


REVIEWS

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# A selective review of smoking cessation interventions in the emergency department

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## Abstract

**Background:** Emergency department (ED) patients disproportionately smoke compared to the general population and frequently utilize the ED for routine, urgent, and emergent care. Thus, the ED is a target-rich environment for interventions aimed at increasing smoking cessation, especially among vulnerable populations. Promotion of smoking cessation in the ED has the potential to address health inequalities and reach patients that experience significant barriers to accessing preventive care and lifestyle modifications.

**Topics of review:** This narrative review presents a concise summary of the major smoking cessation strategies studied in the ED setting for adults, children, and pregnant ED patients. Additionally, this review presents the strategies to increase the uptake of smoking cessation in the ED, as well as an international perspective of smoking cessation efforts in the ED. Past and ongoing efforts to improve smoking cessation among ED patients are discussed, and critical knowledge gaps and research opportunities are highlighted.

**Conclusion:** Smoking cessation is both efficacious and feasible during an ED visit, with multiple options available to both adults, children, parents, and pregnant patients. Little standardization among cessation strategies among EDs has been demonstrated, despite the ED being uniquely positioned to address disparities in smoking cessation and contribute towards national smoking cessation goals. During most ED visits, any health care team member can address ongoing tobacco use, and smoking cessation can easily be related to the context of the patient's presenting complaint. To be effective, health care systems and teams must recognize the ED as a suitable location to engage with patients regarding their knowledge and awareness of ongoing smoking use, and are well suited to provide and initiate effective smoking cessation treatments.

**Keywords:** Tobacco, Tobacco use, Tobacco abuse, Smoking, Tobacco cessation, Smoking cessation

## Background

According to the World Health Organization (WHO), tobacco use kills 8 million people annually, with over 1.3 billion tobacco users worldwide [1]. Tobacco products cause a variety of cancers which is directly due to the over 60 carcinogens contained in cigarette smoke [2]. In 2019, 13.7% of US adults smoked with an estimated 20.8% of US adults having used any tobacco products (including

electronic cigarettes and smokeless tobacco) [3]. Due to the high mortality and morbidity associated with smoking use, the United States Preventive Services Task Force (USPSTF) provides recommendations (grade A) that clinicians ask all non-pregnant adults about tobacco smoking use, advise them to stop smoking, and provide behavioral and US Food and Drug Administration (FDA) approved pharmacotherapy (if non-pregnant) [4, 5].

Adult smokers are frequently treated in emergency departments (EDs), and ED patients are disproportionately lower socioeconomic status, are less likely to have primary care access, and are more likely to smoke compared to the general public [6, 7]. With over 130 million

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ED patient visits per year in the USA, the ED represents a health care location that provides care to a population that experiences barriers accessing routine health-care, likely due to the social determinants of health and associated health disparities [6, 8, 9]. ED smokers often present with illnesses exacerbated by, or even directly caused by, tobacco use. More than 16 million Americans are living with a disease caused by smoking, including diseases in pediatric populations due to second hand smoke [10]. Thus, the ED visit represents a valuable “teachable moment” to address patients’ tobacco use and encourage smoking cessation as smokers are frequently confronted with illness and even death [6].

There is strong evidence that smoking cessation interventions are effective, and according to the USPSTF, clinicians should take any opportunity to discuss tobacco use with their patients [5, 11]. Such opportunities include the ED visit, as adult ED smokers exhibit mild-moderate levels of nicotine addiction and interest in quitting [11, 12]. These data underscore the novelty of targeting ED smokers, as the ED is a target-rich environment to promote lifestyle modifications, especially among vulnerable and hard to reach populations.

Smoking cessation is known to provide numerous health benefits, including reduced rates of cardiorespiratory disease, fatal coronary artery disease, and lung cancer [13, 14]. Unequivocally, the USPSTF recommends that clinicians ask all adults about tobacco use, advise them to stop using smoking tobacco, and provide either FDA-approved pharmacotherapy and/or behavioral therapy [15]. This is because in non-pregnant adults, few to no harms have been associated with smoking cessation interventions [5]. Implementation of tobacco control and ED-initiated cessation is efficacious and feasible and this review provides the ED physician with the tools and background needed to address smoking cessation in the ED [16].

This narrative review presents the opportunities and challenges of utilizing the ED setting to increasing the uptake of smoking cessation. Past anti-smoking campaigns have demonstrated marked success in reducing smoking cessation; however, many campaigns have been insufficient to reduce smoking among various populations. Thus, seeking alternative locations to address smoking cessation are needed to reduce disparities that exist in smoking cessation [17]. Past and ongoing efforts to promote smoking cessation among ED patients are discussed, and critical knowledge gaps and research opportunities are highlighted.

### **Implementation of smoking cessation in the ED**

Several key studies have demonstrated both the feasibility and efficacy of addressing tobacco use in the acute care setting [11]. The current evidence-based treatments

for tobacco use focus on two key domains: behavioral therapy and pharmacotherapy. These treatment modalities can both be effective, but when used in combination may provide greater efficacy as the combination of treatments appears to have additive or synergistic effects [16, 18]. This section will focus on current approaches to ED-based smoking cessation and the different therapies available.

### **Identifying current smokers in the ED**

Tobacco smoking-associated diseases present frequently in the ED, with higher smoking prevalence demonstrated among ED patients compared to the general population [7]. Regarding smoking-related illnesses, 5% of adult ED visits, 6.8% of ED adult admissions, and 10.0% of hospital charges are attributed to smoking in 2002 [19]. Despite this, screening for tobacco use disorder is not frequently addressed in the context of an ED visit, beyond recording tobacco use for electronic health record (EHR). Many challenges exist with documenting smoking status in the EHR, with additional complexities given the numerous other forms of tobacco and nicotine use, such as chew, snus, snuff, dissolvables, electronic cigarettes, cigars, bidi, hookah, pipe, and hand-rolled cigarettes [20, 21].

Various methods are used to screen for smoking use. Firstly, individuals that have smoked at least 100 cigarettes in their lifetime and are every- or some-day smokers are considered to be current smokers; however, if they do not currently smoke, they are considered former smokers. Additional definitions by the Centers for Disease Control and Prevention (CDC) are environmental tobacco smoke exposure, never smoker, quit attempt smoker, and someday smoker [21]. For research purposes, a two-question screener is used by two large annual surveys managed by the CDC: The Behavioral Risk Factor Surveillance System (BRFSS) and the National Health Interview Survey (NHIS) [22]. The two questions ask about the 100 lifetime cigarette use and current smoking status (every day, some days, or not at all).

### **Using the ED visit as a “teachable moment” to discuss smoking**

Naturally occurring life events that may motivate an individual to change health behaviors are described as “teachable moments” [23]. The idea of a “teachable moment” seeks to cue a certain event to prompt a cognitive and emotional response to help with a desired behavior change, such as smoking cessation [24]. The ED visit is an opportune location to discuss and address “teachable moments”, in particular as the ED visit applies to ongoing smoking. Relating a certain experience, such as an illness

caused or exacerbated by smoking, is more likely to result in a health behavior change.

Many of the diseases caused by smoking frequently result in ED visits, which present with problems such as cardiac complaints (chest pain, acute coronary syndrome), pulmonary complaints (shortness of breath, pneumonia, COPD), de novo cancer diagnoses, abdominal complications (aortic aneurysm), and vascular complications (poor wound healing). Table 1 presents the estimated ED visits per 1000 persons, for the top 10 most common ED visit diagnosis in 2014, along with potential associations with ongoing smoking, adopted from Hooker et al. [25]. Recognizing the implications of smoking for nearly any and all presenting ED complaints and ED visit diagnoses further demonstrates the importance and relevance of addressing smoking cessation in the context of the ED visit. Relating the ED visit and even subsequent hospitalization to smoking use, such as in the context of a COPD exacerbation, can increase the effectiveness of smoking cessation [30]. This is less commonly done in the context of more simple ED visit encounters, such as in lacerations, even though smoking is a known risk factor for poor wound healing [27].

#### Strategies for ED-initiated tobacco dependence treatment

ED-based lifestyle interventions are adapted generally from the model known as Screening, Brief Intervention, and Referral to Treatment (SBIRT) [31]. Not just for tobacco, SBIRT employs two questions to identify patients with a certain behavior or addiction (in this case, smoking), a brief motivational interview to promote behavior change, and referral to a clinical or community resource to address future treatment [22]. SBIRT

has been studied in ED settings and in combination with motivational interviewing. These interventions have demonstrated success in treating tobacco use disorder, opioid use disorder, and alcohol use disorders [16].

A newer strategy to addressing smoking cessation in the ED is known as Screening, Treatment Initiation, and Referral (STIR), which incorporates medication management into the ED intervention [16]. The benefits of the STIR approach are multifactorial, particularly in the acute care setting. Firstly, providers can exploit the acute care visit as a “teachable moment” in which an individual presenting with acute illness or injury caused by a risky behavior (such as COPD exacerbation in the setting of smoking) may be amendable to change in that behavior [32]. Additionally, patients’ perceived barriers to medication use are lowered in the ED setting, as initiating medication during the ED visit allows providers to educate the patients on the benefits and expectations of initiating treatment. Initiating treatment in the ED for substance use disorders has been feasible and successful for various chemical dependencies, such as pharmacotherapy for tobacco use disorder, and high-dose buprenorphine induction for managing opioid dependence and withdrawal [33, 34]. ED-initiated nicotine replacement therapy (NRT) may also be an effective strategy for helping avoid nicotine withdrawal, as patients with substance abuse disorders frequently leave hospitals against medical advice due to lack of treatment for withdrawal symptoms [35]. Lastly, in the ED, many systemic barriers exist, such as time, space, and lack of training in behavioral treatment approaches, which may preclude the initiation of various efficacious behavioral treatment modalities [36]. ED providers are likely comfortable prescribing

**Table 1** Patient characteristics of top 10 emergency department (ED) visits diagnoses in 2014 with examples how the visit can relate to smoking, adopted from [25]

Visit diagnosis	Estimated ED visits per 1000 persons	Examples of how ED visit can be associated with smoking
Abdominal problems (pain, nausea, vomiting, surgical issues)	50.80	Vascular problems, referred cardiopulmonary problems, wound healing [26]
Mental health and substance abuse	19.23	ED patients with mental health disorders have high rates of substance and tobacco use [26]
Upper respiratory problems	18.21	Exacerbations of underlying COPD or emphysema, increased rates of pneumonia [26]
Sprains and strains	18.06	Impaired healing [27]
Chest pain (including myocardial infarction, acute coronary syndrome)	17.78	Tobacco use causes many of the causes of chest pain including cardiovascular disease [26]
Superficial injury	17.24	Impaired healing [27]
Back pain	13.05	Impaired healing, referred cardiopulmonary, or abdominal pain [26]
Pregnancy and related problems	11.98	Intrauterine fetal demise, sudden infant death syndrome [28]
Urinary tract infections	10.84	Smoking increases prevalence of lower urinary tract symptoms [29]
Extremity fractures	9.79	Impaired healing and increased risk of fractures [27]

medications for substance abuse treatment, and it is reasonable for ED providers only to initiate pharmacotherapy but they must understand that the patients will likely need concurrent behavioral therapies upon discharge [16].

The ED remains the critical access point for medical care for over 20.1 million American adults with some form of substance use disorder; however, for a host of reasons, the ED has not embraced the critical role it can play in the mitigation and treatment of substance use disorders [22]. This is despite evidence demonstrating that ED-initiated smoking treatments are safe and efficacious. A 2017 meta-analysis of randomized controlled trials of ED-initiated tobacco control demonstrated that tobacco-use abstinence up to 12 months after intervention was possible, and that ED-led initiatives may be a crucial public health location for engaging hard-to-reach smokers [11]. This meta-analysis identified 11 studies that found a significant effect on the 1-year combined point prevalence of smoking cessation of 1.4 (RR, 95% CI, 1.06–1.86). Among these was a 2015 randomized controlled trial of 778 low-income ED patients that found patients in the intervention group containing a brief intervention, 6 weeks of NRT, and referral to a quitline had significantly higher rates of biochemically confirmed abstinence at 3 months (12.2%) versus 4.9% for those patients that only received a brochure [33]. Having a tobacco-related ICD-9 ED diagnosis code at the index ED visit, or subject believing that the ED visit was tobacco-related was associated with increasing likelihood of quitting [37]. Combining on-site counseling in the ED with an intensified referral such as quitline referral or booster session can further help create a positive impact [38].

#### Treatment types available from the ED

Numerous evidence-based treatments for smoking cessation exist, many of which have been studied and implemented in the ED, mostly in non-pregnant adults. These treatments are summarized in Table 2 (with additional information in Supplementary Table 1, adapted from Bernstein [39]) and consist of one of two main categories, medication or pharmacotherapy and counseling.

The current FDA approved pharmacotherapies for the treatment of tobacco smoking dependence include NRT (including nicotine gum, lozenges, inhalers, nasal spray, and transdermal patches), bupropion, and varenicline [15]. All three of these types of pharmacotherapy are efficacious for increasing cessation rates; however, using a combination of these products has generally been found to be more effective than when used as monotherapy [5]. Additionally, when only using monotherapy, varenicline is more effective than NRT or bupropion [5].

Behavioral interventions, including counseling, have been shown to increase smoking cessation in adults [15]. These therapies can be delivered anywhere, although are most implemented in the primary care or community settings, and usually rely on motivational interviewing or cognitive behavioral therapy. Compared with various controls, various types of behavioral interventions have demonstrated efficacy in increasing smoking cessation. The interventions that can be offered include clinician-led, individual behavioral counseling, group behavior therapy programs, telephone-based counseling, text messaging-based intervention, mobile application-based interventions, incentive-based motivational interventions, and internet-based interventions [40–46]. Further studies are needed to explore the efficacy of some of the latter interventions, as there is much heterogeneity among the types of services and interventions offered through some of the more technology-based interventions. For example, a systematic review including 18 manuscripts looking at smartphone health apps for smoking cessation found most studies vary in consistency of interventions, study design, and are mostly in the feasibility stage [47]. While not based in the ED, when adding behavioral therapies to pharmacotherapy, rates of smoking cessation increased when compared to pharmacotherapy alone (RR 1.3, 95% CI, 1.08–1.22) [48]. Lastly, several therapies have demonstrated success in individual trials; however, clear benefit has not yet been established. These therapies include but are not limited to hypnotherapy, acupuncture, print-based materials, and even system-level interventions [49–52].

#### Physician resources

To help facilitate the initiation of smoking cessation, several resources are immediately available to all providers in the USA. Quitlines are available in all 50 states and offers a variety of interventions, including written materials, initiation of NRT, referral or direct counseling, and other more modern services such as web and text-based services. Referral to a quitline from the ED is feasible and has been demonstrated to have a 5-fold increase in tobacco treatment enrollment from the ED as compared to providing only smoking cessation information [53]. Quitlines are available 7 days a week, are free for patients and providers, and increasing evidence has demonstrated success at implementing quitline referrals into the EHR for effective and immediate electronic referral to the quitline [54].

Electronic cigarettes have been shown to be more effective than NRT in helping people to quit smoking, with a 2021 meta-analysis of 16,759 participants finding quit rates were higher in people randomized to electronic

**Table 2** Tobacco cessation treatments<sup>a</sup>

Studied cessation treatments studied in the emergency department (ED) setting				
Therapy	Dosage	Instructions	Treatment duration	Safe in pregnancy
Nicotine patch <sup>b</sup>	21 mg 14 mg 7 mg	One patch per day on clean and dry skin. > 10 cpd: 21 mg 4 weeks, 14 mg 2 weeks 10 cpd: 14 mg 4 weeks 7 mg 2 weeks.	8–12 weeks	No, UPT recommended
Nicotine gum <sup>b</sup>	2 mg 4 mg	Chew and “park” the gum between cheek and gum for 1 min, repeat for 30 min	12 weeks	No, UPT recommended
Nicotine lozenge <sup>b</sup>	2 mg 4 mg	Dissolve lozenge over 20–30 min, treatment duration is 12 weeks	12 weeks	No, UPT recommended
Nicotine inhaler <sup>b</sup> Nicotrol Inhaler <sup>®</sup>	10 mg per cartridge, 4 mg delivered Each cartridge = 2 cigarettes	Gentle puffing, not like a cigarette	6-month taper	No, UPT recommended
Nicotine nasal spray <sup>b</sup>	10 mg/mL 1 spray = 0.5 mg	Tilt head back and spray	3–6-month taper	No, UPT recommended
Varenicline <sup>b</sup> Chantix <sup>®</sup>	0.5 mg per dose	0.5 mg/day for 3 days, then 0.5 mg BID for next 4 days, then after 1 mg BID after first 7 days	3–6 months	No, UPT recommended
Bupropion <sup>b</sup> Zyban <sup>®</sup> or Wellbutrin <sup>®</sup>	150 mg	Start 1–2 weeks before quit date Days 1–3: 150 mg in the morning Days 4–end: 150 mg BID	2–6 months	No, UPT recommended
Counseling		Can initiate brief counseling intervention but needs reliable follow up	At least 8 sessions in a 12-month period (4 sessions 60–90 min in Germany)	Yes, recommended
Quitline Referral		Fax, phone, email, or text referral upon ED discharge		Yes
Example of cessation treatments not studied in the ED				
Electronic cigarettes	Not regulated	Not yet recommended		No
Hypnotherapy	Not regulated	Not yet recommended		Unknown
Acupuncture	Not regulated	Not yet recommended		Unknown

UPT Urine pregnancy test, CPD Cigarette per day

<sup>a</sup> E

<sup>b</sup> FDA approved therapy

cigarettes than in those randomized to NRT (RR 1.5, 95% CI 1.21 to 1.93) [55]. An evidence review by Public Health England concluded that electronic cigarettes are 95% safer than smoking and that encouraging smokers who cannot or do not want to stop smoking to switch to electronic cigarettes could be adopted as one of the key strategies to reduce smoking related disease and death [56]. A systematic review of biomarker findings from clinical studies of electronic cigarettes found that the use of e-cigarettes could lead to a significant reduction in exposure to harmful substances compared to smoking tobacco and the health status of e-cigarettes indexed by levels of biomarkers of biological effect showed potential for improvement compared to smoking; however, longer-term population-based studies are needed to further clarify these findings [57]. Long-term safety data are not yet available for electronic cigarettes and therefore discouraging non-smokers from using electronic cigarettes is important; however, for current smokers, electronic

cigarettes may offer a powerful smoking cessation tool, particularly in unmotivated quitters as may be encountered in the ED setting.

## International perspective

### United Kingdom (UK)

Previously, no smoking cessation interventions have been systematically implemented in UK emergency departments; however, the Cessation of Smoking Trial in the Emergency Department (COSTED) funded by the National Institute for Health Research is currently recruiting participants. COSTED is a multicenter randomized controlled trial with an internal pilot, economic evaluation, and process evaluation. The trial is recruiting adult daily tobacco smokers attending the ED. Participants are being randomized to either a brief smoking cessation intervention, offer of an electronic cigarette and training on its use, and referral to local stop smoking services (intervention group) or the provision of

contact details for local stop smoking services (control group). The intervention is delivered by dedicated smokers cessation advisors rather than relying on members of ED staff. Target sample size is 972, recruiting across 6 National Health Service EDs in England and Scotland. The primary outcome is carbon monoxide verified continuous smoking abstinence at 6 months [58]. It is hoped that if COSTED proves an ED-based smoking cessation intervention is beneficial and cost-effective then smoking cessation initiatives may become standard practice across EDs in the UK.

### Continental Europe

The 2016 Norwegian national guidelines recommend that (1) a minimal intervention should be carried out at all appropriate consultations (this includes EDs), (2) everyone who wants to quit smoking should be offered structured help with rehab, and (3) additionally anyone who wishes to quit smoking should be considered with regard to discontinued use drugs [59]. National Swedish guidelines recommend a qualified counselling dialogue with all adult patients being daily smokers and (priority 1) having specific risk (chronic diseases, cognitive disorders, social vulnerability, adiposities and others), a planned surgical intervention, as well as for children and adolescents younger than 18 years of age, and for pregnant women. Priority 2 is to offer counselling to all smokers. In Denmark, the five health regions recommend to screen hospital patients for smoking and to offer a 'very brief advice' for smoking cessation, followed by making an agreement with the local smoking cessation unit placed in the community [60]. This does not exclude ED patients. Additionally, free NRT is available in hospitals and at smoking cessation clinics. The primary care centers in the community run intensive smoking cessation intervention as the standard, free of charge with open access [61].

In Germany, the national guideline on tobacco control (updated in 2020) explicitly mentions EDs ("Notfallambulanzen") as suitable sites for tobacco control. It is recommended to screen at least once per year (or every new patient) for tobacco smoking and to offer (at least) a brief intervention [62]. NRT and other medication for smoking cessation are covered by health insurance in smokers with severe tobacco dependency at least once in 3 years. The 2018 Italian national guideline on tobacco control explicitly mentions EDs ("pronto soccorso") as suitable places for a 3–5-min brief advice ("intervento minimo"), despite the high NNT (around 40) in this setting [63]. While it is recommended to transfer the patient to centers specialized on tobacco control, a recent study from an Italian ED demonstrated that the 5 A's method of smoking cessation was no better than usual care [64].

## Additional considerations regarding smoking cessation

### Unique populations: pediatrics

Tobacco use is considered a "pediatric disease" by the American Academy of Pediatrics (AAP) given the pediatric morbidity caused by adult tobacco use, which can result in increased pediatric emergency department visits and hospitalizations [65, 66]. Second hand smoke exposure in children and in pregnancy is a major cause of disease among children [67]. Additionally, increasing rates of e-cigarette use is being reported among US adolescents with 28.6% of lifetime e-cigarette users starting at the age of 14 or younger, meanwhile one quarter of cigarette users start by 12 years of age [68]. It is estimated that 12 million children who visit pediatric EDs are exposed to tobacco smoke, and thus addressing smoking cessation in pediatric EDs is needed [66]. Many individual studies have demonstrated success at both targeting pediatric smoking in the ED, as well advising and intervening on parental smoking [66, 69]. Most studies focus on quitline referrals as the main intervention for parents and adolescents, with little focus on behavioral or pharmacotherapy interventions among these populations [70, 71]. Thus, if ED providers encounter circumstances in which either the parents or children smoke, it is strongly recommended to address their use during the ED visit, and if interested, referral to the local quitline is a reasonable first step.

### Unique populations: pregnant patients

Pregnant patients are especially vulnerable to complications of tobacco use, especially for intrauterine growth restriction (OR 2.4, 95% CI 2.34–2.53) and increased odds of preterm delivery (OR 1.2, 95% CI 1.13–1.28) [72]. The primary and most studied intervention for pregnant patients is behavioral support, which is summarized in recent systematic review and by a 2017 Cochrane review [5, 73]. Pooled analyses of all behavioral interventions, regardless of type of behavioral support, demonstrated increased rates of smoking cessation in late pregnancy (RR 1.4, 95% CI 1.23–1.48) [5]. Additionally, there is some evidence that demonstrates cessation in late pregnancy can continue as far as 18 months into the postpartum period (RR 2.2, 95% CI 1.23–3.69) [73]. Variable data is available regarding adverse effects of either NRT, bupropion, or varenicline in pregnant patients, with several studies reporting different results regarding the likelihood of stillbirth, birth outcome adverse effects, or congenital anomaly [15]. The USPSTF has concluded that current evidence is insufficient to assess the balance of benefits and harms of NRT; however, the American College of Obstetricians and Gynecologists (ACOG) acknowledges that clinicians should individualize care by

offering psychosocial, behavioral, and pharmacotherapy interventions [74].

### Cost

Smoking-related illnesses in the US alone account for over \$300 billion in annual costs, with much of that accounting for direct medical care related to tobacco use [75]. In comparison, treatment of tobacco use is affordable, and in many circumstances free to the patient [76]. The screening can be done effectively by any member of the health care team, and free resources for cessation in the ED can include referrals to the state's quitline or brochures provided by the health department. Increasing use of ED peer support specialists are being implemented in large ED settings, in which providers have unique skillsets and training for addressing substance use disorders in the hospital setting [77]. The cost of NRT or other pharmacotherapy may be a prohibitive barrier for many, and thus quitline referrals may be an advisable first step if the patient may experience financial barriers to quitting since many quitlines provide access to inexpensive methods of obtaining pharmacotherapy [78].

### Knowledge gaps and research opportunities

Urban and rural populations smoke tobacco at higher rates than the general population, and thus are an attractive patient population to target for smoking cessation interventions [79]. A randomized controlled trial has demonstrated successful tobacco abstinence among low-income ED patients in a US urban ED; however, an unmet need still exists to generalize these results to other practice environments [33]. Additional knowledge gaps include studying the use of e-cigarettes among ED patients, larger studies in pregnant ED patients, and a better understanding of pediatric tobacco use and cessation.

The ED triage setting is increasingly being used to address many safety issues, such as falls risk, intimate partner violence, suicide risk screening, and infectious disease screening, and the utility of universally addressing tobacco use in the ED remains to be seen [80–83]. Many public policies have been instituted to address smoking cessation and it remains to be seen if any policies should or will be implemented in the ED [84]. Such policies or changes could be intentional integration of smoking cessation recommendations into the EHR, which could link patients and providers with various options and resources for smoking cessation. ED providers frequently lack knowledge and training in smoking cessation; however, the skillset is easy to acquire and could potentially be implemented in future curricula. Lastly, nurse-delivered inpatient smoking cessation interventions have

been successful and cost-effective, demonstrating the ability for non-physicians to share the responsibility for addressing tobacco control [85].

A final place that smoking cessation could be addressed, in the context of the ED, is ED-observation medicine. Observation units are frequently run by ED teams, and have been well demonstrated to be a clinical and financial benefit for hospital systems [86]. In-hospital smoking cessation programs have been well established, such as a pharmacist-led smoking cessation program that demonstrated an increase in 3-month smoking abstinence for hospitalized patients (28.6% vs 16.4%, intervention vs control,  $p = 0.035$ ). ED-led observation units frequently provide care for patients with ongoing tobacco use, such as a COPD exacerbation, and these visits would be an opportune time to address smoking cessation and provide intervention [87].

### Conclusion

Tobacco use is common among ED patients, especially among disadvantaged and vulnerable populations. Initiation of smoking cessation in the ED setting has been effective in promoting sustained tobacco abstinence among ED patients. Tobacco use is both costly to the health care system and creates a large burden of disease and illness for ED patients. Thus, the ED serves as an appropriate and suitable location for tobacco screening and intervention, especially for hard-to-reach patient populations. Several strategies and trials have demonstrated efficacy at exploring smoking cessation in the ED, and future work should focus on implementing tobacco cessation in more ED settings, to determine the optimal strategy. This review seeks to provide ED physicians with the skills and knowledge to begin to implement smoking cessation into their practice. Smoking cessation can occur in all practice settings, need only take a few minutes, and can have immense downstream health benefits for ED patients.

### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s44201-022-00006-5>.

**Additional file 1: Supplementary Table 1.** Tobacco Cessation Treatments Precautions and Adverse effects.

### Authors' contributions

NP organized and conceived the manuscript. NP, IP, BN, RL, and SB contributed and edited the manuscript. SB provided senior mentorship for the manuscript. NP revised the manuscript. The author(s) read and approved the final manuscript.

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