Published in final edited form as:

J Elder Abuse Negl. 2019 ; 31(2): 163–180. doi:10.1080/08946566.2019.1573160.

A New Role for Imaging in the Diagnosis of Physical Elder Abuse: Results of a Qualitative Study with Radiologists and Frontline Providers

Mihan Lee, PhD^a, Tony Rosen, MD MPH^b, Kieran J. Murphy, MD^c, and Pallave Sagar, MD^d

^aHarvard Medical School, Boston, Massachusetts

^bDepartment of Emergency Medicine, Weill Cornell Medical College / NewYork-Presbyterian Hospital, New York, New York

^cDepartment of Medical Imaging, Toronto Western Hospital, Toronto, Ontario, Canada

^dDepartment of Radiology, Massachusetts General Hospital, Boston, Massachusetts

Abstract

Pediatric radiologists play a key role in the detection of child abuse through the identification of characteristic injury patterns. Emergency radiologists have the potential to play an equally important role in the detection of elder physical abuse; however, they currently play little to no part in this effort. We examine the reasons behind this limited role, and potential strategies to expand it, by interviewing attending faculty from Emergency Radiology, Geriatrics, Emergency Medicine, Pediatric Radiology, and Pediatrics.

Our interviews revealed that radiologists' contribution to elder abuse detection is currently limited by gaps in training, gaps in knowledge about imaging correlates, and gaps in inter-team clinical communication. Specifically, radiographic interpretation of elder trauma is severely restricted by lack of communication between frontline providers and radiologists about patients' injury mechanism and functional status. Improving this communication and re-conceptualizing ED workflow is critical to expanding and optimizing radiologists' role in elder abuse detection.

Keywords

Elder abuse; emergency radiology; elder trauma; physical abuse; domestic violence

Introduction

Elder abuse is defined as “an intentional act, or failure to act, by a caregiver or another person in a relationship involving an expectation of trust that causes or creates a risk of harm to an older adult... defined as someone aged 60 or older” (Hall, JE, Karch, DL, Crosby, AE., 2016). The prevalence of elder abuse has been estimated to be as high as 10% in the US (Burnes et al., 2015; C. Cooper et al., 2009; Rosen, Hargarten, Flomenbaum, & Platts-Mills,

2016; Touza Garma, 2017), and can take various forms, including physical abuse, emotional abuse, neglect, and financial abuse; many victims suffer from multiple types of abuse concurrently (Acierno et al., 2010; Connolly, M., B. Brandl, & R. Breckman, 2014; Lachs & Pillemer, 2004). Elder abuse has severe medical consequences, and has been linked to dementia, depression, and overall mortality (Lachs, 1998). It also carries heavy financial costs, estimated at billions of dollars annually (MetLife Mature Market Institute, The National Committee for the Prevention of Elder Abuse, The Center for Gerontology at Virginia Polytechnic Institute and State University., 2009; National Center on Elder Abuse, n.d.). This burden is only expected to increase in future years, reflecting the anticipated growth of the geriatric population (Connolly, M. et al., 2014). Yet despite the urgency of this problem, elder abuse continues to be deeply under-reported, with significant discrepancies observed between estimates from community surveys and direct interview-based studies (Pillemer, Connolly, Breckman, Spreng, & Lachs, 2015).

The health care system, and the emergency department (ED) in particular, has been proposed as providing an important “window of opportunity” to screen patients for elder abuse (Kahan & Paris BE, 2003; Rosen, Bloemen, et al., 2016). Health care providers in the ED are uniquely positioned to detect and report abuse, as they are often the only contact that victims have outside their families (Touza Garma, 2017). In the closely related field of child abuse, diagnostic radiologists have played a major role in developing strategies and protocols to screen, diagnose, and manage at-risk patients. Imaging correlates of child abuse have been extensively characterized (Kleinman, 2015; Offiah, van Rijn, Perez-Rossello, & Kleinman, 2009; Section on Radiology, 2009); some of the most well-studied include posterior rib fractures, corner metaphyseal lesions, and depressed skull fractures. The observation of posterior rib fractures in children under 2 years of age has been estimated to have upwards of 70% sensitivity for child abuse (Kemp et al., 2008; Paine, Fakeye, Christian, & Wood, 2016). Thus, for child abuse, it is not uncommon for the pediatric radiologist, rather than the pediatrician or emergency physician, to raise the first alarm (American Academy of Pediatrics, 2009).

These advances in the field of child abuse stand in stark contrast to that of elder abuse, where, despite the potential for radiologists to contribute similarly to physical elder abuse detection, literature suggests that emergency radiologists currently play virtually no role (Claudia Cooper, Selwood, & Livingston, 2009; Rosen, Hargarten, et al., 2016). Although elders are frequent users of emergency departments, accounting for 12-24% of all ED visits (Samaras, Chevalley, Samaras, & Gold, 2010), and often undergo imaging during their stays (Murphy, Waa, Jaffer, Sauter, & Chan, 2013; Wong et al., 2017), significant gaps in knowledge remain about how to utilize this imaging for the screening and diagnosis of abuse. Evidence-based imaging correlates have not been described (Lachs & Pillemer, 2004), and most radiologists in the US receive neither formal nor informal training in elder abuse identification (Rosen, Bloemen, et al., 2016).

This study sought to examine reasons that radiologists currently do not contribute to physical elder abuse detection, and to both characterize and question the barriers—including both knowledge gaps and training gaps—that limit their role in this effort. To do this, we interviewed experienced radiologists, as well as physicians who provide direct

clinical care for patients who experience abuse at both ends of the age spectrum. We also examined possibilities for expanding radiology's role, and increasing radiology's involvement and integration within the multidisciplinary elder abuse team.

Methods

We conducted semi-structured interviews to examine the role of radiology in elder abuse detection, its limitations, and potential strategies for its expansion. The interviewer was a medical sociologist with a PhD in Health Policy, with experience in qualitative research. All interviews were conducted between June and September of 2017. The study was determined to meet criteria for exemption from institutional review by the Harvard Medical School Institutional Review Board, IRB17-1064.

Interviews were conducted with clinicians who encounter abuse at both ends of the age spectrum, in both elders and children, in order to explore and contrast the involvement of radiology in abuse detection in these two vulnerable populations. We recruited faculty specializing in the following fields: Emergency Radiology, Pediatric Radiology, Emergency Medicine, Geriatrics, and Pediatrics. Potential interviewees were identified from institutional listings at a five large, urban academic medical centers in the Northeast United States, and recruited by email. We limited recruitment to attending physicians. We employed purposive sampling to ensure a range of relevant viewpoints among specialties, an approach commonly used in qualitative research to select information-rich cases related to the phenomenon of interest (Palinkas et al., 2015; Robinson, 2014).

Interviews were open-ended, but guided using a core script of 9 questions, including the following: How often do you encounter child/elder abuse in your field? What role do you play in the identification of child/elder abuse? What formal and informal training did you receive on the topic? Non-radiologists were asked two additional questions, which included being asked to describe their interactions with radiologists in cases of abuse for which patients had undergone imaging. All clinicians were asked how they felt collaboration between the radiology team and referring providers could be improved. The interview guide was continually modified to reflect emergent themes and suggestions made by interviewees as the study went on. The complete guide is included in Appendix 1.

Each interview was audio recorded and transcribed. Interviews were then coded using qualitative content analysis. The set of codes used was partially pre-structured from the literature search (and therefore reflected in the interview guide), and partially derived from the data. Analysis began while interviews were still ongoing, and was conducted iteratively. Recruitment and interviewing continued until data saturation was reached. There was one primary coder on the investigative team, who was an experienced medical sociologist with specialization in qualitative methods. After a set of preliminary codes were assigned, they were reviewed and resultant themes were discussed with the entire investigative team. Next, the number and percentage of participants endorsing each theme were tabulated. We used the Consolidated Criteria for Reporting Qualitative Research to guide collection, analysis, and reporting of the data (Tong, Sainsbury, & Craig, 2007).

Results

Of 51 physicians contacted, 25 agreed to be interviewed, for a response rate of 49%. Interviewees included 7 emergency radiologists, 5 pediatric radiologists, 4 emergency physicians, 5 geriatricians, and 4 pediatricians. The number of years practicing medicine among our interviewees, inclusive of residency training, ranged from 9 to 44, with a median of 19 years. Interviewees had trained or practiced in a total of 7 states and 6 countries (see Table 1).

Four main themes were used to organize data analysis: Training on Elder Abuse, Imaging Older Adults, Communication of Mechanism Mismatch, and Elder Neglect. Of these, the former two themes (Training and Imaging) were chosen as subjects of exploration on the basis of prior literature search, and were therefore built into the interview guide. Meanwhile, the latter two themes (Communication and Neglect) emerged from data analysis, and questions about them were added to the interview guide at a later stage. Within the Communication theme, 3 sub-themes are described: Roles and Workflow, Functional Status Assessment, and Time Constraints.

Two additional, minor themes also emerged from our interviews: Trauma to Family (discussed also within the context of Communication), and Radiology as Separation Tactic. Although these latter two themes were endorsed by only a minority (2-4) of our participants, we include them here as important directions for future study. A tally and breakdown of themes endorsed by our interviewees is presented in Table 2. Themes are illustrated within the text using representative quotations.

Training on Elder Abuse

Across both radiologists and frontline providers, there was a consensus among interviewees that there was a general lack of education about domestic violence, as well as a particular absence of training on elder abuse. In total, 20 of 25 (80%) of our participants, including most notably 7 of 7 emergency radiologists, endorsed this theme; moreover, they particularly highlighted the stark contrast between the minimal to absent instruction they had received on elder abuse during their careers, and the rigorous training they had received in child abuse. One emergency radiologist vividly illustrated the discrepancy:

I know for non-accidental trauma in pediatrics, that's a huge component of radiology. When we took our boards, they'd say that if you missed a case of NAT [non-accidental trauma] in a kid, you'd fail. But for elder abuse, no one talks about it... I definitely received zero training on elder abuse.

Frontline clinicians pointed out this contrast as well: one emergency physician said, for example, "I certainly recall being educated in medical school about child abuse. It's pretty templated. It's to a far lesser extent on elder abuse."

Furthermore, this lack of training appeared to impact whether and how physical elder abuse was perceived in daily practice. Frontline clinicians, such as emergency physicians and geriatricians, endorsed seeing "three or four" or "a few cases per season" of elder abuse. By

contrast, 0 of 7 emergency radiologists interviewed recalled a single case where concern was raised for elder abuse. One said:

In 20-something years of practice... I've never once raised the specter of elder abuse on anything I've read. I've never seen anything where— for us, it would just be like any other trauma. I really can't think of a single case.

Another emergency radiologist stated:

Maybe we don't look quite as closely because, as we said, we haven't been taught about pathognomonic injuries... I'm probably less likely to raise the suspicion in an adult, because it's just hard for me to tell.

In this way, lack of training about elder abuse appeared directly to affect how seriously radiologists looked for abuse, potentially leading to diagnostic misses.

Imaging Older Adults

Many interviewees felt that the lack of training on elder abuse was a direct reflection of the lack of pathognomonic injury patterns for elder abuse that had been characterized, which made it difficult to develop training curricula. When asked further about the reasons for this gap in knowledge, clinicians explained that identifying characteristic injury patterns for elder abuse was a very different challenge than doing so in children. This theme was endorsed by 21 of 25, or 84% of our participants, including 10 of 12 radiologists and 11 of 13 frontline providers.

Pediatricians were able to best describe the unique properties of pediatric bone that enabled the extensive characterization of child abuse lesions. One pediatrician explained:

It's an anatomic, developmental bone issue... in infants, there's microscopic differences in the metaphyseal region during growth. Where most recent growth has happened is not well-knit, so it's more vulnerable and jerking on the leg can take advantage of the weaknesses there.

This type of injury results in the pathognomonic finding known as classic metaphyseal lesions (CMLs). Another pediatrician noted the importance of the “size differential between infant and child victims and adults” which allows for injuries caused by “put[ting] their hands around the child's rib cage. or picking children up by their arms,” leading to more characteristic and identifiable fracture patterns.

Meanwhile, in older adults, both radiologists and frontline providers for elder patients noted that physiologic changes with aging, including deconditioning and balance issues, commonly led individuals to have frequent falls. Moreover, conditions like osteoporosis and demineralization made these patients significantly more likely to fracture from relatively minor mechanisms. From an imaging perspective, these co-morbidities meant that many patients had prior, non-abusive traumas, which obscured the specificity of imaging findings. One emergency radiologist described:

It's not these pristine imaging findings you see in children... A lot of elders have prior fractures, or chronic diseases, you see rib fractures all the time and you

wouldn't even begin to think about raising concern for abuse. It becomes less pathognomonic.

A geriatrician made a similar point:

The problem is the phenotype is indistinguishable. So how do you tell the difference between a hip fracture sustained because someone fell, or because he was pushed?... [with] osteoporosis and fragility fractures... there's going to be a group of people who can sustain fractures from falling 18 inches.

As a result, our interviews showed that the threshold for raising concern was much higher (indicating a lower index of suspicion) in the elder population. As one pediatrician put it, "It's a different default, isn't it... In elders, many times a fracture isn't seen as cause for alarm, it's written off as occurring in the normal course of things."

Communication of Mechanism Mismatch

While our interviewees reported that the majority of "red flags" that had been characterized for child abuse, such as CMLs, were not easily adaptable to the elder population, at least one important exception was noted. This was the radiographic finding of an injury pattern inconsistent with the reported mechanism, another mainstay of child abuse detection. The third major theme that emerged from our interviews was the potential to use and adapt this assessment framework for the evaluation of elder abuse, and the critical importance of interdisciplinary communication to this effort. This theme was endorsed by 18 of 25, or 72% of our participants. Participants focused on three barriers, presented here as sub-themes, that limited radiology's contribution to abuse detection: limited conceptualization of roles and workflow; absence of information about functional status; and time constraints. Several participants also raised the issue of concern about prematurely alarming the patient's family.

Roles and Workflow—Frontline clinicians across specialties—emergency physicians, pediatricians, and geriatricians—all described very similarly the importance of comparing a patient's presentation to the reported mechanism of injury in abuse assessments. A pediatrician called this a "mainstay of diagnosis," while a geriatrician stated it was "one of the most sensitive flags for abuse." However, our interviews revealed a major difference between pediatrics and geriatrics in *how* this gap was evaluated. In pediatrics, imaging was seen as a critical piece of the assessment; thus, pediatric radiologists reported that they felt confident that they received all necessary information from frontline providers. One said, "I think the pediatricians are very aware of these things. Often when I call they'll already know what questions I'm going to ask, or why I might be concerned."

By contrast, our interviews revealed that the evaluation of a mechanism mismatch in older patients relied much more heavily on bedside assessments, and rarely involved imaging. Frontline clinicians for these patients, both emergency physicians and geriatricians, reported that if there was concern for abuse, they did not regard radiology as a source of additional or new information. One emergency physician described:

From a radiology perspective, they're going to help us characterize the injuries the person has suffered from. But it's not vice-versa, like 'oh, this fracture pattern makes us think abuse.' We'll be getting imaging because we're concerned first.

Similarly, a geriatrician stated:

I spend an hour or more with the patient doing the comprehensive geriatric assessment. I don't interact with the radiologists... the imaging is all confirmatory. I never thought about radiology being helpful in this kind of thing.

The effects of frontline clinicians viewing radiology in this limited, confirmatory role was reflected in how emergency radiologists described the communications they received from these providers. Unlike their colleagues in pediatric radiology, 7 of 7 emergency radiologists interviewed stated that clinical communications regarding cases of elder trauma left much to be desired. One reported that any concern or suspicion for abuse was never passed on, saying, "It's never something that's identified to us, like, 'please evaluate for possible abuse.'" Another stated:

The histories on radiology requisitions... are abysmal. Everything that is related to injury often has a single word for the history: Trauma... I've definitely seen cases where failure to provide history may have made it more difficult to establish the diagnosis, or harder to do it with a higher level of specificity.

Another radiologist elaborated on how additional communication of history was critical for them to contribute meaningfully to abuse detection:

One of the things we do as radiologists is try to integrate information, not just from the scan, but from lab findings, clinical presentation, and the clinical context of what happened before the patient came to our X-ray machine.

Without adequate communication, the ability of radiologists to perform this task and make a meaningful contribution to abuse assessment was greatly diminished.

Functional Status Assessment—Another critical piece of history to evaluate a mechanism mismatch was the functional status of the patient. Many pediatricians noted that considering the patient's developmental stage was another mainstay of child abuse assessment. One stated, "Red flags are developmentally impossible scenarios, like a 2-month old who supposedly rolled off the bed." Another noted, "We always take a developmental history and ask, What kinds of things can they do? Can they walk, can they walk fast?"

Among older adult patients, however, functional and ambulatory status can vary widely between two patients of the same age. Without reliable age-related milestones from which to infer it, communication between frontline clinicians and radiologists becomes all the more important in documenting and passing on information about functional status. However, our interviews revealed just how commonly this communication does not occur, leaving critical information missing from abuse assessments. One emergency radiologist said, "We don't think about [functional status], we don't ask for it. I'm not even aware if there are EMR [electronic medical record] fields for that kind of thing." This renders it impossible for

radiologists to comment on whether an injury seen on imaging was consistent with a patient's baseline level of activity.

Time Constraints—Interviewees noted several other issues impeding effective communication between frontline clinicians and radiologists, which perpetuated and exacerbated radiology's marginal place in the workflow. Time was a constantly cited constraint to including a detailed history with the imaging order. Frontline clinicians, and especially emergency physicians, noted that they had little incentive to do so, saying: "It's easy to just click off a request, and there's no failsafe built into the system that forces us to provide more context." Another noted, "There are big-time flaws in what we put in in the order for an X-ray. People... don't write down a whole differential. So if abuse was on our minds, it might not be communicated."

When there was initially little to no patient history provided, emergency radiologists also described time constraints to actively seeking out and obtaining this information from their end. One stated:

It's another system we'd have to log into. That's part of the problem, the history provided in our system is not the full story... [but] the problem is we often don't have time to delve into the history. So it might also be our fault, that we're not checking.

One radiologist did note ongoing improvements to the system, saying:

As our IT systems get more integrated, we [are] able to access this information without someone having to type it all in. So what's happened recently... is I can actually see the summary and the note, that gives me a ton more information than I used to have. That didn't used to be the case.

However, as of now, the fragmented way in which patient information is entered into the record means that radiologists often see only the limited history that referring clinicians think pertinent or worthwhile to pass on.

Trauma to family—A last barrier to communication about suspicion for abuse also emerged as a minor theme from our interviews, which was the hesitation that documentation would cause distress to the patient's family. Four interviewees raised the issue of whether ED clinicians usually felt empowered to pass on the concern to radiology, in situations where it had not yet been investigated and confirmed. One emergency physician noted that, "I'm not sure if people are bashful to document it, but they probably hesitate in cases where... families can see it." A pediatric radiologist noted, "Once you put it in writing, you can't take it back... It can be very aggravating if the patients read it. We don't want to raise the concern frivolously, since parents get incriminated."

To address this hesitation, one geriatrician proposed "an ED cultural shift... you could put in the system, 'suspicion for abnormal injury mechanism,' it doesn't have to say 'abuse,' and that might... trigger communication." Similarly, one ED radiologist suggested:

If it is something on EM docs' minds [and] they can't share that with us easily, or don't want to put it in the record, creating some other pathway to convey that

concern to us would be tremendously helpful, whether it be creating some slip, or a page, anything.

Either creating a trigger word or phrase to signal concern, or using a form of communication outside the EMR, may be helpful to increase communication without prematurely alarming or burdening families and caregivers.

Radiology as Separation Tactic

A second minor theme was brought up by two interviewees, who noted that radiology can be an important tool in abuse assessments aside from actual imaging findings. One emergency physician described how he already uses radiology as a tactic for temporarily separating a patient from a caregiver, when one appears to be purposely obscuring elements of the history, intimidating the patient out of telling the truth, or taking over interactions with the clinical team. The physical separation of the radiology suite from the ED allows patients a space to speak openly with the clinician and give as full and accurate an account as possible of what happened. He stated:

We actually use radiology frequently as a strategy to separate [patients and family] ... the techs are really helpful if you suggest to them that you're worried this patient was actually assaulted, and the family is acting suspicious, and they'll create a situation where I can... have a one-on-one with the patient.

In other instances, patients may suffer from cognitive or memory impairments, or have difficulty verbalizing, and clinicians must rely more heavily on observing the interactions between the patient and caregiver. Our interviews suggested that radiology may be able to play an important role in this effort, as well. A pediatrician described how she uses the radiology suite to observe patient-caregiver interactions, saying:

A lot happens in the radiology waiting room. The technologists, they work on the frontline... they'd see the dynamics, when someone is bringing in their elderly parent... We have had calls from techs here in pedi radiology about child abuse. I don't know if that happens on the adult medicine side.

Opening and strengthening channels of communication between radiologists and their technicians, and creating avenues for reporting concerning dynamics and interactions, could be another important way to adapt child abuse assessment strategies to elder abuse.

Elder Neglect

A final major concern raised in our interviews was that, even if further work were to reveal imaging correlates for physical abuse, this would not address another significant, and potentially even more common, form of abuse that elders suffer. Many frontline clinicians, including 4 of 4 emergency physicians and 4 of 5 geriatricians, noted that elder neglect was much more prevalent than physical abuse. One geriatrician stated:

Actual physical abuse—trauma, injury—is much smaller than neglect, which is not active intention of harm, but inactivity that harms. Neglect runs the spectrum from willful neglect to, 'I just didn't know any better,' or 'I lack capacity as a caregiver.'

Negligent actions were described ranging from patients being left without medications, to caregivers not taking them to see doctors, to being left unsupervised resulting in frequent falls. Another geriatrician agreed:

It's people just not realizing. People don't recognize when things aren't normal signs of aging, they don't recognize depression or dementia... so they might leave people to themselves, and then they end up neglected. It's more lack of family education.

Radiologists were also aware that neglect was a more prevalent problem than physical abuse, and 6 of 7 emergency radiologists also discussed how these injuries may also appear on imaging. One pointed to neglect as a possible etiology of "repeated, high-risk fractures... Like someone comes in with a hip fracture, and we can ask, 'Why is this 92 year old woman with PD walking without a walker?' That could be seen as negligent." Several radiologists also noted that soft tissue injuries, such as decubitus ulcers or gangrene, could raise suspicion for neglect. While these injuries would usually be apparent at bedside, frontline clinicians noted that radiologists could help to assess the extent and the age of injury.

Discussion

The lack of experience our interviewees reported with elder abuse was consistent with previous surveys, in which a large percentage of clinicians denied having been in contact with a victim of elder abuse in the past year (Rinker, 2009). These low reported rates of elder abuse, both in our study and in the literature, also align with larger epidemiological studies that report significant under-recognition of the problem (Fulmer, 2003; Touza Garma, 2017). In prior, interview-based qualitative studies, both radiologists and EM physicians reported believing that a lack of adequate training had led them to miss cases of elder abuse, and expressed desires for more training on the subject (Rosen, Bloemen, et al., 2016; Rosen, Hargarten, et al., 2016). Our interviews were also consistent with these findings and showed an overwhelming consensus across disciplines that elder abuse was both lacking and desired from training curricula.

Our findings were also consistent with previous literature describing the challenges to identifying "pathognomonic" findings for elder abuse. Dyer and colleagues (Dyer, Connolly, & McFeeley, 2003) reported "a paucity of data" on imaging correlates for elder abuse, describing how factors like osteoporosis, poor nutrition, Vitamin D deficiency, and prolonged bed rest could make elders' bones more brittle and prone to fractures, thus limiting conclusions that could be drawn from imaging. In what is, to the authors' knowledge, the only published literature review of physical findings of elder abuse, Murphy et al (Murphy et al., 2013) found that 2/3 of abusive injuries occurred to the upper extremities and maxillofacial area. Wiglesworth and colleagues (Wiglesworth et al., 2009) reported that 72% of elder abuse victims showed bruising, particularly on the head, neck, lateral right arm, or posterior torso. Our own interviews were not able to reveal additional imaging correlates that could serve as potential "flags" for abuse, but the majority of our interviewees suggested it as a critical area for future research.

One important potential strategy that our interviewees did note could be adapted from pediatrics was the recognition of injuries inconsistent with the reported mechanism. Physicians across specialties, including both frontline clinicians and radiologists, felt that identifying such “mechanism mismatches” was a key area in which radiologists could potentially contribute to abuse assessments. However, our interviews also showed that this contribution is currently severely limited by gaps in communication between frontline providers and radiologists, and a workflow that largely bypasses radiology in cases with concern for abuse. The severity of this lack of communication was clearly—and concerning—evidenced by the fact that while emergency physicians and geriatricians reported seeing cases of elder abuse with reliable frequency, many senior emergency radiologists reported seeing zero to vanishingly few cases of elder abuse during their entire careers. This strongly indicates that within the current ED workflow, critical information about suspicion for abuse is not communicated to the radiology team.

Our interviews also elucidated several reasons for these gaps in communication. These related to both the culture of medicine in the US, which shapes workflow and the definition of roles, and practical constraints, including time and structural issues with the EMR. Regarding the former, our interviews revealed how the conceptualization of radiology’s role in abuse detection varies drastically between pediatrics and geriatrics, and this shapes the nature and depth of communication between radiologists and their referring providers. Geriatricians and adult emergency physicians reported that they often did not think of radiology as being able to add new insight to an abuse assessment, and thus only asked them to confirm injuries that were already suspected. This approach may constitute a kind of self-fulfilling prophecy: the relegation of radiology to a confirmatory role may ensure that it remains so.

More practical constraints to communication, such as lack of time, and reluctance to document suspicion and cause distress to patients’ families in the absence of certainty, were also reported by our interviewees, again aligning with previous work (Joubert & Posenelli, 2009; Samaras et al., 2010; Touza Garma, 2017). These two barriers to abuse detection may compound one another: while in-person or telephone patient handoffs may help to avoid distressing the family, rather than simply documenting suspicion in the EMR, this can take significant time per case and further increase time pressure on providers (Rosen, Hargarten, et al., 2016). Our interviews suggested some strategies that could help to facilitate and streamline the pass-off of information, included defining code words or phrases to quickly indicate a concern.

Finally, our interviewees pointed out that elder neglect is significantly more common than physical elder abuse, with just as profound a lack of known imaging correlates. While previous work has characterized several “red flags” for elder neglect, including weight loss (Lachs & Pillemer, 2004), decubiti (Dyer et al., 2003), poor hygiene, malnutrition, and dehydration (Harrell et al., 2002), these can also all stem from common geriatric pathophysiologies, and thus no specific radiographic findings have been described. As a result, radiologists’ role in the assessment of elder neglect is arguably even more limited than in physical elder abuse. A full treatment of the gaps in the assessment and management of patients experiencing neglect, and the potential contributions of radiology to this effort, is

beyond the scope of this paper. However, both rigorous review of imaging, in conjunction with further efforts to improve and streamline communication, is a critical direction for future work.

Conclusions and Limitations

This study was mainly limited by its sample size, which was impacted by both geographic and institutional restrictions on faculty members who could be recruited. Thus, the themes that emerged from our interviews can only be taken to reflect a small number of academic teaching hospitals, and the proportion of participants endorsing each theme cannot be easily generalized to other settings. Like any purely qualitative study, all hypotheses and conclusions were subjective, formulated by the research team.

Despite this limitation, the consistency of responses from participants across specialties indicates that the themes reported here are real and worthy of further investigation. Regarding generalizability, further confidence can be taken from the fact that many of these participants had trained and worked at institutions in different states and countries over the course of their careers, and were able to speak to these years of experience during their interviews. Moreover, the barriers participants described to inter-team communication would only be heightened and accentuated in many other practice settings, such as private practice or smaller community hospitals, where radiologists are not physically embedded. Thus, our results should be biased towards describing *better* inter-team communication than many clinicians experience, and the strategies proposed here to reforming communication and workflow should be relevant, though not necessarily sufficient, for other types of practices.

Ongoing research must continue to seek definitive imaging correlates of elder abuse; however, we must recognize that this alone will not empower emergency radiologists to contribute to elder abuse detection in a manner comparable to their peers in pediatrics. To achieve this, we must also understand the sociological context within which emergency radiologists would translate and implement these research findings. Our study offers preliminary insights into this context, and specifically, characterizes two main areas of focus for future interventions: gaps in training, and gaps in communication between radiologists and their referring clinicians.

In order to address gaps in training, modules on elder abuse detection should be incorporated into medical student and resident curricula, as well as continuing medical education. Cooper (Claudia Cooper et al., 2009) found that face-to-face training on abuse for health professionals was more effective in increasing knowledge than distributing written information. Therefore, an important future direction may be designing and piloting hands-on training modules for radiologists to gain exposure to elder abuse and its detection and management strategies. In order for these training to be evidence-based and relevant, these efforts must work in conjunction with ongoing research investigating imaging findings of physical elder abuse.

Meanwhile, both cultural and practical modifications to current workflow are necessary to improve communication between radiology and other clinical teams, and to ensure that

radiologists have access to the clinical information necessary for them to perform meaningful abuse assessments. Emphasizing to frontline clinicians the potential of radiologists to contribute to elder abuse detection, and particularly the value while ordering imaging of providing information about injury mechanism and functional status, is critical. This can serve to better define the role of radiologists and disrupt the conception that elder abuse is a purely bedside assessment. In addition, clinicians and radiologists should be encouraged to discuss in real time any concerns or suspicion of elder abuse, and to collaborate on assessment. Electronic medical records may be modified to facilitate and support this cultural shift. Finally, care must be taken to adapt channels of communication that neither unduly slow workflow, nor cause premature alarm and distress to families.

While our interviewees suggested initial strategies for these efforts, pilot programs are needed to test and modify them, and to develop them into effective working protocols. Furthermore, the lack of data so far regarding the use of radiology in screening for elder abuse means that these suggested changes are still very much speculative and based on inference from other fields. Taking steps to implement these proposed actions, and then measuring their results, can generate the critical data needed to guide further evidence-based changes to medical practice. In this way, these proposed strategies can serve as vital first steps to integrating radiologists into the effort to detect and initiate treatment for elder abuse.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Summary Characteristics of Participants

	Field	n	% Female	States practiced or trained in	Countries practiced or trained in	Years in Practice (median, min-max)
Radiologists	ER Radiologists	7	43	2	2	22 (10-28)
	Pediatric Radiologists	5	60	3	4	19 (17-34)
Frontline clinicians	Emergency Medicine	4	0	4	1	7 (7-29)
	Geriatricians	5	40	3	3	29 (9-44)
	Pediatricians	4	75	4	1	21 (14-24)
Total	Total	25	44	7	6	19 (7-44)

Table 2.

Themes Endorsed by Participants, by Field

	Field	Theme (% endorsed)						
		Training	Imaging	Communi-cation	Sub-theme			Neglect
					Roles	Functional status	Time	
Radiologists	ER Radiologists (n=7)	100	100	71	71	43	71	86
	Pediatric Radiologists (n=5)	80	60	60	40	40	20	60
Frontline clinicians	Adult EM (n=4)	100	75	75	75	75	50	100
	Geriatricians (n=5)	40	100	80	60	60	0	80
	Pediatricians (n=4)	75	75	75	75	50	50	75
Total	Total (n=25)	80	84	72	64	52	40	80