Assessing Physician Response Rate Using a Mixed-Mode Survey

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Abstract

Background. It is important to minimize time and cost of physician surveys while still achieving a reasonable response rate. Mixed-mode survey administration appears to improve response rates and decrease bias. A literature review revealed physician response rates to mixed-mode surveys averaged about 68%. However, no identified studies used the combination of e-mail, fax, and telephone. The purpose of this study was to evaluate physician response rates based on surveys first administered by e-mail, then fax, then telephone.
Methods. Surveys initially were administered by e-mail to 149 physicians utilizing SurveyMonkey©. Two follow-up reminder e-mails were sent to non-respondents at two-week intervals. Surveys then were faxed to physicians who had not responded. A follow-up fax was sent to non-respondents one week later. Finally, phone interviews were attempted with physicians who had not responded by e-mail or fax; each physician was called at least twice.
Results. Of the 149 eligible physicians, 102 completed the survey for a response rate of 68.5%. Of those who responded, 49 (48%) responded by e-mail, 25 (24.5%) by fax, and 28 (27.5%) by phone. Mode of response did not differ by gender, specialization, or years in practice. In addition, mode of response was not related to the primary study question, physician willingness to use text messaging for immunization reminders.
Conclusions. This mix of survey methodologies appeared to be a feasible combination for achieving physician responses and may be more cost effective than other mixed methods.
KJM 2010; 3(5):1-6.

Introduction

Due to demanding schedules, physicians remain a difficult population from whom to obtain reliable and valid findings. Previous attempts to survey this population using only e-mailed surveys[1] has resulted in low response rates. Using a mixed-mode method for conducting physician surveys may yield higher response rates and reduce the risk of eliminating members of the population who do not use certain technologies regularly.[2]

To identify the most effective combination of methods for physician surveys, a literature review was conducted. PubMed, PsychInfo, and Google Scholar were searched for articles with "survey response rate(s)" in the title and were limited to English articles published in the last 10 years. "Physician" was not included to avoid missing articles regarding specialties, such as "family medicine". The search resulted in 149 articles, 103 unduplicated. Titles and abstracts were evaluated by two independent reviewers and articles describing non-physicians were removed (n=70). Full text was reviewed on the remaining 33 articles and 26 were removed for the following reasons: (1) non-physician respondents, (2) review article, and (3) single method of delivery. Review of the references of the seven remaining articles[3-9] revealed four additional ones.[10-13] These 11 articles reported response rates

from 32% to 100% (see Table 1). Mixed methods, follow-ups, and incentives may have impacted response rates.

The combination of e-mail, fax, and telephone survey methods has not been reported, based on our systematic review. Therefore, the purpose of this study was to evaluate physician response rates based on this multi-method approach.

Methods

As part of a feasibility study to determine the openness of physicians to using text messages for immunization reminders, a 20-question, IRB-approved survey was conducted with family physicians and pediatricians. Contact information was obtained from the local medical society. Surveys initially were administered by e-mail to 149 physicians utilizing SurveyMonkey©. Two follow-up e-mails were sent to non-respondents at two-week intervals. Surveys then were faxed to non-respondents, with a follow-up fax one week later. Finally, phone interviews were attempted with physicians who had not responded by e-mail or fax; each was called twice (Figure 1).

Results

Of the 149 eligible physicians, 102 completed the survey for a response rate of 68.5%. Of those who responded, 49 (48%) responded by e-mail, 25 (24.5%) by fax, and 28 (27.5%) by phone interview. The majority were male (60/94; 64%), White, not Hispanic (78/96; 81%), and age ranged from 27-73 (M = 48; SD= 9). The majority (60/94; 64%) reported having been in practice 10-29 years, followed by 0-9 years (15/94; 16%) and 30-50 years (18/94; 19%). Seventy-four percent (70/95) practiced family medicine, 24% practiced (23/95) pediatrics, and 2% (2/95) selected "other". Sixty-seven respondents (66%) indicated current use of a fax machine in their practice, while 94% (96) indicated use of a computer with internet access.

Mode of response did not differ by gender ($\chi^2(2)=1.384$, $p=0.501$), specialization ($\chi^2(2)=1.089$, $p=0.580$), or years in practice ($F(2,91)=1.756$, $p=0.178$). In addition, mode of response was not related to the primary study question, willingness to use text messaging for immunization reminders ($\chi^2(4)=4.832$, $p=0.305$).

Discussion

Mailed surveys have long been a useful research method with average physician response rates reported in medical journals around 54%.[14] However, mailed surveys can be time consuming and costly, with printing, envelopes, and postage estimated as high as $11 per response.[15] Telephone surveys have shown similar rates and cost per response,[10] but are more time consuming and require an experienced interviewer.[16] Current technology allows researchers to utilize a variety of newer methods, such as fax and e-mail, that are lower in cost and time requirements.

Lensing et al.[17] gave physicians the option of receiving a survey by fax, telephone, or mail. Nearly twice as many physicians requested to be surveyed by fax than other modes, and of those, 87% responded (with fewer follow-ups). Faxing is more cost-effective than mail since no postage is required and surveys can be sent and returned quickly. The costs of designing and sending a fax survey were estimated as low as $0.52 per response.[18] However, there may be difficulty obtaining fax numbers, loss of anonymity of responders, and possible problems in contact, such as busy signals or inoperable machines.

Table 1. Physician response rates to surveys using a mixed-mode approach.

Article	N Surveyed	Group	Response Rate/Method	Overall Rate
Armstrong 2000[3]	72	All	73.6% mail 6.9% phone follow-up 19.4% face-to-face follow-up	100%
Beebe 2007[10]	245	Web/mail	62.9% web survey with mail survey follow-up	66.7%
	244	Mail/web	70.5% mail survey with web follow-up	
Fielding 2005[4]	98	All	Unknown initial distribution, fax return requested; mail follow-up with return envelope	96%
Grava-Gubins 2008[5]	35,270	E-mail group	29.9% e-mail	31.6%
	25,541	Mail group	34.1% mail	
Keating 2008[6]	286	$20 incentive	52.1% mail with internet option, phone follow-up with offer of mail or fax replacement	60%
	292	$50 incentive	67.8% mail with internet option, phone follow-up with offer of mail or fax replacement	
Leece 2004[11]	221	Mail	58% mail with mail follow-up	51%
	221	E-mail	45% e-mail with e-mail follow-up and final mail follow-up	
McLaren 2000[7]	305	Pre-survey call	61.6% phone teaser, mail survey	61.5%
	316	Pre-survey postcard	61.4% mail teaser, mail survey	
McMahon 2003[12]	150	Mail	55% mail survey with mail follow-up, then fax or e-mail follow-up	53%
	150	Fax	57% fax survey with fax follow-up, then mail or e-mail follow-up	
	150	E-mail	47% e-mail survey with e-mail follow-up, then mail or fax follow-up	
Puleo 2002[8]	761	All	64% mail 10% with phone or e-mail reminder 17% phone follow-up	91%
Raziano 2001[13]	57	Mail	77% mail survey with mail follow-ups and final e-mail follow-up	65.8%
	57	E-mail	58% email survey with e-mail follow-ups and final mail follow-up	
Recklitis 2009[9]	136	$20 incentive	81.6% mail with internet option, both e-mail and mail follow-up	73.7%
	135	Flash drive incentive	63.0% mail with internet option, both e-mail and mail follow-up	
	135	$20 and flash drive incentive	76.3% mail with internet option, both e-mail and mail follow-up	

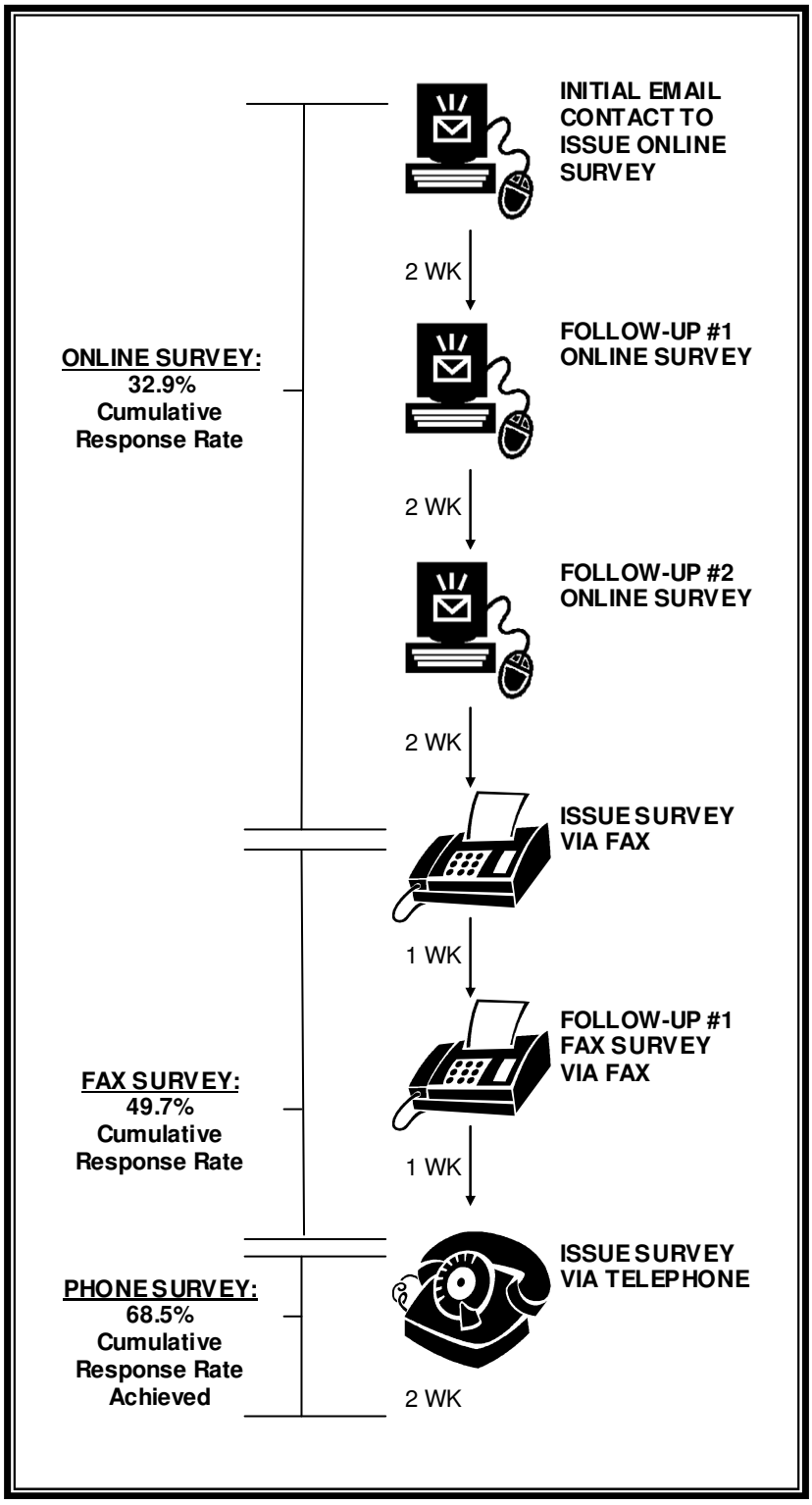

Figure 1. Mixed mode survey response rates and time between follow-ups

Email surveys can be distributed quickly and inexpensively. Kaplowitz[15] suggested costs as little as $1.32 per response, including computer programming and hosting costs for a web-based survey. Hundreds of surveys can be sent simultaneously by e-mail, while it is often necessary to fax surveys one at a time. Schaefer and Dillman[19] reported returns came in more quickly by e-mail than mail and answers to open-ended questions were more complete. E-mail has similar limitations to faxing, however, physicians also may neglect to access their e-mail on a regular basis, slowing response time.

Assessing the combination of e-mail, fax, and telephone survey methods, after 10 weeks of data collection, our response rate fell within the average range of multi-method surveys of physicians. Our response rate potentially could have improved if more time were allocated to telephone follow-up. However, our intention was to maximize physician responses in a timely and cost-effective manner, and follow-up calls were very time-intensive. We, therefore, opted to discontinue after two attempts per person. Unfortunately, the phone-based studies in Table 1 did not indicate the number of attempts required before physician contact was achieved.

Response rates to phone interviews and fax surveys may have been impacted by clinic staff. Often administrative staff or nurses triage phone calls or fax messages and weed out any that are non-clinical or commercial. Therefore, it is possible some physicians never received the fax or phone message. Other study limitations included: a) the survey was administered in one geographic region; b) no comparison group was used; c) mail and face-to-face interview were not included; d) no incentive was provided, and e) the effects of the questionnaire content, study topic, and question structure were not assessed.

In conclusion, mixed-method survey including e-mail, fax, and telephone follow-up achieved a reasonable response rate from physicians. Future studies should use randomized groups to assess the cost- and time-effectiveness of different mixed-mode survey techniques.

References

1 Mason BR, Ahlers-Schmidt CR, Stuart-Hilgenfeld M. Adolescent patients: Who is providing their care? Clin Pediatr (Phila) 2010; 49:805-808.

2 Dillman DA, Smyth JD, Christian LM. Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method. 3rd ed. Hoboken NJ: John Wiley & Sons, Inc., 2009.

3 Armstrong D, Ashworth M. When questionnaire response rates do matter: A survey of general practitioners and their views of NHS changes. Br J Gen Pract 2000; 50:479-480.

4 Fielding J, Clothier H, Stocks N, Kelly H. What factors facilitate a GP survey high response rate? Aust Fam Physician 2005; 34:895-896.

5 Grava-Gubins I, Scott S. Effects of various methodologic strategies: Survey response rates among Canadian physicians and physicians-in-training. Can Fam Physician 2008; 54:1424-1430.

6 Keating NL, Zaslavsky AM, Goldstein J, West DW, Ayanian JZ. Randomized trial of $20 versus $50 incentives to increase physician survey response rates. Med Care 2008; 46:878-881.

7 McLaren B, Shelley J. Response rates of Victorian general practitioners to a mailed survey on miscarriage: Randomised trial of a prize and two forms of introduction to

the research. Aust N Z J Public Health 2000; 24:360-364.
[8] Puleo E, Zapka J, White MJ, Mouchawar J, Somkin C, Taplin S. Caffeine, cajoling, and other strategies to maximize clinician survey response rates. Eval Health Prof 2002; 25:169-184.
[9] Recklitis CJ, Campbell EG, Kutner JS, Bober SL. Money talks: Non-monetary incentive and internet administration fail to increase response rates to a physician survey. J Clin Epidemiol 2009; 62:224-226.
[10] Beebe TJ, Locke GR 3rd, Barnes SA, Davern ME, Anderson KJ. Mixing web and mail methods in a survey of physicians. Health Serv Res 2007; 42(3 Pt 1):1219-1234.
[11] Leece P, Bhandari M, Sprague S, et al. Internet versus mailed questionnaires: A controlled comparison (2). J Med Internet Res 2004; 6:e39.
[12] McMahon SR, Iwamoto M, Massoudi MS, et al. Comparison of e-mail, fax, and postal surveys of pediatricians. Pediatrics 2003; 111(4 Pt 1):e299-303.
[13] Raziano DB, Jayadevappa R, Valenzula D, Weiner M, Lavizzo-Mourey R. E-mail versus conventional postal mail survey of geriatric chiefs. Gerontologist 2001; 41:799-804.
[14] Asch DA, Jedrziewski MK, Christakis NA. Response rates to mail surveys published in medical journals. J Clin Epidemiol 1997; 50:1129-1136.
[15] Kaplowitz MD, Hadlock TD, Levine R. A comparison of web and mail survey response rates. Public Opin Q 2004; 68:94-101.
[16] Kellerman SE, Herold J. Physician response to surveys. A review of the literature. Am J Prev Med 2001; 20:61-67.
[17] Lensing SY, Gillaspy SR, Simpson PM, Jones SM, James JM. Encouraging physicians to respond to surveys through the use of fax technology. Eval Health Prof 2000; 23:349-360.
[18] Moreo PJ, Warde B, Cobanoglu C. A comparison of mail, fax, and web-based survey methods. International Journal of Market Research 2001; 43:405-410.
[19] Schaefer DR, Dillman DA. Development of a standard e-mail methodology: Results of an experiment. *Public Opin Q* 1998; 62:378-397.

Keywords: health care surveys, physicians, electronic mail, telefacsimile, Kansas

Visual Recognition of Child Body Mass Index by Medical Students, Resident Physicians, and Community Physicians

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Abstract

Background: Many studies have assessed the ability of mothers to identify their child's Body Mass Index (BMI) category and the vast majority of mothers are unable to do so accurately. This suggested a need for physicians to inform parents about their child's weight status. However, many physicians do not chart BMI-for-age, even though it is recommended. Instead they rely on their visual perception of the patient's weight status. This study determined the number of medical students, resident physicians, and community physicians who correctly categorize preschool children into their appropriate weight class by visual cues alone.

Methods: Fourth-year medical students, family medicine and pediatric resident physicians, and family medicine and pediatric community physicians completed a brief on-line survey. Pictures of three preschool children were shown and respondents described each child's BMI-for-age category.

Results: A 43% (134/312) response rate was achieved. Only 15% of respondents correctly identified a 3-year-old boy, whose BMI was >95th percentile for his age, as obese. Nearly 86% correctly identified a 4-year-old girl with normal BMI-for-age, but only 21% correctly identified another girl who was overweight at the 90-95th percentile BMI-for-age. No significant difference was found in total accuracy between medical students, resident physicians, or community physicians ($F(2,123)=0.743$, $p=0.478$) or between family medicine physicians and pediatricians ($F(1,107)=2.269$, $p=0.135$) when predicting the BMI-for-age categories.

Conclusions: Medical professionals and trainees have difficulty visually assessing a child's BMI-for-age weight status. This underscores the importance of calculating and plotting BMI at healthy check-ups.

KJM 2010; 3(5):7-14.

Introduction

The importance of early identification of weight problems is clear based on the 2003 American Academy of Pediatrics (AAP) Policy Statement on the Prevention of Pediatric Overweight and Obesity, which was also reaffirmed in 2007.[1] The report stated Body Mass Index (BMI) should be calculated and plotted, and urged pediatricians to educate and empower families to raise healthy children. However, studies have shown that physicians do not regularly assess BMI[2-5], especially in young children.[5] This is disturbing as physicians tend to underestimate children's weight categories when using only visual cues.[2,6]

Early identification and treatment are keys to improving health and decreasing risk of long-term health issues. Many providers are more likely to identify obesity in older children (with higher BMI percentiles), therefore missing opportunities for early interventions.[7] In a study of pediatric subspecialists, children less than five years of age were less likely to receive a diagnosis

of overweight.[8] Yet, obesity interventions with children aged 3 to 5 years were more likely to be successful.[9] Therefore, it can be concluded that to treat this medical condition, it is necessary to recognize and identify the problem early.

Parents who were aware that their child's weight was a health problem were more likely to make positive changes than those who did not recognize the problem.[10] Also, parents were more likely to identify weight issues in their child if their doctor had addressed the child's weight.[11] In addition, physician identification of obesity correlated with increased time spent counseling patients.[2] These findings suggested physicians and healthcare workers may have an "ethical obligation" to identifying children who are overweight and sensitively educate parents when treating their overweight child.[10]

Correctly identifying and approaching obesity early allows children to be medically managed better. Children clearly identified as overweight in their medical records were more likely to have had laboratory testing than overweight children not identified.[7] In addition, children identified as overweight were more likely to have appropriate medical evaluations for comorbid conditions associated with obesity and earlier interventions for those conditions.[7,8]

Because parents have difficulty accurately categorizing children's weight status[6,12], it is imperative that physicians can identify obese children to counsel parents regarding their child's condition.[10] The problem of pediatric obesity may be common, but it should not be considered "normal".

Physicians should maintain a healthy mental image of appropriate weight and generally be able to identify overweight or obese children by visual cues. This may be especially challenging for resident physicians and medical students, as they represent a group of people who have grown up surrounded by increasing rates of overweight and obesity, therefore, may be desensitized. One study concluded that "children and adolescents who live in environments in which people they see on a daily basis, such as parents and schoolmates, are overweight/obese may develop inaccurate perceptions of what constitutes appropriate weight status".[13]

A review of the literature identified no studies that assessed the ability of students or resident physicians to identify weight status accurately. Therefore, this study aimed to evaluate whether community physicians, resident physicians, and medical students are able to categorize preschool children correctly into their appropriate weight class by visual cues alone, and whether there appears to be a difference in accuracy based on training level.

Methods

All fourth-year medical students, family medicine and pediatric resident physicians, and family medicine and pediatric physicians in Sedgwick County, Kansas (a single geographic area), were included in the survey. Institutional Review Board approval was obtained from both the university and hospital.

SurveyMonkey© was used to send an electronic survey to each potential respondent. A reminder e-mail with the link was sent every two weeks to non-respondents, with a maximum of two reminders after the initial e-mail. Consent was implied by the respondent's willingness to answer the survey.

The survey began by inquiring about the respondent's confidence in his/her ability to identify a child's BMI-for-age-category accurately and beliefs regarding the importance of BMI-for-age status on children's health. The survey proceeded to ask the respondent to rate their perception of

the following groups of people on their level of accuracy for visually assessing a child's BMI-for-age: parents, family medicine physicians, pediatricians, nurses, and elementary teachers. Respondents then were asked if they thought different races/ ethnicities perceive children's weights differently, and if so, which race is the least accurate in describing a child's weight.

Pictures of three preschool children were shown. The pictures were the same as ones used in the US Center for Disease Control and Prevention internet-based training on using the BMI-for-Age Growth Charts.[14] The respondent was asked to describe each child's BMI-for-age category using only visual cues (see Figure 1). The weight category choices were underweight (< 5^{th} percentile), normal weight (5^{th} to < 85^{th} percentile), overweight (85^{th} to < 95^{th} percentile), and obese (≥ 95^{th} percentile). The survey concluded by obtaining basic demographic information on the respondents, including age, sex, race, medical training and specialty (or intended specialty if the respondent was a medical student.)

Data analysis was completed using the Statistical Package for the Social Sciences (SPSS) version 15.0. Frequencies were computed for categorical data while means and standard deviations were computed for continuous data. Because age was not normally distributed, the median also was reported. For additional analysis, ANOVA was computed to assess total accuracy (sum of correct responses) by level of profession (student, resident physician, or physician) and chi square was used to compare accuracy regarding individual pictures with respondent's gender and confidence level. Due to the low number of respondents for the two extreme categories, the respondents who felt "very confident" were collapsed into "confident" and those who were "somewhat confident" were collapsed into "not confident" for the chi-square analyses to allow Fisher's Exact corrections.

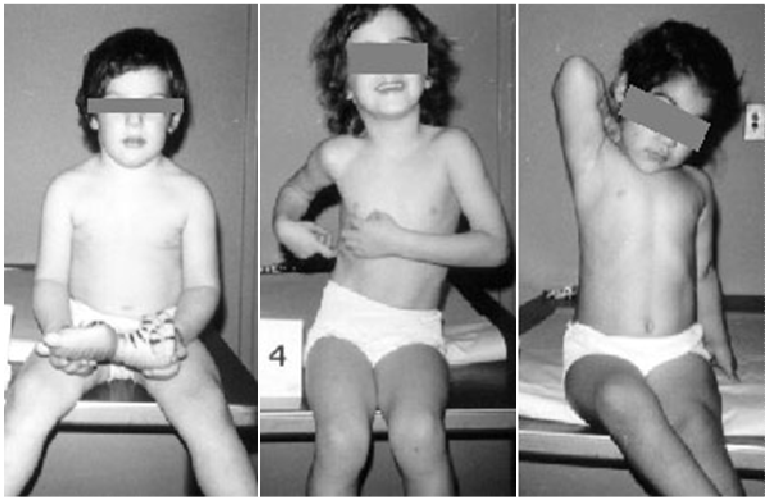

Figure 1. Body mass index Growth Grid Training Module pictures from left to right: an obese male child, a normal-weight female child, and an overweight female child. (Pictures used with permission from the UC Berkeley Longitudinal Study, 1973)[14]

Results

Of the 312 surveys, 134 were completed, resulting in a response rate of 42.9% (see Table 1). Over 81% (109/134) of respondents indicated they were not confident in their abilities to predict a BMI-for-age category for a child by visual cues accurately, while the remaining 19% (25/134) were confident. Nearly all (95.5%; 127/133) respondents indicated that BMI-for-age status is either important or very important for children's overall health.

Over half of the respondents (51.6%; 67/130) reported that pediatricians visually were able to assess a child's BMI-for-age status accurately, while about one-third of respondents (36.1%; 47/130) indicated that family medicine physicians were able to do so (see Figure 2). Respondents were varied on their confidence in a nurse's ability to assess a child's BMI-for-age status accurately, while they were even less confident in elementary school teachers' abilities. Only 3% (4/134) of respondents reported that parents visually were able to assess their child's weight accurately. Further, 97% (130/134) of respondents indicated that different ethnicities perceive children's weight differently, with Hispanics as the least accurate in describing a child's weight, followed by African Americans.

Table 1. Percent (number) of respondent's demographic characteristics and confidence ratings.

	Total (n=134)	**MS4** (n=20)	**Resident Physician** (n=54)	**Community Physician** (n=52)
Sex				
Male	51.5% (69)	25.0% (5)	51.9% (28)	50.0% (26)
Female	44.8% (60)	75.0% (15)	48.1% (26)	50.0% (26)
Race				
Caucasian	88.7% (110)	90.0% (18)	86.0% (43)	90.2% (46)
African American	2.4% (3)	5.0% (1)	2.0% (1)	2.0% (1)
Hispanic	4.0% (5)	0.0% (0)	4.0% (2)	5.9% (3)
Asian American	4.8% (6)	5.0% (1)	8.0% (4)	2.0% (1)
Specialty/Intended Specialty				
Family Practice	53.7% (72)	25.0% (5)	66.7% (36)	59.6% (31)
Pediatrician	30.6% (41)	10.0% (2)	33.3% (18)	40.4% (21)
Other	9.7% (13)	65.0% (13)	0.0% (0)	0.0% (0)
Self-Confidence in Predicting BMI				
Very Confident	1.5% (2)	0.0% (0)	0.0% (0)	1.9% (1)
Confident	17.2% (23)	15.0% (3)	13.0% (7)	23.1% (12)
Somewhat Confident	71.6% (96)	70.0% (14)	79.6% (43)	65.4% (34)
Not Confident At All	9.7% (13)	15.0% (3)	7.4% (4)	9.6% (5)

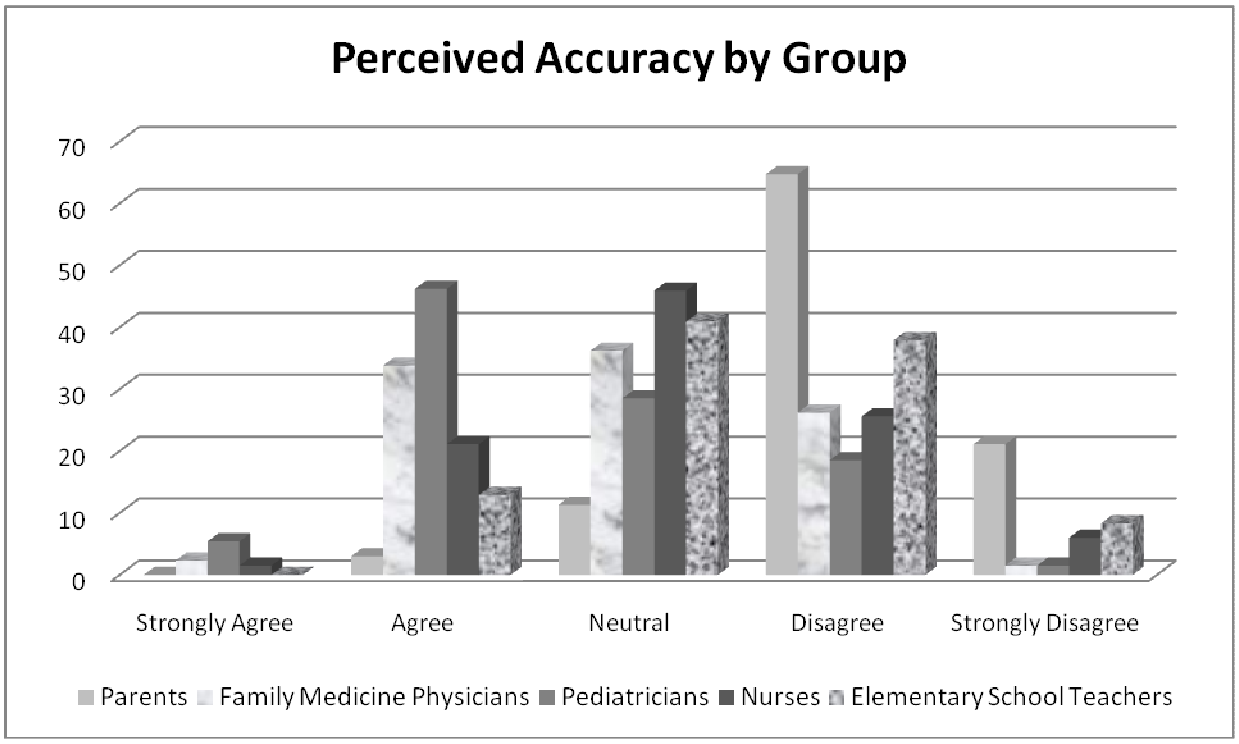

Figure 2. Respondents' beliefs in each group's ability to assess a child's BMI-for-age accurately by visual cues alone (as percents).

Only 14.9% of respondents (20/134) successfully identified the pictured male, whose BMI is > 95th percentile for his age, as obese (see Table 2). A total of 85.8% of respondents (115/134) placed the pictured normal weight female child in the correct category (normal BMI-for-age at the 10th percentile). For the third pictured child, who is overweight at the 90-95th percentile BMI-for-age, 20.9% of respondents (28/134) placed her in the correct BMI-for-age category. "Normal" was the most commonly chosen category for her BMI-for-age.

After separating respondents by training level, the analysis revealed no significant difference in total accuracy between medical students, resident physicians, or community physicians when predicting the BMI-for-age categories ($F(2,123)=0.743$, $p=0.478$). There

Table 2. Percentages (numbers) of respondents who placed each child into the BMI-for-age categories. Correct responses are shaded.

	Obese Male	Overweight Female	Normal Weight Female
Underweight	0.0% (0)	1.5% (2)	11.9% (16)
Normal weight	23.9% (32)	77.6% (104)	85.8% (115)
Overweight	61.2% (82)	20.9% (28)	1.5% (2)
Obese	14.9% (20)	0.0% (0)	0.7% (1)

was no significant difference in total accuracy between family medicine physicians and pediatricians ($F(1,107)= 2.269$, $p=0.135$); neither was there a significant difference in accuracy for each picture by the respondent's gender ($\chi^2(1)=0.12$, $p=.734$; $\chi^2(1)=0.102$, $p=.749$; $\chi^2(1)=0.716$, $p=.397$ respectively). Additionally, using Fisher's Exact test to compare binary confidence level with accuracy for each picture, results were not significant for the obese male ($\chi^2(1)=1.99$, $p=0.210$) or the normal weight female ($\chi^2(1)=0.12$, $p=.508$), however, accuracy in predicting the overweight female's BMI category was affected significantly ($\chi^2(1)= 6.79$, $p=0.013$).

Discussion

This survey found medical professionals and trainees believe BMI-for-age status is important for health. However, our data showed medical professionals and trainees were unable visually to assess a child's BMI-for-age weight status accurately. At best, classification of children by visual assessment can be described as inconsistent. This supported Barlow's 2007 findings[3] that pediatricians were able to identify only 27% of children with a BMI between the 85th and 94.9th percentile. However, the Barlow study also found that 86% of pediatricians identified children as obese if their BMI was above the 95th percentile for their age, a better rate of recognition than found in our study. An Australian study[2] found general practitioners correctly categorized children into BMI-for-age classes 72% of the time, while pediatricians had a 68% overall correct categorization. Our study contrasted this finding, as there were no statistically significant differences between pediatric and family medicine physicians' abilities to categorize children accurately.

Our results suggested that physicians and trainees recognize the difficulty in assessing BMI category visually, as less than 2% of respondents felt "very confident" in their ability to assess a child's BMI-for-age category just by looking at a child. In addition, over half of respondents felt pediatricians would be accurate and less than 40% felt family medicine physicians would be accurate. Our study indicated very low confidence in visual assessment by self or other physicians, which is a clear indicator that the AAP's recommendations for charting BMI are not only appropriate, but necessary. Physicians report barriers to charting BMI, such as time and complexity of explaining BMI[5], but also endorse innovations, such as color-coded charts, which increase the likelihood of identification and discussion of BMI.[4] In addition, the use of electronic medical records with automatic BMI computations improved documentation of obesity (BMI $\geq$ 30) by 40%.[15]

This study had several limitations. The small area (Sedgwick County, KS) of this cross-sectional survey limited the generalizability of the results. Further, physicians are notably poor survey responders[16] and studies[17,18] report a dramatic decline in response rates of email surveys. However, email was chosen because it is cost-effective, in both time and monetary savings and results in fewer unanswered items than other modes.[19] Our response rate was over 40% after three personalized attempts. According to an article by Schoenman and colleagues[20], survey results do not differ significantly between 30% and 60% response rates, so we closed survey collection two weeks after the third reminder.

Another limitation is the formatting and form of the pictures. The pictures were black-and-white and respondents may have chosen differently had the pictures been in color. All of the pictures were of non-Hispanic white children, which also could

affect perception. Additionally, it is difficult to assess a patient's weight from a photograph, and the children were sitting down which further complicated the assessment. If the children were patients in their own clinics, subjects may have categorized them differently. However, these pictures were used by the US Centers for Disease Control and Prevention for their BMI training and have been used in previously published studies.[21] Further, the physician confidence question was asked before the photos were viewed and responses indicated a dearth of conviction that they would be able to identify any child by sight alone successfully. Finally, the respondents were not asked whether they previously had viewed the pictures on the survey.

References

[1] Krebs NF, Jacobson MS, American Academy of Pediatrics Committee on Nutrition. Prevention of pediatric overweight and obesity. Pediatrics 2003; 112:424-430.

[2] Spurrier NJ, Magarey A, Wong C. Recognition and management of childhood overweight and obesity by clinicians. J Paediatr Child Health 2006; 42:411-418.

[3] Barlow SE, Bobra SR, Elliott MB, Brownson RC, Haire-Joshu D. Recognition of childhood overweight during health supervision visits: Does BMI help pediatricians? Obesity (Silver Spring) 2007; 15:225-232.

[4] Gilbert MJ, Fleming MF. Use of enhanced body mass index charts during the pediatric health supervision visit increases physician recognition of overweight patients. Clin Pediatr 2007; 46:689-697.

[5] Woolford SJ, Clark SJ, Strecher VJ, Gebremariam A, Davis MM. Physicians' perspectives on increasing the use of BMI charts for young children. Clin Pediatr 2008; 47:573-577.

[6] Chaimovitz R, Issenman R, Moffat T, Persad R. Body perception: Do parents, their children, and their children's physicians perceive body image differently? J Pediatr Gastroenterol Nutr 2008; 47:76-80.

[7] Dilley KJ, Martin LA, Sullivan C, Seshadri R, Binns HJ, Pediatric Practice Research Group. Identification of overweight status is associated with higher rates of screening for comorbidities of overweight in pediatric primary care practice. Pediatrics 2007; 119:e148-e155.

[8] Riley MR, Bass NM, Rosenthal P, Merriman RB. Underdiagnosis of pediatric obesity and underscreening for fatty liver disease and metabolic syndrome by pediatricians and pediatric subspecialists. J Pediatr 2005; 147:839-842.

[9] O'Brien SH, Holubkov R, Reis EC. Identification, evaluation, and management of obesity in an academic primary care center. Pediatrics 2004; 114:e154-e159.

[10] Parry LL, Netuveli G, Parry J, Saxena S. A systematic review of parental perception of overweight status in children. J Ambul Care Manage 2008; 31:253-268.

[11] Rhee KE, De Lago CW, Arscott-Mills T, Mehta SD, Davis RK. Factors associated with parental readiness to make changes for overweight children. Pediatrics 2005; 116:e94-e101.

[12] Baughcum AE, Chamberlin LA, Deeks CM, Powers SW, Whitaker RC. Maternal perceptions of overweight preschool children. Pediatrics 2000; 106:1380-1386.

[13] Maximova K, McGrath JJ, Barnett T, O'Loughlin J, Paradis G, Lambert M. Do

you see what I see? Weight status misperception and exposure to obesity among children and adolescents. Int J Obes (Lond) 2008; 32:1008-1015.

[14] US Centers for Disease Control and Prevention. Using the BMI-for-Age Growth Charts. Accessed at: http://www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules/module1/text/page8a.htm.

[15] Bordowitz R, Morland K, Reich D. The use of an electronic medical record to improve documentation and treatment of obesity. Fam Med 2007; 39:274-279.

[16] Cull WL, O'Connor KG, Sharp S, Tang SF. Response rates and response bias for 50 surveys of pediatricians. Health Serv Res 2005; 40:213-226.

[17] Sheehan K. E-mail survey response rates: A review. J Comput Media Commun 2001;6(2). Accessed at: http://jcmc.indiana.edu/vol6/issue2/sheehan.html.

[18] Thorpe C, Ryan B, McLean S, et al. How to obtain excellent response rates when surveying physicians. Fam Pract 2009; 26:65-68.

[19] Schaefer DR, Dillman DA. Development of a standard e-mail methodology: Results of an experiment. Public Opin Q 1998; 62:378-397.

[20] Schoenman JA, Berk ML, Feldman JJ, Singer A. Impact of differential response rates on the quality of data collected in the CTS physician survey. Eval Health Prof 2003; 26:23-42.

[21] Reifsnider E, Flores-Vela A, Beckman-Mendez D, Nguyen H, Keller C, Dowdall-Smith S. Perceptions of children's body sizes among mothers living on the Texas-Mexico border (La Frontera). Public Health Nurs 2006; 23:488-495.

Keywords: body weight, body mass index, perception, physicians, child preschool

Recurrent Interstitial Pneumonitis and Pulmonary Hemorrhage Secondary to Amiodarone Toxicity

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Introduction

Amiodarone is a commonly used drug for the treatment of cardiac arrhythmias. It has a broad range of toxicity including photosensitivity, blue-gray discoloration of the skin, thyroid dysfunction, corneal deposits, abnormal liver function tests, and bone marrow suppression.[1] Pulmonary toxicity is the most serious adverse effect of amiodarone. Treatment of amiodarone-induced pulmonary toxicity includes discontinuation of the drug and initiation of glucocorticoid therapy in the majority of symptomatic patients. This case of recurrent amiodarone toxicity was manifested by acute interstitial pneumonitis and diffuse alveolar hemorrhage after a rapid taper of glucocorticoids.

Case Report

A 60-year-old male patient with no previous lung disease was admitted to the hospital with dyspnea and hypoxemia of 85% on room air. On physical examination, he had bilateral late inspiratory rales involving two-thirds of the chest. His chest x-ray showed diffuse bilateral pulmonary infiltrates (see Figure 1).

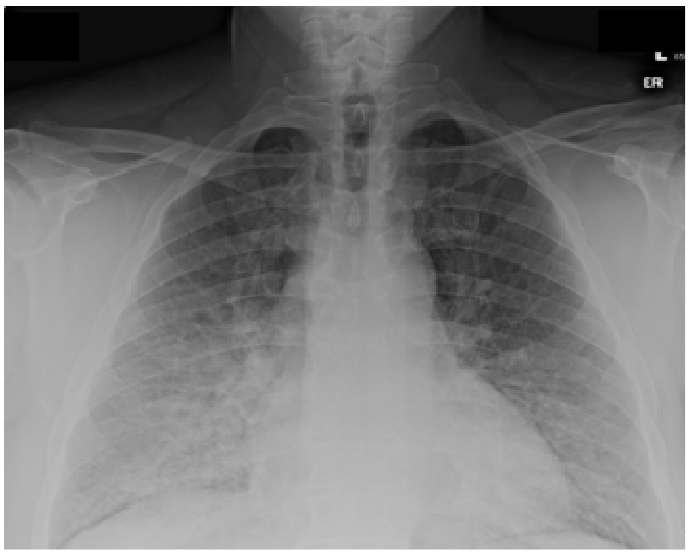


Figure 1. PA chest x-ray showing diffuse interstitial infiltrates especially at the bases.

The patient had no history of occupational pulmonary exposure or history of rheumatologic disorder or joint pain. He was diagnosed with atrial fibrillation nine months prior to presentation and was started on amiodarone 200 mg daily at that time.

After admission, his laboratory workup revealed normal blood counts and electrolytes. His brain natriuretic peptide (BNP) level was 150 pg per milliliter. A 2-D echocardiogram showed normal ejection fraction. There was no clinical or radiologic improvement after empiric antibiotics and treatment with diuretics.

A high resolution computed tomography of the chest was performed and showed bilateral ground glass opacities associated with small bilateral effusions (see Figure 2). Amiodarone-induced hypersensitivity pneumonitis was suspected. Subsequently, amiodarone was stopped and treatment with glucocorticoids initiated.

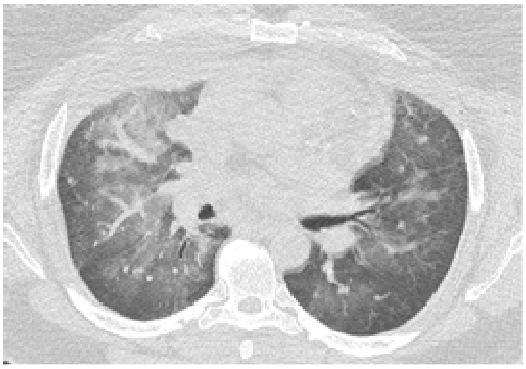


Figure 2. High resolution CT scan of the lung demonstrating bilateral ground glass appearance more prominent in the right middle lobe.

There was a significant clinical and radiologic improvement (see Figure 3) on a follow-up visit one month later. The glucocorticoids were tapered over two weeks, then stopped.

One week after stopping glucosteroids, the patient complained of shortness of breath on minimal activity, rapidly worsening to occur also at rest. He also complained of a dry cough that progressed over the next few days to mild hemoptysis. He again was hypoxic with bilateral rales on physical examination and his chest x-ray revealed bilateral infiltrates.

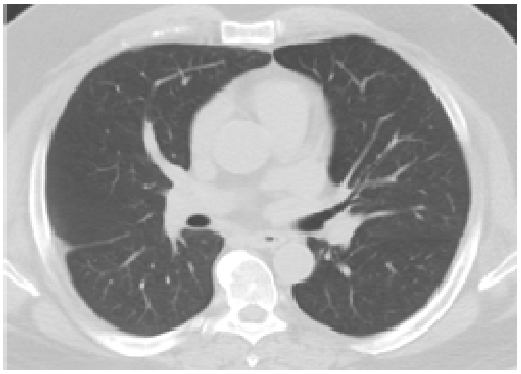


Figure 3. High resolution CT scan after steroid treatment showing almost complete resolution of the infiltrates.

Bronchoscopy was performed and transbronchial biopsies were obtained from the right lower lobe. The pathology examination showed interstitial fibrosis with no evidence of vasculitis or neoplasm (see Figures 4 and 5).

Bronchoalveolar lavage in the right middle lobe yielded a progressively bloodier return. Cytology of the fluid was negative for malignant cells and revealed numerous lipid-laden macrophages (index of 70%), characteristic of amiodarone toxicity. A significant number of hemosiderin-laden macrophages (index of 41%) were present, confirming the diagnosis of alveolar hemorrhage.

The patient was started on intravenous glucocorticoids. He significantly improved and was discharged home on prednisone 60 mg daily with plans to follow-up for several months. A follow-up examination after two weeks revealed clinical and radiologic amelioration.

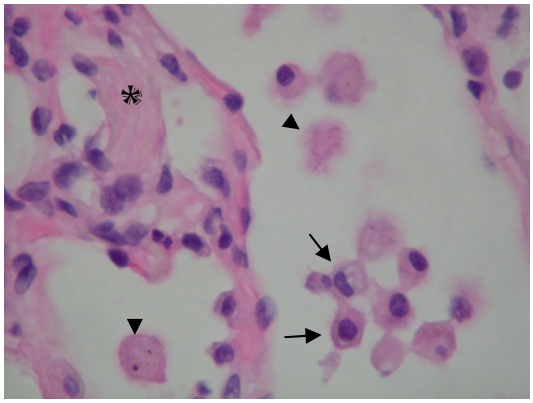


Figure 4. Transbronchial biopsy showing fibrosis (asterisk), lipid-laden macrophages (black arrows), and hemosiderin-laden macrophages (arrowheads).

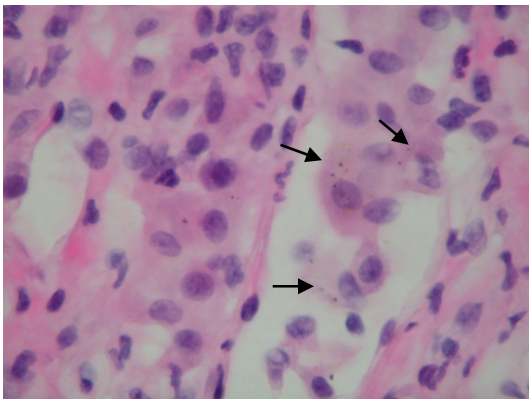


Figure 5. Transbronchial biopsy with hematoxylin and eosin stain. The arrows indicate macrophages with hemosiderin granules.

Discussion

Pulmonary toxicity secondary to amiodarone use occurs in 5-15% of patients.[2] Pulmonary manifestations range from mild to severe and even fatal disease such as ARDS. The most common presentation is interstitial pneumonitis accounting for one-third of patients.[3]

Interstitial pneumonitis usually is recognized after two or more months of therapy, especially in patients in whom the dose of amiodarone exceeds 400 mg per day. Cytology from bronchoalveolar lavage is characterized by mononuclear cells predominance and foamy alveolar macrophages. Type II cell hyperplasia and pulmonary fibrosis have been reported. Other manifestations include organizing pneumonia,[4] eosinophilic pneumonia, and lung nodules.[5]

Alveolar hemorrhage is a rare complication of amiodarone pulmonary toxicity. Only a few cases were reported in a large study of 171 patients.[4] Two other cases of alveolar hemorrhage secondary to amiodarone use also were reported.[6]

Amiodarone is a highly lipophilic drug that avidly binds to adipose tissues, resulting in a large distribution volume and a prolonged half-life reaching 180 days.[7] Given the high accumulation in adipose tissue, pulmonary toxicity may progress despite drug discontinuation. Treatment includes stopping the offending drug with initiation of glucocorticoid therapy in severe cases. Prednisone at 40 to 60 mg daily is recommended with slow tapering, as tolerated, over two to six months. Despite the slow tapering, cases of recurrent pulmonary intoxication may occur.[8]

In our case, the rapid tapering of prednisone may have been responsible for the acute recurrence of a more severe form of interstitial pneumonitis with evidence of diffuse alveolar hemorrhage. The patient's elevated body mass index suggested a high volume of distribution of amiodarone which might explain the severity of the recurrent disease. This case emphasizes the importance of slow tapering of glucocorticoids following amiodarone-induced lung injury.

References

[1] Mason JW. Amiodarone. N Engl J Med 1987; 316:455-466.

[2] Greenspon AJ, Kidwell GA, Hurley W, Mannion J. Amiodarone-related post-operative adult respiratory distress syndrome. Circulation 1991; 84(5 Suppl): III407-III415.

[3] Martin WJ 2nd, Rosenow EC 3rd. Amiodarone pulmonary toxicity. Recognition and pathogenesis (Part I). Chest 1988; 93 (5):1067-1075.

[4] Dean PJ, Groshart KD, Porterfield JG, Iansmith DH, Golden EB Jr. Amiodarone-associated pulmonary toxicity. A clinical and pathologic study of eleven cases. Am J Clin Pathol 1987; 87:7-13.

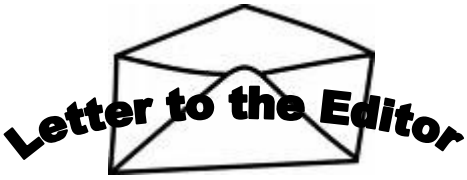
[5] De Granda Orive JI, Herrera de la Rosa A, Martinez Albiach JM, Escobar Sacristán JA, Sáez Valls R, Gallego Rodríguez V. [Amiodarone pulmonary toxicity: Radiological coexistence of nodules with interstitial and alveolar abnormalities.] An Med Interna 1998; 15:267-269.

[6] Vizioli LD, Cho S. Amiodarone-associated hemoptysis. Chest 1994; 105:305-306.

[7] Podrid PJ. Amiodarone: Reevaluation of an old drug. Ann Intern Med 1995; 122:689-700.

[8] Okayasu K, Takeda Y, Kojima J, et al. Amiodarone pulmonary toxicity: A patient with three recurrences of pulmonary toxicity and consideration of the probable risk for relapse. Intern Med 2006; 45: 1303-1307.

Keywords: interstitial lung disease, hemorrhage, amiodarone, drug toxicity, case report



Use of the QuantiFERON®-TB Gold Assay in Pregnant Patients

I find the article, "Use of the QuantiFERON®-TB Gold Assay in Pregnant Patients",[1] in your journal very interesting. I have not read any other work done on QuantiFERON in pregnant woman. In our practice, we have noticed a few pregnant women, especially in second and third trimester, have had "indeterminate" QuantiFERON®-TB Gold Assay results and when these were repeated at six-weeks postpartum, they showed a definite positive or a negative result. Our feeling is the immune changes during pregnancy are significant in later half of the pregnancy which interferes with the QuantiFERON®-TB Gold Assay. We would be interested to know what was the gestation of the women enrolled by Chehab BM et al. for their study "Use of the QuantiFERON®-TB Gold Assay in Pregnant Patients"?

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References

[1] Chehab BM, Kallail KJ, El Fakih RO, Zackula RE, Minns GO. Use of the QuantiFERON®-TB Gold Assay in Pregnant Patients. KJM 2010; 3:24-30.

Response:

The subjects in this study were patients of the local health department. Study data were collected only on pregnancy status, not gestational age. It is very difficult to track these patients over time because the health department does not provide a full-range of primary care services. Patients are not seen regularly. Thus, the question posed in the Letter to the Editor forms the basis for an interesting future study.

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