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Improving the Forensic Documentation of Injuries Through Alternate Light: A Researcher–Practitioner Partnership

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ABSTRACT

An alternate light source (ALS) is a practitioner-driven technology that can potentially improve the documentation of injuries among victims of interpersonal violence. However, evidence-based guidelines are needed to incorporate and document an ALS skin assessment into a forensic medical examination that accurately reflects the science, context of forensic nursing practice, trauma-informed responses, and potential impact on criminal justice stakeholders. This article introduces the forensic nursing community to a current translation-into-practice project focused on developing and evaluating an ALS implementation program to improve the assessment and documentation of bruises among adult patients with a history of interpersonal violence. Our researcher–practitioner collaboration uses theory-based approaches that consider both the developed program's practice context and stakeholder impact. The goal is to provide evidentiary support for adult victims of violence and a more equitable forensic nursing practice that benefits diverse patient populations.

KEY WORDS:

Alternate light; bruise; evidence-based practice; forensic nursing; intimate partner violence; sexual assault

The U.S. National Institute of Justice's (2019) Forensic Science Technology Working Group identifies "detecting subtle injuries on bodies, both living and deceased" (p. 8) as an important research priority. Its urgency

highlights an ongoing disparity in detecting and documenting bruises and other soft tissue injuries among people with darker skin tones. Over the last decade, findings from 10 studies indicate an alternate light source (ALS) may have

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a role in improving cutaneous injury assessment. However, no evidence-based guidelines currently exist for incorporating and documenting an ALS skin assessment into forensic medical examinations.

Implementing a new assessment modality into forensic nursing practice requires a process that accurately reflects the science, the forensic nursing clinical practice context, patients' trauma-informed responses, and the potential impact on criminal justice stakeholders. For example, existing practice recommendations such as those published by the U.S. Department of Justice (2013) do not address the following questions related to the use of ALS by forensic nurses:

- What is the role of ALS in clinical injury assessment?
- How is ALS incorporated into forensic nursing practice?
- How should ALS findings and lack of findings be documented?
- What can a forensic nurse testify to regarding the interpretation of ALS findings?

The purpose of this methodology paper is to introduce the forensic nursing community to a current translation-into-practice project focused on developing and evaluating an ALS implementation program to improve the assessment and documentation of bruises among adult patients with a history of interpersonal violence. This scholarly venture began in response to the clinical and evidentiary challenges encountered when serving a diverse patient population who report sexual assault and intimate partner violence (IPV). By considering the context of forensic nursing practice and stakeholders' input within the criminal justice system, our researcher-practitioner partnership aims to find an evidence-based solution.

Background

The forensic medical examination of soft tissue injuries serves two purposes: (a) to direct the nursing care of the patient and (b) to identify any implications pertinent to the assessment findings (American Nurses Association & International Association of Forensic Nurses, 2017). The appearance and location of injuries often tell the story of physical trauma, including chronic abuse, acute assault, and other maltreatment. Capturing these details through appropriate clinical assessments, documentation, and imaging may provide vital evidence to corroborate or refute a history of injury described by the patient. Hence, the quality of injury assessments can affect potential diagnoses, treatment plans, patient outcomes, and investigations. For example, a recent study found patients receiving a forensic medical examination after sexual assault were 2.5 times more likely to report the incident to law enforcement if there was a documented injury, regardless of

whether the injury was nongenital or anogenital (Downing et al., 2022).

Equitable care is an essential component of the *Forensic Nursing Scope and Standards of Practice* (American Nurses Association & International Association of Forensic Nurses, 2017). Yet, documenting soft tissue injuries across ethnically and racially diverse patient populations is not equal. In particular, skin color variation creates disparities in identifying and documenting bruises. Individuals with darker skin tones are particularly disadvantaged by current practices because of the inability to visually detect their injuries. In a qualitative study by Deutsch et al. (2017), survivors of IPV reported: "Race was a significant factor, explaining... their bruises were either not visible or did not accurately reflect the severity of the injury" (p. 769). In their study, lawyers and advocates confirmed that bruise appearance impacted legal outcomes, including the severity of criminal charges filed and relief received in family court.

Forensic pathologists have the advantage of performing multiple dissections in areas of suspected tissue trauma to identify latent bruises on deceased victims of violence. However, fewer options exist for living patients in the clinical setting. *Alternate light*, defined as light of a specific wavelength (Marin & Buszka, 2013), was first suggested in early case reports to aid in photographing bite marks and wound patterns (Krauss & Warlen, 1985; Vogeley et al., 2002; West et al., 1992). Following the U.S. Department of Justice (2013) recommendations to use ALS for identifying "subtle injury" (pp. 67–68), there was an explosion of studies investigating the validity of their recommendation. Concurrently, ALS equipment has become more portable and widely available for field and clinical use (Forensic Technology Center of Excellence, 2018). Five studies investigated whether an ALS clinically improved *bruise detection* (i.e., visible injury presence; Holbrook & Jackson, 2013; Lombardi et al., 2015; Mimasaka et al., 2018; Rowan et al., 2010; Scafide, Sharma, et al., 2020). Another two studies examined whether an ALS clinically improved *bruise visibility* (i.e., degree of clarity in which the injury is visible; Limmen et al., 2013; Nijs et al., 2019). Overall, the research revealed that bruise detection and visibility were significantly enhanced using an ALS, specifically using violet or blue light (400–450 nm). However, most of these studies had design flaws and small, primarily White, population samples.

To move the science forward, the first author (K.N.S.) and a team of researchers conducted a longitudinal, cross-over, randomized controlled trial on 157 adult subjects representing six different skin color groups (Scafide, Sheridan, et al., 2020). An analysis of 2,903 bruise assessments investigating 10 wavelength and filter/goggle combinations revealed violet (415 nm) and blue (450 nm) lights using a yellow or orange filter increased the odds of detecting a bruise up to 5 times greater than white light (odds ratio: 5.34, 95% CI [4.35, 6.56], $p < 0.0001$). These findings applied to all skin

colors and bruises ranging in age from 30 minutes to 4 weeks. In addition, violet light viewed through a yellow filter provided a clinically meaningful improvement in bruise visibility for previously detected injuries (parameter estimate = 0.46, 95% CI [0.43, 0.48], $p < 0.0001$; [Scafile & Sheridan, 2017-2019]). These results confirm previous research findings with greater generalizability.

Researchers have expressed concern regarding the specificity of ALS to detect bruises (Lombardi et al., 2015; Olds et al., 2017). Although ALS is one modality for completing a skin assessment, it is not a diagnostic tool for bruising. Specific skin lesions and topical products can mimic bruising when viewed under alternate light (e.g., hyperpigmentation, scars, tattoos, nevi, sunscreen, makeup; Holbrook & Jackson, 2013; Olds et al., 2017; Pollitt et al., 2016). Using ALS technology provides additional data for interpretation of findings within the context of the patient history, physical assessment, and follow-up examinations (when possible). Hence, evidence-based guidelines are needed to incorporate and document an ALS skin assessment into a forensic medical examination that accurately reflects the science, the context of forensic nursing practice, trauma-informed responses, and potential impact on criminal justice stakeholders.

Project Aims

The *purpose* of this ongoing project is to conduct a formative evaluation of the programmatic implementation of alternate light during the forensic medical examinations of cutaneous injuries among adult patients. The methodology presented in this article was designed to accomplish two aims:

- Aim 1:* Develop an evidence-based alternate light implementation program for forensic nursing departments to assess and document cutaneous injuries among adult victims of sexual violence and IPV.
- Aim 2:* Evaluate the feasibility of the alternate light implementation program.

Overall Design and Timeline

The project is a feasibility study that uses a mixed-methods design, incorporating qualitative and quantitative data to provide a deeper understanding of the practice context and evaluation of the future ALS program. Established theoretical frameworks guide the data collection as presented in the following sections. The project has five phases organized around the two aims: assessment and development phases for Aim 1 and implementation, maintenance, and evaluation phases for Aim 2 (see Figure 1). The original project's timeline was anticipated not to exceed 2 years—7 months for Aim 1 and 13 months for Aim 2. However, as discussed later, the coronavirus pandemic created significant delays. At the time of preparing this article, the project is currently in the assessment phase.

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Setting and Stakeholders

This multisite project involves a partnership between academic researchers and forensic nurses from two forensic nursing departments located in Maryland. Both nursing units provide acute forensic medical services for more than 300 adult patients annually. Both agencies offer forensic medical services to a wide range of adult and pediatric populations, including sexual assault, IPV, chronic abuse, and human trafficking. One program does not currently employ ALS tools during injury assessment, whereas the other has used ALS technology for approximately 10 years. By including both settings in this project, we can obtain critical insight into the strengths and challenges of infrastructure, training, documentation, and procedures needed to support alternate light technology among new adopters and established users of the ALS tools. We can then develop an ALS implementation program adaptable to forensic nursing programs with—and without—existing ALS experience.

As partners, the forensic nurses in both departments actively collaborate during all project phases. Members of the research team regularly attend forensic department meetings, maintaining open communication and engagement with the nursing staff. Other stakeholders involved in the project include law enforcement professionals and district attorneys in the jurisdictions served by these forensic units.

Aim 1: Develop the Evidence-Based Program

Theoretical Framework

The *integrated Promoting Action on Research Implementation in Health Services* (iPARIHS) framework guides the development and implementation phases of this ALS program. This determinant framework recognizes the “multidimensional and complex nature of implementation as well as highlighting the central importance of context” (Harvey & Kitson, 2015, p. 33). Success in implementation occurs through engaged stakeholders, achieving agreed-upon goals, and realizing sustainable practice change. We selected this framework because of its wide use, evaluation, and continued refinement in facilitating healthcare program

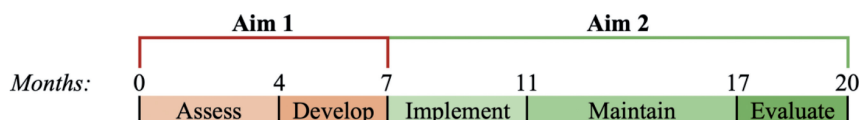


FIGURE 1. Timeline and project phases for program development (Aim 1) and evaluation (Aim 2).

implementation (e.g., Nilsen, 2015; Wray et al., 2018) and nursing practice improvement (e.g., Barakat-Johnson et al., 2020; Jacobsen et al., 2017).

Four constructs of iPARIHS contribute to identifying factors for a practice change to be successful: innovation, recipients, context, and facilitation (see Figure 2). *Innovation* refers to integrating new knowledge specific to the ALS program with existing knowledge. The construct of *recipients* includes the forensic clinical partners, both nurses impacted by integrating the new knowledge and nurses influencing the program's implementation. *Context* refers to the effects of local, organizational, and external health-system-level influences in which the program is situated. The final construct, *facilitation*, involves one or more individuals (i.e., facilitators) executing the innovation's implementation by tailoring it to the recipients and context.

Methods

Facilitators

During the project, volunteer forensic nurses at both study sites and members of the external research team serve as internal and external facilitators, respectively.

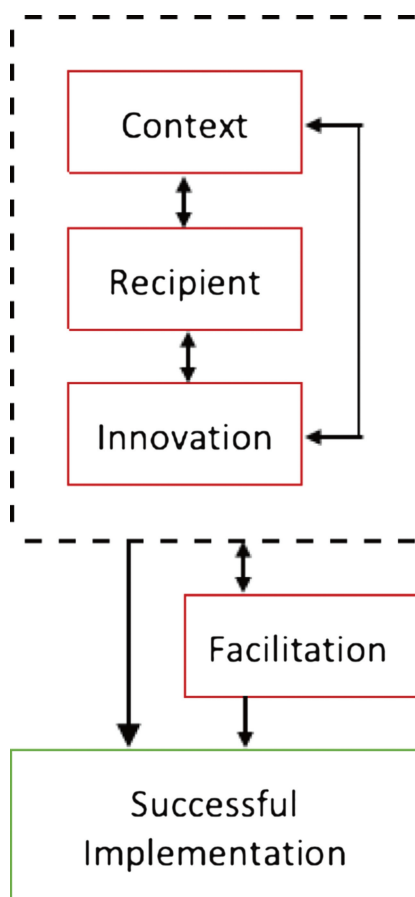


FIGURE 2. Integrated Promoting Action on Research Implementation in Health Services framework.

Context Assessment

For the ALS implementation program to be successful, iPARIHS first requires a careful assessment of factors that facilitate or create barriers to practice change within the context of the forensic nursing program environment. The environmental context includes an inner, department-level layer and an outer, external, or system-level layer. During the assessment phase, qualitative and quantitative data are collected (see Figure 3) to provide a baseline understanding of processes and infrastructure within each department. Qualitative data are accumulated by direct observation and review of written policy and procedure documents, followed by interviews with administrators to fill in any information gaps (see Table 1). Of particular interest are the existing training, procedures involving injury assessment and documentation, and experiences with quality improvement. Finally, to facilitate the forensic unit's context assessment within the broader system in which it functions, external stakeholders (i.e., local law enforcement and prosecutors) are also consulted.

Aggregate admissions or registration data help define the characteristics of populations served by the department who are receiving forensic medical examinations. Reviewing forensic medical records also provides essential data to determine each program's evaluability (i.e., ability to evaluate reliably and credibly). Data on the characteristics of the cutaneous injuries and quality of the photodocumentation are collected from the patients' forensic clinical records at both study sites for the 6 months preceding program development (see Table 2). Only forensic nurses not involved in the patients' care or members of the research team will be completing this data collection to avoid potential bias. To ensure consistency, all reviewers will receive training by an expert in forensic photodocumentation (R.A.E.), and the lead researcher (K.N.S.) will perform ongoing interrater checks.

Recipient Assessments

Recipients, or end users, of the innovation are significant contributors to whether the change in practice is adopted or resisted (Harvey & Kitson, 2015). External facilitators will assess the forensic nursing staff's knowledge, beliefs, and team dynamics to determine what and how to present new knowledge in the program to support successful implementation. The forensic nurses are invited to complete an anonymous, online survey to assess current knowledge and practices related to injury assessment, injury documentation, and alternate light (see online supplemental material, <http://links.lww.com/JFN/A102>). The Organizational Readiness to Change Assessment instrument developed by Helfrich et al. (2009) was adapted for inclusion in the survey to examine each unit's strengths and weaknesses toward a change in practice. The recipients' perspective of the iPARIHS constructs (i.e., innovation, context, and facilitation) formed the basis of the Organizational Readiness to Change Assessment's

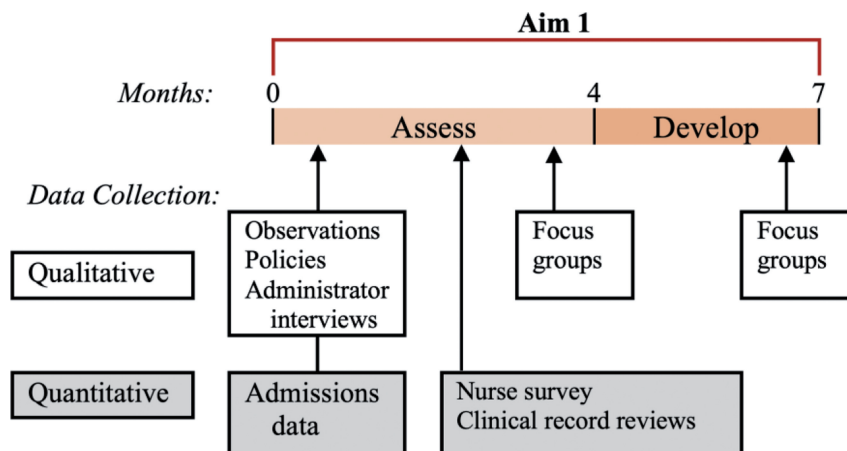


FIGURE 3. Data collection and timeline for program development.

development. The 77-item instrument consists of three subscales that measure the recipient’s perception of (a) the strength in evidence for the proposed change in practice, (b) the quality of support by the organization to facilitate the change, and (c) the capacity of the organization to support the change.

After surveys are completed, an external facilitator with expertise in qualitative research methods (R.K.M.) will con-

duct semistructured focus groups with the forensic nursing staff at both study sites. Each focus group will last approximately 1 hour and include six to eight volunteer participants. Open-ended questions posed to the groups will be based on the survey results. Through the use of follow-up probes, we will seek to understand the forensic nurses’ prior experience with alternate light and implementing changes in practice (positive and negative), readiness for a practice change,

TABLE 1. Qualitative Data Collected During the Assessment Phase

Category	Data
Medicolegal examination procedures	How are forensic medical examinations currently performed by forensic nursing staff, and is it congruent with written policies?
Digital imaging, image storage, security, and evidentiary transfer procedures	How is digital imaging performed by forensic nursing staff, and is it congruent with written policies?
Medicolegal documentation	How are injuries documented?
Personnel structure	What is the current forensic department personnel, characteristics, and reporting structure?
Orientation process	How are new staff oriented, trained, and assessed for competence?
Current learning environment	What are the current methods and content included in training forensic nursing staff on injury assessment?
Evaluation and feedback processes	What are the existing evaluation or peer-review procedures pertaining to forensic medical documentation?
Quality improvement (QI)	What are the department’s existing processes for QI/quality assurance?
Prior experience with innovation and change	What is the prior experience of staff and leadership in implementing changes in practice?
Collaboration and teamwork	Does forensic nursing staff actively engage in teamwork and collaboration, and are such behaviors valued during changes in practice?
Current equipment	What is the current forensic nursing staff exposure to imaging technology, and is the current equipment compatible with ALS?
Examination room	How will the physical environment of the forensic units’ examination room(s) support the ALS equipment (e.g., natural light, location of electrical outlets, security)?

Note. Data collected through direct observation, written policies and procedures, interviews with administrators, and focus groups with forensic nursing staff. ALS = alternate light source.

TABLE 2. Data Collected From Forensic Medical Records

Category	Data
Patient information	Age, gender, race, ethnicity, preexisting cognitive or physical deficit
General examination information	Type of examination (e.g., sexual assault), time of day of examination, number of hours since assault (if known), whether assault is suspected to be drug facilitated
Written injury documentation: white light	Total number of injuries ^a First 10 injuries documented: location on the body, type of injury, size, other descriptors
Written injury documentation: ALS ^b	Wavelength and goggle color used Total number of positive findings (absorption or fluorescence) First 10 positive findings documented: location on the body, size, other descriptors, whether associated with injury documented under white light
Injury photodocumentation: white light	Method of patient identification (e.g., face image) Whether first 10 injuries in written documentation have a coinciding digital image At least one image per injury: taken at 90°, centered in field, injury in focus, good exposure, presence of distractors, scale used appropriately (i.e., image with and without scale, at 90° to camera angle, not covering injury) Orientation (body part) evident by single or multiple images (i.e., rule of thirds)
Injury photodocumentation: ALS ^b	Whether the first 10 areas of positive findings in written documentation have coinciding digital image At least one image per finding: taken at 90°, centered in field, finding in focus, good exposure, presence of distractors, scale used appropriately (i.e., image with and without scale, at 90° to camera angle, not covering finding) Orientation (body part) evident by single or multiple images (i.e., rule of thirds)

Note. ALS = alternate light source.
^aInjuries included various types of soft tissue trauma, erythema, and pain/tenderness.
^bDuring the assessment phase, ALS data are collected only from the study site already using ALS.

and engagement in teamwork and collaboration. Finally, participants are asked about their preferred methods for learning.

Data Analysis Plan—Aim 1

After the assessment phase, the context and recipient data will be analyzed to obtain a comprehensive view of two forensic nursing environments where the ALS implementation program will be developed. Approaches will include descriptive statistics and thematic analysis for quantitative and qualitative data, respectively. The results will then be integrated to inform their collective interpretation in collaboration with the study sites' internal facilitators. Findings will be compared between study sites and aggregated by the external facilitators to identify resources, barriers, and facilitators common to both study sites.

Program Development (Innovation)

Knowledge gained from the assessment phase will guide the development of the ALS implementation into practice program. Critical to the iPARIHS framework, the program's innovation must be informed by research evidence and compatible with existing practices and beliefs.

Program Features

The program will feature four major components: training, procedures, documentation, and equipment recommenda-

tions. The assessment of the forensic nursing departments' existing knowledge and learning environment is fundamental for developing the training program and content. Examples of ALS-related content include scientific principles behind alternate light, application, documentation, imaging techniques, maintaining patient-centered care when using an ALS intervention, and the scope of forensic medical interpretation. The training program will use active learning methodology to foster self-directed learning, critical thinking, and acquisition of knowledge about the appropriate use and integration of ALS into existing clinical practice. Examples of learning activities may include unfolding case studies, self-reflection exercises, skill demonstrations, and simulation to promote successful knowledge transfer.

Evidence-based procedures for implementing ALS in forensic nursing practice will include conditions of use, application during skin assessments, patient and user safety considerations, documenting use and findings, photodocumentation, and maintenance and storage of the ALS equipment. Necessary clinical steps, considering the context of forensic nursing practice, such as cleansing the skin before ALS application but after sample collection (when applicable), will be included based on the available research evidence (Anderson et al., 2020; Pollitt et al., 2016). The internal facilitators at both study sites will receive specific training in preparation for their role as "champions." Champions serve as a readily available resource to staff and encourage

the staff's engagement in adopting and implementing practice changes when using the ALS tools.

Existing documentation templates may require modification to ensure general injury and ALS documentation is evidence based. A combination of narrative, body map, and digital image components provides a more comprehensive representation of patient injuries. Existing injury classification systems, such as those proposed by Sommers et al. (2012), increase documentation standardization. Objective documentation of alternate light assessment settings (e.g., wavelength and filter applied) and light absorption findings may include the use of the Absorption Visibility Scale (Scafide et al., 2021).

The context assessment will reveal the current equipment, including photodocumentation, available at both study sites. Given one forensic nursing unit will already have ALS tools, a site assessment will determine whether the equipment provides the appropriate wavelengths recommended by the research evidence (i.e., 415 nm/450 nm). A similar photodocumentation equipment assessment at the second study site will reveal recommendations for acquiring additional equipment, such as longpass camera filters and goggles for imaging and observation.

Recipient Feedback

After completing the ALS implementation program's development and presenting it to the forensic nursing staff and administrators, focus groups will be conducted to obtain additional feedback. These focus groups (six to eight nurses per group) will provide the implementation team with the recipient's perspectives on successful execution and continue to engage the forensic nurses in the implementation and evaluation processes. This end-user feedback will inform further improvements to the program.

Program Implementation

The introduction of the four components of the ALS program will occur during the 4-month implementation phase. Internal facilitators (champions) will continue to support and engage the forensic nurses in adopting the new practice during this gradual process. External facilitators will frequently communicate with the forensic nurses and internal facilitators throughout the transition with additional activities to address individual staff or setting needs. The nursing staff will receive a second anonymous survey at the end of the implementation phase. This postimplementation survey examines the forensic nurses' perceptions of the ALS program across each component, including the implementation, impact on assessment, documentation of injuries, and perceived patient burden. During the implementation phase, clinical record reviews will be spaced at least 6 weeks apart and serve as a source of feedback for the forensic nursing staff during the critical early stage of executing the program.

Aim 2: Program Evaluation Theoretical Framework

The Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework guides the new ALS implementation program's feasibility evaluation plan. The successful pairing of RE-AIM and iPARIHS tools appears in the literature (Wray et al., 2018) and is more widely adopted to evaluate interventions involving research translation into practice within healthcare settings (Gaglio et al., 2013). RE-AIM incorporates a multidimensional approach to evaluating real-world program sustainability and generalizability (Glasgow et al., 2019). The first dimension, *reach*, focuses on whether the intervention achieves its target population. The *effectiveness* of the intervention examines its impact on specified outcomes. The third dimension, *adoption*, assesses whether the organization supports the implementation of the program into practice. *Implementation* evaluates the fidelity of how the intervention is administered at the setting level. The final dimension, *maintenance*, determines the extent of continued adoption long-term.

Methods

Formative Evaluation

The RE-AIM framework will be operationalized using quantitative and qualitative measures presented in Table 3, each contributing to our understanding of the ALS program's overall feasibility. This formative evaluation will assess the program's (a) reach of the intervention to the target population, (b) impact on injury documentation, (c) user adoption and willingness, (d) fidelity, and (e) sustainability at 6 months after implementation. In addition, we will identify ethical considerations given the potential benefits and burdens on staff and patients.

The fidelity of the staff's application of ALS procedures during patient encounters will be measured through observations by the champions. Using a checklist based on developed guidelines, champions will observe forensic nurse staff complete ALS assessments and provide individual feedback to support the forensic nurses' adherence to the established protocol. These observations will occur at the end of the implementation and maintenance phases (see Figure 4).

Data Analysis Plan—Aim 2

The extent to which forensic nurses adopt the program, implement it based on the developed protocol, and reach patients will be determined by univariate analysis. Subgroup analysis using bivariate statistics may identify conditions in which ALS or its full protocol is less frequently administered (e.g., patient characteristics or examination location). We hypothesize the use of ALS will increase the number of injuries documented over time, preintervention and postintervention (assessment and maintenance phases, respectively). We will explore whether the number of injuries, their characteristics,

TABLE 3. Evaluation of Program Based on RE-AIM Framework

Dimension	Data	Source
Reach	Number and proportion of total patients receiving ALS assessment	Forensic medical records
	Characteristics of patients receiving ALS assessment	Forensic medical records
	Willingness of patients to receive the ALS assessment	Focus groups
Effectiveness (6 months after program implementation)	Compare number of injuries/areas of absorption documented (written and digital images) with before intervention	Forensic medical records
	Compare size and other characteristics of injuries/areas of absorption with before intervention	Forensic medical records
	Compare number and proportion of total injuries/areas of absorption documented with coinciding photodocumentation with before intervention	Forensic medical records
	Compare quality of photodocumentation (white light and ALS) ^a with before intervention	Forensic medical records
	Negative effects, unintended effects, and economic impact of implementing ALS assessments	Focus groups and admin. interviews
Adoption	Number and proportion of total forensic nursing staff conducting examinations using ALS during assessments	Forensic medical records
	Distribution in number of patients receiving ALS assessments by individual forensic nursing staff	Forensic medical records
	Willingness of forensic nurses to conduct ALS assessment	Nurse survey
Implementation	Proportion of the steps in the intervention's protocol completed by forensic nursing staff (i.e., fidelity)	Forensic medical records Champion obs.
	Total time required for ALS program implementation and added time to patient care	Champion obs.
Maintenance	Degree to which the ALS intervention has become institutionalized or part of routine practice	Admin. interviews Focus groups
	Reasons for maintenance, discontinuation, and adaptation of program	Admin. interviews Focus groups

Note. RE-AIM = Reach, Effectiveness, Adoption, Implementation, and Maintenance; ALS = alternate light source; obs. = observations; admin = administrator.
^aSee Table 2 for measures of photodocumentation quality.

and associated photodocumentation quality change over time using a multilevel modeling framework. This type of advanced statistical modeling rigorously accounts for repeated measurements taken over time (Hayat & Hedlin, 2012). Further multivariable analyses may identify whether the number of injuries documented varies by race/ethnicity,

location on the patient's body, or other characteristics. Finally, themes identified in the qualitative data will contribute to our understanding of patients' willingness to be examined using an ALS and nurses to use the ALS technology. We will also identify any adverse or unintended effects that may contribute to the program's sustainability.

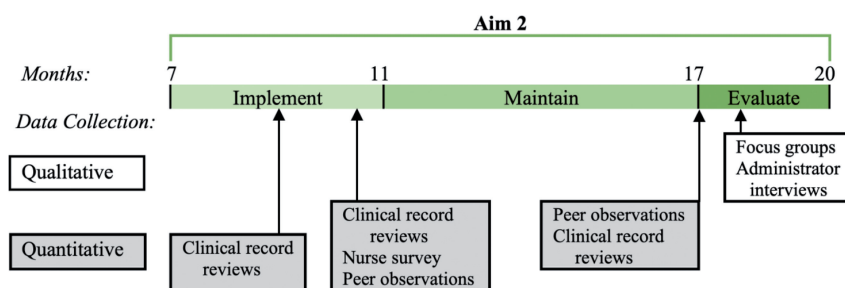


FIGURE 4. Planned data collection and timeline for program implementation and evaluation.

Results of the formative evaluation will be shared with the forensic nursing staff to validate their interpretation.

Ethical Review

This project received institutional review board approval from both study sites through either a reliance agreement with the lead researcher's academic institution (Protocol #1522940) or their hospital's own independent review board. The project's complexity required the distinction between elements of research and program evaluation. Research activities involving the recruitment of forensic nurses (i.e., interviews, focus groups, and surveys) will be carried out solely by the external facilitators to maintain confidentiality and ensure voluntary participation. Informed consent will be obtained from participants in which cross-sectional data (i.e., survey, interviews, focus groups) are collected and waived for retrospective data collection activities (i.e., forensic medical records). Implementing and evaluating a programmatic-level change in practice usually falls outside the scope of research. Regardless, forensic nurses will be instructed to obtain consent from patients before conducting an ALS assessment as they would do during any examination procedure and use their clinical judgment to determine its appropriateness for the context.

Pandemic Impact

The coronavirus pandemic has negatively impacted human subjects research worldwide, creating delays in discovery particularly in healthcare settings. As our project began in early spring of 2020, the clinical partners justifiably focused on navigating, what was then, an unknown patient care landscape during coronavirus. In addition, both hospital and academic institutions limited the research team's access to the study sites to protect the welfare of all those involved. We adapted the project's protocol, moving to virtual or distance data collection where possible (i.e., virtual administrator interviews and focus groups). The forensic patient records of both study sites were not virtually accessible as they were not linked to their hospital's main electronic medical record to protect patient privacy. Therefore, data from injury documentation could not be collected until on-site research continuity was deemed safe. Presently, we anticipate the project to conclude in 2023.

Forensic Nursing Implications

Clinical

Our project aims to improve the quality of injury-associated evidence for patients reporting physical violence in which current practices disproportionately favor light skin tones. Given the many challenges racial and ethnic minorities face in disclosing their victimization to law enforcement, forensic nurses must develop and incorporate evidence-based tools to support equitable practice and just outcomes. Using alter-

nate light to enhance the visualization of bruises may provide more reliable medicolegal documentation for patients of color, thereby potentially improving the response by law enforcement and prosecution. However, translating research into practice is not as simple as just purchasing the equipment. The rigorous approach to developing an ALS implementation program shows the importance of considering both the practice change context and the feasibility of its adoption.

Developing a comprehensive toolkit for implementing ALS into forensic nursing clinical practice meets Aim 1 of this translation into practice study. The toolkit will include written procedures, training materials, documentation templates, equipment considerations, evaluation processes, and other available resources. The toolkit will also consist of recommendations for adapting and incorporating a research-supported ALS program into existing practices and strategies for overcoming barriers to implementation. Because of the focus of this project's funding mechanism, we had to limit the planned program's application to adult patients reporting sexual assault or IPV. Research has shown the potential for additional populations, such as children, to benefit from an ALS skin assessment during examination (Mimasaka et al., 2018). However, further research is needed to support the application of ALS tools during patient encounters with vulnerable patient populations, including those unable to provide a history.

Research

As a formative evaluation of an implementation program, this study's results will inform the design and conduct of a larger-scale outcome study. For example, a cluster randomized controlled trial design across multiple forensic nursing departments may be used to determine whether the intervention has a sustained impact on improving cutaneous injury documentation and photodocumentation (i.e., number of injuries, injury characteristics, and documentation/image quality). External to the forensic nursing program, future research could assess whether the resulting ALS-related documentation affects law enforcement and prosecutorial decision making. We also recommend garnering a better understanding of the technology's use during forensic medical examinations from the patient's perspective.

Conclusion

The evidence shows that ALS is a practitioner-driven technology that can potentially improve the documentation of injuries among victims of sexual and interpersonal violence. However, the lack of evidence-based guidelines on its implementation creates a barrier to the technology's widespread adoption. Our researcher-practitioner collaboration seeks to develop and evaluate a comprehensive ALS skin assessment program considering both the practice context and

stakeholder impact using a theory-based approach. Our goal is to provide evidentiary support for adult victims of violence and a more equitable forensic nursing practice that benefits a more diverse patient population.

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