over 1,000 obstetricians and gynecologists in a national random sample is illustrative.32 Despite the fact that a “safe threshold” for alcohol consumption during pregnancy has never been demonstrated, 50% of these obstetricians and gynecologists believed that drinking one or fewer drinks per week is a “safe threshold” during pregnancy, while between 16% and 28% remain unsure as to whether a “safe threshold” exists.

Although greater than 90% asked their patients about alcohol use, many reported significant barriers affecting alcohol use assessment in their practice, including time limitation (70%), patient sensitivity (65%), need for additional training to enhance ascertainment skills (65%), lack of referral resources (50%), confidentiality issues (32%), and lack of financial reimbursement (26%).

Regarding resources needed to improve alcohol use ascertainment in clinical practice, 83% identified information on thresholds for adverse reproductive outcomes as important, 63% identified referral sources for patients with alcohol problems as important, 44% identified additional training in consultation and ascertainment as important, and 44% identified reimbursement by insurance carriers for screening and assessment as important. Regarding advice and education about the consequences of drinking during pregnancy these providers give to their patients, most reported giving such advice, though only 50% provided it for all patients. Other studies on regional samples of physicians and other health care professionals showed varied responses to questions regarding whether a safe drinking threshold exists during pregnancy, whether FAS can be diagnosed at birth, and what are the diagnostic criteria for FAS.28-32,36-39 Although most physicians ask about alcohol use when caring for a woman of childbearing age, a recent focus group of providers showed that most don’t follow up with a more in-depth assessment or treatment recommendations.28 Thus, our survey results are consistent with previously published surveys of other health care professionals.

**CONCLUSION**

In conclusion, like other health care professionals, family physicians, although they possess a general knowledge base about FASD and alcohol use during pregnancy, have knowledge deficiencies in the area of FASD prevention, diagnosis, and treatment, and have identified barriers in this area that affect their practice. Lack of clinical training in medical school, residency, and continuing education venues may be a prime reason why these deficits occur. As a first step to improve the performance of family physicians in FASD prevention, recognition, diagnosis, and treatment, medical schools, family medicine residency programs, and presenters of continuing medical education training should take steps to develop educational resources in FASD prevention, recognition, diagnosis, and treatment in order to increase the ability of family physicians to prevent alcohol exposed pregnancies and diagnose and treat children with FASD.

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Corresponding Author: mengelmb@slu.edu
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