Influence of Race and Socioeconomic Status on the Diagnosis of Child Abuse: A Randomized Study

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Objectives To measure empirically the influence of race and socioeconomic status (SES) on the diagnosis of child abuse and willingness to report to child protection services.

Study design A total of 5000 pediatricians randomly selected from the American Medical Association's Masterfile received 1 of 4 randomly assigned versions of a fictional clinical presentation of a child (black/white + high SES/low SES) that described an unwitnessed event in a mobile 18-month-old child resulting in an oblique femur fracture. Outcome measures included ranking the degree to which the injury was accidental versus abuse and agreement with reporting the injury to child protection services.

Results A total of 2109 of 4423 physicians responded (47.7%). Patient's race did not have an effect on a diagnosis of abuse (black, 45% versus white, 46%). Abuse was more likely to be diagnosed in patients with low SES (48% versus 43%, overall $P = .02$).

Conclusion This study supports earlier work demonstrating physicians' greater willingness to consider abuse as a potential cause of injury in low SES children. It failed to demonstrate the finding of retrospective, real world studies of an increased likelihood to consider abuse in black patients. Future work should try to understand why there remains a differential approach to evaluating minority children for abuse in real world settings. *(J Pediatr 2012;160:1003-8)*.

In 2009, there were 123 599 unique reports of child physical abuse and nearly 1800 cases of fatal child maltreatment, of which almost half were caused in part by physical abuse.[1] There is conflicting evidence as to whether physical abuse is more prevalent in minority populations.[2-8] African-American children are over-represented in the child welfare system, and it is unclear whether this may be explained in part by a higher rate of reporting suspected abuse in minorities,[9,10] an increased likelihood of thorough medical evaluation for suspected abuse in minority patients, a difference in the way test results are interpreted,[10,11] or a representation of the higher risk that minority children are exposed to by virtue of their higher rates of poverty and its risk factors.[6,7,12] Exposure to family violence in early childhood is clearly linked to lifelong physical and mental health consequences.[13,14]

For physicians, unconscious stereotypes may cause erroneous assumptions about a patient. Unconscious or implicit stereotypes are generalizations, good or bad, that a person unknowingly relies on to facilitate decision-making. Such stereotypes in physicians appear to impede the effective and rational detection of child abuse. It is clear that a patient's race plays a significant role in the type and quality of medical care received.[15] For example, there is evidence that abusive head trauma is missed more frequently in white children,[11] and it is possible that there may be greater errors of "over diagnosis" in minority children and "under diagnosis" in white children.

Children's socioeconomic status (SES) may also play a role in how they are evaluated for abuse or neglect, how the results are interpreted, and the actions that are taken as a result.[9,16-18] Errors in over- and under-diagnosis have the potential to be very harmful: false suspicions hurt relationships between health care providers and families, and missed diagnoses may result in delayed medical care and additional injuries. A better understanding of these differences in the diagnosis and reporting of child abuse by race and SES are needed so that appropriate quality improvement measures, and novel educational strategies for physicians, may be developed.

Our objectives in this study, therefore, were to measure the influence of race and SES on physicians' diagnoses of child abuse, and their willingness to report their concerns to the appropriate child protection authorities (child protection services [CPS]).

AMA	American Medical Association
CPS	Child protective services
SES	Socioeconomic status

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Supported by Agency for Healthcare Research and Quality (grant K08 HS016564-01A2 to A.L.). Dr S.P. is supported by the National Institutes of Health (Clinical and Translational Sciences Institute grant UL1RR025761). The content is solely the responsibility of the authors and does not necessarily represent the official views of Agency for Healthcare Research and Quality. The authors declare no conflicts of interest.

Presented as a poster at the 2010 Pediatric Academic Society Meeting in Vancouver, BC, Canada, and in a platform presentation at the 2010 Helfer Society Meeting in Philadelphia, PA.

 10.1016/j.jpeds.2011.11.042

Methods

A national sample of 5000 practicing general pediatricians was randomly selected from the American Medical Association (AMA) Masterfile. The AMA Masterfile is a database of all licensed physicians in the United States, regardless of membership. Data provided in this file included sex, year of medical school graduation, and type of practice environment. Subjects were randomly assigned to one of 4 versions of an instrument depicting either a black or white child of either high or low SES. A cover letter was included indicating this was a national survey of pediatricians about decision-making in circumstances in which clinical information may be incomplete. The instrument included a color photo of a fictional patient and a name that had been pre-tested for racial associations,[19] medical information, and a description of the chief complaint. A social history, including the current occupational status of the parents, was also provided. In the high SES version, the parents were an accountant and a bank manager. In the low SES version, they were a grocery clerk and a factory worker. The description of the chief complaint was of an unwitnessed event in a mobile 18-month-old child resulting in a non-displaced oblique femur fracture. The remainder of the physical examination was described as unremarkable (**Appendix**; available at www.jpeds.com). The decision to use the example of a non-displaced oblique femur fracture was based on the inherent ambiguity in its etiology. Many physicians feel spiral fractures automatically connote an abusive injury. Oblique fractures in mobile infants can be either inflicted or accidental. The use of a fracture without a clear etiology allows other factors to become more salient in the decision-making process.

The physician subjects were asked to categorize the injury on a scale of 1 (almost certainly accidental) to 5 (almost certainly abuse). They were also asked to rate their agreement with reporting the injury to CPS on a scale of 1 (strongly disagree) to 5 (strongly agree). Finally, they were given the opportunity to indicate whether there was other information, obtainable through a more detailed clinical history or diagnostic testing, that they would need to answer the questions that had been asked. The purpose of this was to mirror a real clinical interaction, in which further information may be gathered after a diagnosis of fracture is made. The information was not collected to test any a priori hypotheses. In addition, because this was a paper instrument, no further information was provided to the physician related to their additional requests. Demographic data were also collected.

The instruments were mailed in the summer of 2009 with a $1 bill and a stamped return envelope. Non-responders received a reminder card after 4 weeks, and continued non-responders received a complete re-mailing of the instrument without the incentive. Collection of responses was closed approximately 12 weeks after the first mailing.

For the statistical analysis, scores on the rating scale for the injury rating were re-coded: 1 or 2 as "accident," 3 as "unsure," and 4 or 5 as "abuse." Scores on the rating scale for the reporting question were re-coded: 1 or 2 as "don't report to CPS," 3 as "unsure," and 4 or 5 as "report to CPS." χ^2 tests were used to determine whether there were significant differences in percentages of recognition and reporting between race and SES study group subjects (P value <.05 was considered significant).

This study was approved as an exempt study by the institutional review board of the Indiana University School of Medicine.

Results

Of the 5000 mailed instruments, 577 were returned as ineligible (eg, returned to sender, physician retired, deceased, or a subspecialist) for a resulting sample size of 4423. Approximately half of the remaining eligible subjects responded (n = 2109, 48%; **Figure 1**). There were no statistically significant differences between responders and non-responders by sex or year of medical school graduation. Most respondents were female (55%), white (72%), and members of a group practice (54%; **Table I**).

Most respondents categorized the patient's injury as 3 (unsure) or 4 (possibly abuse), and most respondents agreed or strongly agreed with the decision to report to CPS. When the injury rating responses were analyzed by the race of the patient, no statistically significant differences were identified (**Figure 2**, A). There were, however, statistically significant differences by the SES of the patient. Physicians were more likely to identify patients with low SES as abused, and patients with higher SES as having an injury of unclear etiology (χ^2 = 7.50, df = 2, P = .02; **Figure 2**, B). When the results were stratified by instrument version (ie, black-high SES, black-low SES, white-high SES, white-low SES), statistically significant differences were demonstrated (χ^2 = 13.82, df = 6, P = .03; **Figure 2**, C). Approximately

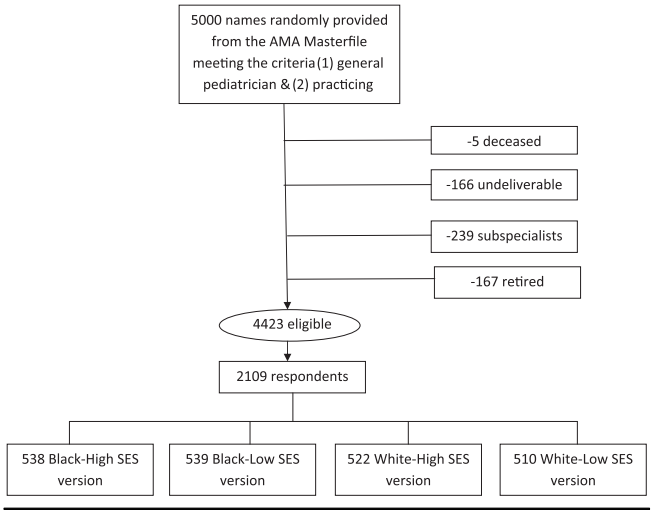

Figure 1. Response and randomization.

Table I. Characteristics of the sample

Characteristic	Respondents
Female, n (%; 13 missing)	1169 (55)
Race/ethnicity, n (%; 23 missing)	
White	1494 (72)
Black	104 (5)
Asian	342 (16)
Hispanic	92 (4)
Other	54 (3)
Medical school graduation (median, mode)	1943-2009 (1987, 1999)
Practice type, n (%; 15 missing)*	
Group practice	1120 (54)
Solo practice	346 (17)
University based	158 (8)
Community hospital	145 (7)
Other	325 (16)
Practice location, n (%; 228 missing)	
Suburban	863 (46)
Urban/not inner city	470 (25)
Urban/inner city	297 (16)
Rural	232 (12)
Other	19 (1)

*Not all percentages total to 100 because of rounding.

half the respondents (51%) receiving the white-low SES case reported abuse, compared with 46% abuse for black-low SES, 43% abuse for black-high SES, and 42% abuse for white-high SES. Also, a quarter of the respondents receiving the white-low SES case reported they were unsure, compared with 31% unsure for black-low SES, 34% unsure for black-high SES, and 31% unsure for white-high SES (**Figure 2**, C). There were no statistically significant differences by race ($P = .4$), SES ($P = .2$), or instrument version ($P = .5$) in the reporting decision.

Although physicians overwhelmingly (914/956 = 96%) indicated that they would report cases that they identified as concerning for abuse, a small percentage of physicians (42/956 = 4%) indicated they would not report a case they identified as consistent with abuse (**Table II**). In physicians reporting abuse, there was no statistical difference in the percentage to report to CPS by sex, race, graduation year from medical school, type of practice, or location of practice between those who chose to report identified abuse to CPS and those who did not report (data not shown). In physicians reporting they were unsure of an abusive etiology, 56% (355/633) reported they would report their concerns to CPS, 12% (77/633) said they did not agree with the decision to report, and 32% (201/633) said they were unsure whether they would report.

Approximately one-third of respondents (665, 32%) wrote free text comments or questions on the survey instrument. The most commonly requested information in all versions of the survey was more details about the events leading to presentation to care, more information about the social environment in which the child lived, more past medical history, and the results of a skeletal survey. Because the free text area was provided as an "outlet" for uncertainty that often accompanies limited information, no further analysis of these comments was conducted.

Discussion

In contrast to real-world retrospective studies,[10,11] our large randomized study did not show a race effect in the determination of abuse etiology with an ambiguous injury. However, similar to another recent study,[18] we did demonstrate a salient SES effect. Physicians were more likely to label the fracture as abuse in patients with low SES and remain unsure about the etiology in patients with a high SES. One explanation for this may be unconscious or implicit stereotypes that result in physicians giving patients with higher SES the benefit of the doubt. Although the results are statistically significant for the SES variable, the magnitude of the difference is not very large between high and low SES cases (ie, 5%) and may not be clinically relevant in real world decision-making.

Despite earlier empirical evidence suggesting that race plays a role in the diagnosis and reporting of abuse, our study did not demonstrate this effect. Our methodology was designed to present race in a realistic fashion (ie, using a photo and a name), but it is possible that subjects were attuned to race as a variable and social desirability bias could be a factor in our failure to find a significant effect for race. Alternatively, the current national focus on healthcare disparities by race may have increased physician's sensitivity to this issue, thus influencing their response. However, depicting only one patient for each subject should have minimized this effect. Another possibility is that a race bias is not the factor behind the overrepresentation of minorities in the child welfare system. One recent study of pediatricians measured both implicit and explicit racial attitudes and found that pediatricians in comparison with the general public had weaker implicit attitudes toward black patients.[20]

We did, however, demonstrate that SES influenced decision-making in our population, leading to a higher likelihood of abuse diagnoses with a fracture of ambiguous etiology. Perhaps SES is the more significant driving force in the determination of etiology, confounded in the real world by clinicians' implicit beliefs about SES in the races, possibly explaining the statistically higher rate of "uncertainty" in the black-high SES stratum. In other words, previously reported race effects may be mediated through perceived SES. Further, it is possible that these beliefs are reasonable because poverty is a risk factor for abuse.

The variability by race and SES status of the patient when the diagnosis was abuse (**Figure 2**, C) is striking. Although both races' high SES scenarios had similar rates of abuse determination, the magnitude of difference between the low SES conditions is notable. It is possible that clinicians accept the low SES status condition in black patients as normative and "discount" this information implicitly, giving more weight to this information in white patients. A similar effect has been suggested to explain the disparities in autism spectrum disorder diagnosis related to IQ expectations by race.[21] Although earlier work has shown that low SES can be a risk factor for abuse,[3] it is imperative

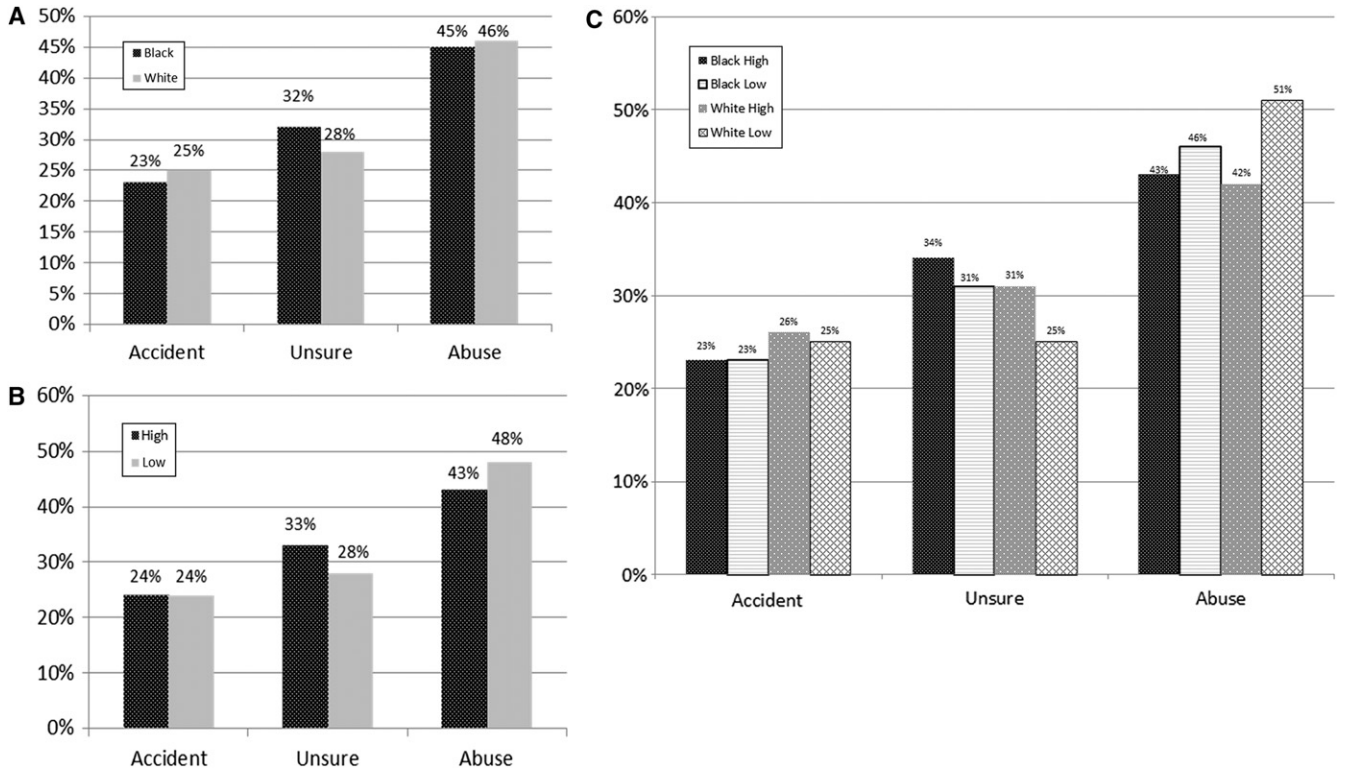

Figure 2. Etiology of fracture by **A,** race of the patient (χ^2, $P = .1$), **B,** SES of the patient (χ^2, $P = .02$), and **C,** instrument version (χ^2, $P = .03$).

that clinicians remain aware that risk factors are not causative factors, particularly as they relate to child abuse. This is not to suggest that risk factors should be discounted, rather it is to remind clinicians that an ascertainment bias may occur when screening or further evaluation is driven by the presence or absence of non-causative risk factors that could lead to a higher rate of case findings or improper diagnoses in patients with low SES and missed cases in patients with high SES.

There was a clear lack of consensus on the etiology of the fracture across all conditions. The injury depicted was specifically chosen to be of a somewhat ambiguous etiology to allow other case factors to play a more prominent role in decision-making. Even after a complete evaluation, physicians may have varying levels of consensus on whether an injury is abusive or accidental in nature. Earlier work suggests, however, that even among pediatricians with expertise in child abuse evaluations, broad variability exists in determination of abuse in less clear cut cases with the least variability in cases on the extreme ends of the scale (ie, definite abuse or no reasonable concern for abuse).[22] Cases that are more ambiguous because of injury type, lack of history or corroborating witnesses, or concurrent risk factors will be more prone to subjective determinations.

In our study, physicians largely acted appropriately for reporting decisions on the basis of their diagnoses of abuse. Although concerning, it is consistent with earlier studies[23-25] that 4% of physicians indicated that they would not report a patient to CPS even when they had diagnosed injuries consistent with abuse. This dissonance may be caused by reasons previously enumerated by Flaherty et al (ie, lack of certainty with the diagnosis, wanting to handle the situation with the family themselves, fear of angering the family, or not wanting to get involved with the system).[25] Alternatively, it could be caused by the nature of the actual instrument. In the "real world," physicians would likely have an opportunity to order more tests, ask more questions, and access more information before making a decision about whether to report to CPS.

When the etiology of the fracture could not be determined, more than half the physicians indicated they would report the case to CPS. CPS often contributes meaningfully to the investigation of an injury by collecting corroborating information from other caregivers and possible witnesses and assessing the environment of the child at the time of the event. It is through this collaboration with multidisciplinary partners that physicians may achieve the most accurate diagnoses. It is important to recognize that the decision to report is actually a binary one. Remaining "undecided" on this issue is equivalent to not reporting, which means that 44% of physicians who were unsure of the etiology ultimately chose not to report on the basis of the information they had available, thereby failing to involve outside agencies that could have contributed meaningfully to the investigation. It is possible that given more information in a real-world setting, they

Table II. Cross tabulation of injury rating and reporting to CPS

	"I believe this child should be reported to CPS"					
	1 strongly disagree	2	3 neutral	4	5 strongly agree	Total
"Based on the information currently available, I believe this injury is…"						
1 almost certainly accidental	106	14	6	3	5	134 (6.4%)
2	45	224	60	31	11	371 (17.7%)
3 unsure	11	66	201	222	133	633 (30.2%)
4	1	3	33	372	274	683 (32.6%)
5 almost certainly abuse	2	0	3	11	257	273 (13.0%)
Total	165 (7.9%)	307 (14.7%)	303 (14.5%)	639 (30.5%)	680 (32.5%)	2094 (100%)

would have been able to commit to reporting or not on the basis of that additional information.

A limitation of our study includes the artificial nature of a paper instrument, which may have played a role in how physicians arrived at their determination of etiology. In an attempt to provide the information in a manner as close to a real world interaction as possible, we included color photographs with names and field-tested both to ensure accurate race salience. Our intent was to simulate a real clinical interaction, in which patient race is often assigned in a similar manner on the basis of appearance and name. Despite insurance often being used as a proxy for SES in retrospective studies, it would not be the routine of many physicians to assess SES on first encounter by asking patients about their insurance status. For this reason, we used validated profession proxies to trigger implicit attitudes related to the SES of patients and their families. There are, however, other indicators of the SES of the family included in the scenario such as both parents being employed and the use of a licensed daycare facility. This does imply that they have more resources than many families with whom physicians interact, but was necessary to prevent confounding or implicit biases.

There is also the potential for response bias. There were no significant differences found between responders and non-responders by sex or year of medical school graduation. Unfortunately, it is not possible to determine whether there were racial differences between responders and non-responders because race information is not available from the AMA Masterfile, but the population approximates the national racial profile of practicing physicians. There is no reason to believe that the a priori hypotheses of the study were apparent to the subjects, thus influencing their decision to participate or not in the study.

One strength of our study was the substantial response rate, with approximately half of all subjects completing the outcome measures. For a χ^2 test of association, Cohen categorizes an effect size as small (w = .1), medium (w = .3), or large (w = .5). Assuming a type I error rate of .05 and a sample size of 2109, our study had >98% power to detect a "small" effect size in race and SES groups and >95% power to detect a "small" effect size for the interaction between race and SES.[26]

With a randomized controlled study methodology, we were able to use a more clinically realistic presentation of a preverbal child with an injury of ambiguous etiology. By isolating race and SES, we were able to demonstrate that there was no race effect in the determination of abuse and there was a statistically significant difference in diagnosis with SES. To understand better why this study did not support the assertion that there is a racial bias in the diagnosis and reporting of abuse, further work looking at implicit attitudes by using established methodologies and other possible interactions related to physician and patient characteristics will need to be conducted. ■

The authors wish to thank Dr Wendy Lane (funded by National Institutes of Health and Family League of Baltimore City), Dr Tom Inui (funded by National Institutes of Health, United States Agency for International Development, and Walther Cancer Foundation), Amy Lewis-Gilbert, and Dr Kristin Hendrix (funded by Indiana Family and Social Services Administration, Office of Medicaid Policy and Planning, and Medicaid Medical Advisory Cabinet) for their valuable contributions.

Submitted for publication Jul 15, 2011; last revision received Nov 7, 2011; accepted Nov 16, 2011.

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Appendix

Patient Name: Malik Johnson*

Age: 18 months

Historian: Mother

Chief Complaint: Refusing to bear weight on left leg, crying

History of Present Illness: Malik was in his normal state of good health today. Mom reports he was playing in the family room while she was doing work around the house. She left the room to do a load of laundry on and heard him crying. When she returned to the family room, he was sitting on the floor crying. She picked him up and thought he was tired. She carried him to his bedroom and laid him in his crib where he eventually fell asleep. When he woke up, he wasn't standing in his crib as usual and mom picked him up and tried to place him on the floor so he could walk with her to the kitchen. He refused to bear weight and would cry if she attempted to stand him up. He has been like this for the last 6 hours so she has brought him in for evaluation.

Past Medical History: Term infant, no hospitalizations or surgeries, up to date on immunizations, normal growth and development

Family History: Non-contributory

Social History: Only child lives at home with mother, an accountant and father, a bank manager. No pets, no smokers. Attends a licensed day care facility while parents are at work.

Physical Exam: Temperature 37°C (98°F) Pulse 114 (crying) Respirations 32 (crying); patient is crying but soothes when held by mother. Physical exam reveals no abnormalities with the exception of tenderness to palpation over the left femur and some swelling, but no bruising on leg (or elsewhere on body)

Radiology Results: Based on physical exam, left leg x-rays were ordered (anterior-posterior and lateral). Radiologist report indicates a minimally displaced oblique femur fracture.

	Almost certainly Accidental		**Unsure**		**Almost certainly Abuse**
1. Based on the information currently available, I believe this injury is…	1	2	3	4	5
	Strongly Disagree		**Neutral**		**Strongly Agree**
2. Based on the information currently available, I believe this child should be reported to Child Protection Services.	1	2	3	4	5

3. What year did you graduate from medical school?
19____ OR 20_____

4. What is your gender? ☐ M ☐ F

5. What is your race/ethnicity? (check all that apply)
☐ White ☐ Black
☐ Asian ☐ Other
☐ Hispanic

6. Please indicate your primary employment setting, that is, the setting in which you spend the most time. Choose ONE.
☐ Community hospital ☐ County hospital
☐ Solo private practice ☐ Group private practice
☐ Health Maintenance Org. ☐ University medical center
☐ Public health/community clinic ☐ Other:_____

7. What type of community best describes your practice area? Choose ONE.
☐ Urban – Inner City ☐ Urban – NOT inner City
☐ Suburban ☐ Rural

8. As in many clinical interactions, information can be incomplete. Is there information (clinical history or diagnostic

***This is a fictional patient**