Innovative Strategies to Prevent Childhood Smoking Epidemic: Systematic Review

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ABSTRACT

Background: The phenomenon of smoking in children is a serious problem. There are still many minors who smoke and traders who still sell cigarettes to them. Although regulation regarding this issue has been established, legal attention to this problem is still fairly minimal; this shows the need for law enforcement and further protection for children. The rate of e-cigarette use among children aged 13-15 years is higher than adults across WHO regions. Aims: This research aimed to determine how efforts have been made to reduce smoking prevalence in children. Method: This literature study used a Systematic Literature Review (SLR). PubMed, Science Direct, ResearchGate, and Google Scholar were used for the literature search. The keywords used were "Child Smoking," or "Child Cigarettes" and "Smoking Policy" or "Child Smoker". Results: Several efforts were made to reduce the prevalence of smoking in children, including legal protection efforts related to cigarette advertising regulations, restriction on cigarette dealers, prevention on selling cigarettes to children, expanding the implementation of KTR, providing smoking cessation services for children, mass campaigns and education for children, improving fiscal policy, and making innovation such as "Smoking Prevention in School Children in Hospitals" program and an idea called cigarette vending machine. Conclusion: Regulations related to cigarette use must continue to be pursued and implemented according to standards following local government policies by paying attention to the principles and guidelines provided. Families also play a role in helping to prevent the initiation of smoking in children.

Keywords: Children, Cigarettes, Government Regulations, Health Policy, Smokers

INTRODUCTION

The incidence of underage smoking in Indonesia remains notably high. Data from the Basic Health Research (Riskesdas) indicates that the proportion of smokers among individuals aged 10 to 18 years rose from 7.2% in 2013 to 9.1% in 2018, subsequently declining to 7.4% by 2023 (Kementerian Kesehatan Republik Indonesia, 2018). These statistics reveal that the prevalence of underage smoking has met the target outlined in the National Medium-Term Development Planning (RPJMN), which aimed to reduce the prevalence of underage smokers from 9.1% in 2018 to 8.7% by 2024. However, there are still many children who smoke as research conducted by Sari found that 50% around male students of elementary schools have smoked, this can be seen when they come home from school to gather with their friends.

Although it is clear that school regulations prohibit students from smoking, students do not care about these rules. The influence of peers is a major factor in the increasing number of underage smokers in Camba sub-district. Based preliminary observations, it was found children who smoked elementary students in grades 3-6 aged 7-12 years (G. S. I. Sari and Awaru 2021). Therefore, efforts to reduce prevalence of smoking in children must continue to be attempted. Smoking is a behavior that can be detrimental to the health of smokers and those around them. Individuals who smoke face a heightened risk, ranging from 2 to 4 times, of developing coronary heart disease and are also at an elevated risk of experiencing sudden death. Smoking constitutes a primary risk factor for numerous noncommunicable ailments, including hypertension, coronary heart disease,



respiratory infections, stroke, and complications during pregnancy, impotence, and various types of cancer. Moreover, smoking ranks as the second most significant contributor to mortality globally, following hypertension, with statistics indicating that smoking has resulted in the demise of 1 out of every 10 adults worldwide (Kemenkes RI, 2017). The price of cigarettes in Indonesia is rather cheap and affordable for children, and sold retail. The affordability of cigarettes by children threatens the quality of life of Indonesia's next generation (Nurhasana et al. 2022).

Article 28B Paragraph (2) of the 1945 Constitution claims that the state must guarantee the right of every child to develop (Republik grow and Indonesia, 2016). In addition, according to Law Number 35 of 2014, children are individuals who have not reached the age of 18 years, including those who are still in conceive (Presiden Republik Indonesia 2014). As stipulated in the Republic of Indonesia Law Number 23 of 2002, it is mandated that both the Government and other state bodies are obligated and accountable to offer tailored safeguarding to children during crises, including those who fall victim to substance abuse-such as narcotics, alcohol, psychotropics, and other addictive substances (commonly referred to as drugs)-as outlined in Article 59. This will be achieved through vigilant oversight, preventive measures, treatment, and rehabilitation programs facilitated by governmental and societal entities. Therefore, everyone prohibited from conciously placing, allowing, involving, ordering to involve children in the abuse, production and distribution of drugs (Presiden Republik Indonesia 2002). In fact, smoking habits prevent children from growing developing optimally. Therefore, governments should address smoking among children through policies based on empirical evidence involving various groups of people.

The Center for Behavior and Health Promotion, Faculty of Medicine, Public Health, and Nursing (FK-KMK), asserts that smoking represents a type of harm inflicted upon children, as it detrimentally impacts their health. Consequently, children who engage in smoking are regarded as recipients of this Indonesia has ratified harm.

Convention on the Rights of the Children (CRC), which states that every child is entitled to the highest standard of health. Therefore, parents are responsible for maintaining the health of their children, including preventing them from smoking and helping children who already smoke to quit (Fakultas Kedokteran, Kesehatan Masyarakat, UGM 2023). The Ministry of Health of the Republic of Indonesia reported that the number of smokers in Indonesia showed an increase from 2013 to 2019, especially among children and adolescents. During this five-year period. the number of smokers in the child and adolescent age group increased by about 2% more. Around one in ten children aged 10-18 years in Indonesia are smokers, showing one of the highest smoking rates among adolescents in the world. The number of these young smokers continues to increase. Despite a ban on tobacco sales for those under the age of 18, more than 40 percent of Indonesian students aged 13-15 have used tobacco products, according to the 2019 Global Youth Tobacco Survey (N. R. Sari 2023).

Young individuals who initiate smoking at an early age exhibit an elevated occurrence of tobacco-related cancers as they reach a particular age, primarily attributable to their premature exposure to detrimental toxins found in cigarettes. Additionally, adolescent smokers often encounter a greater frequency of both short- and long-term respiratory symptoms compared to their non-smoking peers. Moreover, smoking can impede lung development in children and adolescents while also heightening the susceptibility to asthma among youth without a prior medical history of the condition (Scholes, Mindell, and Neave 2016).

The increasing number of minors who smoke and their easy access to cigarettes, despite existing regulations, highlights the urgency for immediate action in health promotion and behavioral science. This involves implementing evidence-based strategies aimed at safeguarding children from the harms of tobacco use. Regarding health promotion, the study stresses the importance of legal safeguards, especially in regulating cigarette advertising and sales to minors. It observes that although regulations are in place, their enforcement needs to be improved, revealing a gap between policy



and practice. This gap presents an opportunity for health promotion professionals to advocate for stricter enforcement and innovative programs aimed at reducing smoking rates among children. These efforts are essential for creating a supportive environment that promotes healthy behaviors and upholds children's rights to health.

Behavioral science plays a crucial role in comprehending and addressing the factors influencing childhood smoking. The study identifies peer influence and affordability of cigarettes significant drivers of underage smoking. Interventions grounded in behavioral science can target these factors through initiatives such as peer education programs and advocating for fiscal policies that increase the cost of cigarettes for children. By applying behavioral change theories, these interventions can effectively curb the initiation and prevalence of smoking among children, contributing to broader public health goals of fostering a healthier, smoke-free generation. Based on these issues, it is important to analyze efforts made to reduce the prevalence of smoking in children to better understand which approaches are most effective and how to improve strategies to protect children's health from the dangers of smoking. This will

help create a healthier and more supportive environment for future generations.

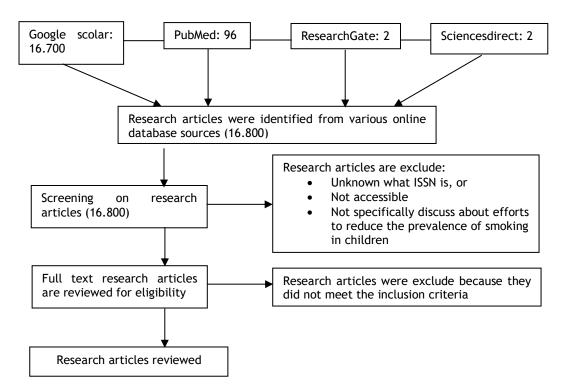
METHODS

The method used in this study was Systematic Literature Review (SLR). The research was meticulously conducted, adhering to established protocols in the literature review process to mitigate any potential subjective biases. Data utilized in the study was sourced from diverse publication scientific databases. encompassing national and international sources. Articles were sourced from databases including Google Scholar, ResearchGate, and Science PubMed, Direct, employing keywords such as "Child Smoking," or "Child Cigarettes," "Smoking Policy" or "Child Smoker.'

The literature search was limited by the inclusion criteria:

- 1. The research was conducted between 2014 and 2024,
- 2. Research results published on Journal with ISSN, and
- 3. The results of the research specifically discuss about the efforts to reduce the prevalence of smoking in children.

The article journal search scheme is as follows:





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Figure 1.Literature Search Scheme RESULTS AND DISCUSSION

Search results through online databases found 16,700 articles on Google Scholar, 96 articles on PubMed, 2 ResearchGate articles, and ScienceDirect articles. Next, articles were selected based on title, year published, and full text. Finally, 9 articles were selected based on inclusion and exclusion criteria. Based on a literature review, 9 articles discussing about various efforts made to reduce the prevalence of smoking in children. Figure 1 is the result of journal identification using systematic review. Some articles were excluded because they were not eligible for review. Requirements that were not met include: journals that do not have ISSN, articles that cannot be accessed, and articles that are not specific to efforts to reduce the prevalence of smoking in children. In addition, the nine articles discussed have texts that are complete, appropriate, and relevant to this study. Table 1 is the result of the literature review that shows the characteristics of articles that are proper of systematic review. Efforts in the form of law, family efforts, increasing child detention, and various other attempts are the focus of research in 2014-2024.

Table 1. Summary of finding from 9 studies

No	Title	Researcher	Source	Study Design	Results
		and Year of Publication			
1.	Consumer Protection of Cigarette Product Advertising as an Effort Reducing the Prevalence of Child Smoking	Tiara Nabila, Muthia Sakti (2023)	Jurnal Interpretasi Hukum	Normative juridical method	Legal protection for child smokers as consumers as an effort to reduce the prevalence of child smokers has been stated in various regulations that regulate regarding the control of cigarette product advertising which can be said to be preventive legal protection, but this is considered unable to reduce the prevalence of child smokers in Indonesia.
2.	Analysis of Non- Smoking Area Regulatory Compliance in UPTD Kampung Anak Negeri Foster Children	Mike Danis Mutika Wati, Mochammad Bagus Qomaruddin (2020)	Jurnal Promkes: The Indonesian Journal of Health Promotion and Health Education	Observational using a cross-sectional approach.	All variables, including personal responsibility and support among fellow foster children have a relationship with compliance with non-smoking area. it's just that the closeness of the relationship between each variable is different. It is better to form peer educators in foster children and increase bonding with mentors and coaches.



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3.	Prohibition of Cigarette Sales to Children in Tambaksari District, Surabaya City	Rani Triana Simatupang, Emmilia Rusdiana (2016)	Novum: Jurnal Hukum	Sociological Juridical	There needs to be more enforcement regarding the prohibition outlined in Government Regulation on Safeguarding Tobacco Products for Health article 25 paragraph (b), which prohibits the sale of cigarettes to individuals under the age of 18 years in the Tambaksari District of Surabaya City. Several factors contribute to this regulation's weak enforcement, including law enforcement and community-related aspects. A significant portion of the population needs to be made aware of this regulation due to inadequate dissemination efforts by authorities. Moreover, there is a notable absence of surveillance and enforcement actions taken by law enforcement agencies against violators of this regulations of the regulations of this regulations of the regu
4.	Cigarette Vending Machine and Cicard "Alternative Solutions to Reduce the Number of Underage Active Smokers	Latifa Fajri Ramdhani, Fitrianur Laili, Zahrotul Mahmudati (2014)	Jurnal Ilmiah Mahasiswa	Notion	A new idea in the form of cigarette vending machines and cicards (cigarette cards) that can limit the age of cigarette consumers.
5.	Prosecution of Traders and Businessmen who Sell Cigarettes to Children in Batam City, Indonesia	Rika Permatasari, Winsherly Tan (2021)	Conference on Management, Business, Innovation, Education and Social Science	Sociological or empirical, where empirical legal research is a legal research method that attempts to see law in a real sense or real observations, examine how law works in society.	The government has conducted socialization regarding regulations prohibiting selling cigarettes to children, to traders and entrepreneurs, and education on the dangers of smoking for children. The government is trying to continuously socializing and



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					educating during this pandemic, by conducting webinars, electronic books about the dangers of smoking, and developed Quit-Line via telephone for children who want to quit smoking can consult and get tips and info on the website of the Ministry of Health of the Republic of Indonesia.
6.	Preventing Smoking in Children and Adolescents: Recommendations for Practice and Policy	Johanne Harvey, Nicholas Chadi (2016)	Canadian Paediatric Society	Literature review	The most effective measures to reduce adolescent smoking rates are already in place in Canada: High tax rates Labelling disincentive Marketing and sales restrictions No smoking in public places.
7.	Smoking Prevention in Children and Adolescents: A Systematic Review of Individualized Interventions	Lindsay R. Duncana, Erin S. Pearsonb , Ralph Maddison (2017)	Elsevier	A systematic review	Preventing the onset of smoking among adolescents aged 7 to 18 years entails implementing interventions within primary healthcare facilities employing interpersonal communication and support tactics. Ultimately, the most effective approach to deter adolescent smoking is likely to integrate traditional intervention methods with individual-level interventions that educate adolescents on cognitive-behavioral principles, such as effectively managing their behavior concerning cigarette use.
8.	Family-Based Programmes for Preventing Smoking by Children and Adolescents	Thomas RE, Baker PRA, Thomas BC, Lorenzetti DL (2015)	The Cochrane Library ScienceDirect	RCT's	There is compelling evidence indicating that interventions focused on families can yield favorable



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					outcomes in
					deterring children
					and adolescents
					from initiating
					smoking.
9.	Smoking prevention	K. Furrer a,	Elsevier	Cohort	The "Hospital-based
	intervention with	M.M.			Prevention Program
	school classes in	Schuurmans			for Schoolchildren
	university hospital	b, M.			Smoking" is an
	by thoracic surgeon	Hebeisen c,			initiative designed
	und pulmonologist.	S. Schulte a,			to offer students
	The Zurich	D. Schneiter			interactive
	prevention project	a, W. Weder			educational sessions
	h h .3	a, I. Opitz a,			regarding the health
		S. Hillinger			implications of
		(2022)			smoking and its
		(===)			ramifications.

Of the 9 articles selected and presented in table 1, the most discussed effort was legal protection efforts with a total of 4 articles. 1 article discussed legal remedies carried out in Canada. Another article mentioned several recommendations for efforts that should be made by the government in reducing the prevalence of child smokers. The rests advertising discussed cigarette regulations, regulatory revisions, Nο Smoking Area regulations, strict supervision by the government, and legal affirmation.

Several other efforts followed. namely: the formation of peer education or support from peers as many as 1 article, social support as many as 2 articles, conducting socialization or coaching and education related cigarettes as manv as 4 articles. conducting interpersonal communication with children as many as 2 articles, diverting children's attention with positive activities as much as 1 article, parental supervision as many as 2 articles, innovate a program as many as 2 articles.

Based on a literature review of 9 selected articles, there were several efforts made to reduce the prevalence of smoking in children. One of the most discussed efforts was to socialize, foster and educate children contained in 4 articles. The government, through the Education Office, can hold campaigns or socialization in schools with the aim of educating children about the negative effects of smoking on health (Nabila and Sakti 2023). In order for a regulation to be known by the community, one way that must be done is socialization. However, in Tambaksari sub-district, residents, including cigarette sellers, the elderly,

and children who smoke, said they had never attended a socialization event cigarettes (Simatupang about Rusdiana 2016). The government strives to continue to carry out socialization and education through various means, such as holding webinars, providing electronic books about the dangers of smoking, and Ouit-Line providing services via telephone. Children who want to quit smoking can consult, get tips, and access information on the website of the Ministry of Health of the Republic of Indonesia (Permatasari and Tan 2021). Based on interventions conducted by Furrer et al., (2022) socialization sessions showed a significant increase in knowledge about the effects of smoking. This was shown by an increase in the number of correct answers from 40% to 81%.

There are four articles that discuss various legal efforts made to prevent the prevalence of smoking in children. Legal protection to prevent disputes cigarette consumers is contained in Article 4 of the Law regarding Consumer Protection that must be regarding the protection of cigarette advertisements in an effort to reduce the prevalence of child smokers can be seen in several positive laws in Indonesia that regulate the control and restriction of cigarette product advertisements in various platforms, such as in the Law of Customer Protection, Broadcasting Law, Health Law, and Government Regulation No. 109/2012.

As mandated by laws and regulations, the Indonesian Food and Drug Authority (BPOM) also oversees the legal aspects of cigarette advertisements. BPOM monitors advertisements for various cigarette products and evaluates their



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compliance with government regulations. Additionally, preventive legal measures are implemented by restricting access for individuals under 18 to purchase cigarettes, as stipulated in Article 21 Letter a of Regulation of The President of the Republic of Indonesia Number 109/2012. However, in that Presidential Regulation, it is considered that there is a void in legal provisions, namely that the regulation has not been regulated regarding criminal sanctions for parties violate regulations related to cigarette advertising and has not been regulated also related to electronic cigarettes that have appeared since 2012 in Indonesia. In addition, there has been no regulation regarding the prohibition of cigarette purchases so that minors exposed to cigarette advertisements can easily buy cigarettes at stalls (Nabila and Sakti 2023).

One of the factors that make a regulation effective is the citizens of the community. The awareness of citizens to comply with laws and regulations is still poor. If the community obeys and is aware of the law, the laws/rules that are valid will run according to their functions. Law enforcement of the ban on the sale cigarettes to children requires coordination between law enforcement officials, the community, and the children themself. All communities must begin to realize that cigarettes are harmful and cause many negative effects. With good coordination between parties, the rule can run properly and will reduce adolescent smokers (Simatupang and Rusdiana 2016). In addition, efforts to train children's responsibility in complying with regulations related to smoking can be added by becoming a peer educator for fellow children. Support provided by peers can lead to positive or negative things. Therefore, there is a need for peer educators who can be a positive role model for children to learn in order to understand the negative effects of smoking (Wati 2020).

There are several regulations governing the prohibition of the sale of cigarettes to children. Not only selling but giving. Giving is also prohibited according to existing rules and has different sanctions also in each law, based on Government Regulations and Batam City Regional Regulations (Permatasari and Tan 2021). Regulations governing the

prohibition of selling cigarettes to children are:

- Government Regulation Number 109 of 2012 concerning Safeguarding Substances Containing Addictive Substances in the Form of Tobacco Products for Health
- Law Number 35 of 2014 concerning Amendments to Law Number 23 of 2002 concerning Child Protection
- 3. Law Number 8 of 1999 concerning Consumer Protection
- 4. Batam City Regional Regulation Number 1 of 2016 concerning Non-Smoking Areas

The legal action for traders who sell cigarettes to children is that socialization will first be carried out to traders or entrepreneurs by community police office (bhabikantibmas) explaining the rules that prohibit selling cigarettes to children. If they violate it, they will get sanctions, fines to revoke business licenses.

In Canada, the Tobacco Act, passed in 1997, and its amendment, Bill C-32, passed in 2009, became the basis for federal tobacco regulation. Several measures considered most effective for reducing adolescent smoking rates have been mandated in Canada (Johanne Harvey and Chadi 2016) Among them are:

- 1. High tax rates: Making tobacco products less affordable by raising taxes on tobacco products.
- 2. Labeling disincentives: The use of explicit photos and smoking-related health warnings on all tobacco products, their packaging and labeling.
- 3. Marketing and sales restrictions: Prohibit point-of-sale displays, advertising to minors, and sponsorship of public events by tobacco companies.
- 4. Non-smoking spaces: Smoking is prohibited in public places such as schools, daycare centers, workplaces, hospitals, restaurants, hotels and parks, as well as on public transport and cars transporting minors.

All levels of government should:

- Continue to adopt and enforce laws and regulations restricting tobacco access for minors, including ecigarettes and alternative tobacco products.
- 2. Passed a universal ban on smoking in cars whose passengers are teenagers under the age of 18.



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- Continue to regulate tobacco advertising and packaging, and specifically control new tobacco products aimed at minors.
- 4. Apply strict penalties to any company or individual that sells contraband cigarettes.
- 5. Make all tobacco products less affordable by imposing very expensive taxes.
- 6. Provide confidential access and coverage for smoking cessation therapy, including treatment based on provincial/territorial health plans
- 7. Fund and encourage research on the impact of tobacco use in young people and successful smoking prevention and cessation interventions.

In an effort to help prevent initiation of smoking in children. Families communicate to children, adolescents and other family members about tobacco use and exposure and provide age-appropriate information and counseling to prevent initiation as part of routine health services (Johanne Harvey and Chadi 2016). There is evidence of moderate quality indicating interventions focused on families can prevent children and effectively adolescents from initiating smoking. Intensive programs may yield greater success compared to less intensive ones. Additionally, incorporating a family-based element into school interventions has shown promise in preventing smoking initiation. Because the interventions and situations in these reviews are so different, it is important for family-based programs to be continually evaluated (Thomas et al., 2015). Based on research conducted by Septiono dan Meyrowitsch (2014) it was found that parental control and parental consent to tobacco use were associated with smoking among children, and active interventions that encourage these factors could potentially also influence the likelihood of smoking among children.

Parental control can be done through monitoring social activities and setting boundaries to avoid negative influences. This will reduce the socio-environmental impact of tobacco use as it is also intended to prevent the influence on smoking. However, parents' disapproval of smoking habits in the home can lead to the perception that smoking is a negative act. In addition, the status of

fathers, mothers, and siblings who smoke is also a strong predictor of children will smoke.

Preventing adolescents aged 7 to 18 years from initiating smoking requires interventions implemented in primary healthcare settings, along with interpersonal communication and support strategies. Nevertheless, research consistently highlights that children are susceptible to influence and may alter their smoking behavior over time. This underscores the importance of continuous regular interventions involving and interpersonal communication with influential individuals, commencing from a young age (e.g., consistently practicing strategies to refuse offers of cigarettes). Further research is required to determine the most effective setting, dosage, and combination of intervention components necessary to sustain nonsmoking behavior impressionable demographic (Duncan, Pearson, and Maddison 2018).

Thoracic and pulmonary surgeons at the University Hospital Zurich, Switzerland, also contributed endeavors aimed at decreasing prevalence of smoking among children. They achieved this by arranging student visits to the University Hospital Zurich, where they directly interacted with physicians and patients. Throughout these sessions, students were educated about the health consequences of smoking and were shown surgical videos depicting the contrasting conditions of lungs in smokers and non-smokers. After the intervention, there was a significant increase in the correct number of answers questionnaires on smoking knowledge. This session was followed by discussions and questions made by students (Furrer et al., 2022).

Furthermore, Ramdhani et al. (2014) introduced an innovation known as the cigarette vending machine and cicard (cigarette card) to restrict cigarette purchases to individuals of legal age. This system permits only consumers aged 18 years and above to utilize the cigarette vending machine and cicard. operation of this cigarette vending machine mirrors that of a standard vending machine, with the distinction that payment is facilitated through the cicard, which can be replenished via partnered banks and minimarkets. The implementation of cigarette vending



machines and cicards serves to curtail the unrestricted accessibility of cigarettes to individuals under the age of 18.

CONCLUSION

The results of this literature review be the basis for determining appropriate interventions to prevent the incidence of smoking in children, so as to reduce the prevalence of smoking in children. Some efforts made to reduce the prevalence of smoking in children are conducting socialization and education to increase children's understanding of cigarettes, strengthening legal protection regarding criminal sanctions for parties who violate regulations related to advertising, and cigarette making regulations related to electronic cigarettes. In addition, it is necessary to regulate the prohibition of cigarette purchases in a moderate manner. Families also play a role in helping to prevent initiation of smoking in children, families should communicate to children, adolescents, and families about tobacco use and exposure and provide ageappropriate information and counseling to prevent initiation as part of routine health services. To train children's in complying responsibility with regulations related to smoking can be added by becoming a peer educator for fellow children. There are several innovations or ideas as a form of effort to reduce the prevalence of smokers, namely intervention program "Smoking Prevention in School Children in Hospitals" and an idea called cigarette vending machine and cicard (cigarette card).

To effectively reduce prevalence of smoking in children, comprehensive school-based programs are essential. These should combine educational curricula that address the risks associated with tobacco use and equip students with skills to resist peer pressure. Additionally, implementing enforce policies that smoke-free environments and restrict minors' access to tobacco products can reinforce the educational messages. Community involvement is also vital, ensuring a anti-smoking consistent message communicated across various platforms. For sustained success, regular monitoring and evaluation of these interventions are necessary to assess their impact. Engaging

key stakeholders—parents, teachers, and policymakers—in ongoing discussions can improve strategy.

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