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Tobacco quit motivation attempts self efficacy and cessation support among adolescents in Zambia

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Abstract

Background: Adolescent tobacco control is incomplete if it prevents initiation but does not help young users stop. Zambia now has substantial evidence on tobacco initiation, current use, second-hand smoke, and access, but less is known about where adolescents sit along the cessation continuum and whether support reaches those who need it. We assessed four cessation indicators and translated them into implementation priorities for WHO FCTC Article 14 and MPOWER.

Methods: We analysed the nationally representative 2021 Zambia Global Youth Tobacco Survey using an Adolescent Cessation Continuum and Enabling Environment (ACCEE) framework. Four WHO-derived outcomes among eligible tobacco-smoking adolescents were examined separately: desire to stop now, a quit attempt in the previous 12 months, confidence in ability to stop, and receipt of programme or professional help. Survey weights, strata, and primary sampling units were incorporated. Survey-weighted modified Poisson models estimated adjusted prevalence ratios for prespecified demographic, household/school environment, and information/support correlates. Dependence was reserved for sensitivity analysis to avoid overadjustment.

Findings: Among adolescents aged 13–15 years, 67.1% wanted to stop, 58.4% had attempted to quit in the previous year, 70.9% believed they could stop, and 48.7% reported programme or professional help. In the full observed age range, desire to stop increased at ages 15–16 years (aPR 1.49, 95% CI 1.11–1.98) and 17 years (1.66, 1.24–2.23) relative to ages 13–14 years. Second-hand smoke exposure at home was associated with greater reported desire to stop (1.21, 1.00–1.45). Receipt of programme/professional help was higher in the Rest of Country than Lusaka (1.54, 1.08–2.19), among 17-year-olds (1.42, 1.02–1.97), and among adolescents reporting school tobacco education (1.26, 1.04–1.53). Descriptively, programme/professional help was reported by 34.2% in Lusaka, 55.9% in the Rest of Country, and 45.9% in Tobacco Regions.

Interpretation: The 2021 Zambia GYTS reveals a substantial reservoir of quit motivation and self-efficacy, but a thinner and geographically uneven layer of structured support. The policy opportunity is to convert motivation into sustained cessation through adolescent-responsive screening, brief advice, referral, follow-up, and smoke-free enabling environments. Because the survey is cross-sectional and each cessation indicator has a different eligible denominator, the estimates should be interpreted as an implementation dashboard rather than a longitudinal treatment cascade.

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Running title: Adolescent tobacco cessation in Zambia

Research in context

Evidence before this study

We conducted a targeted evidence search through 13 September 2026 using PubMed, WHO sources, and publisher databases for combinations of "adolescent", "tobacco", "smoking", "cessation", "quit attempt", "Global Youth Tobacco Survey", "Zambia", and "Africa", without language restrictions. Zambian studies have concentrated on current tobacco use, initiation, school curriculum, second-hand smoke, and cigarette access. International GYTS evidence shows wide variation in quit attempts and receipt of cessation assistance, but Zambia-specific evidence has not previously organised motivation, action, self-efficacy, and support into one implementation framework.

Added value of this study

This study moves beyond a single quit-attempt outcome. It treats four cessation indicators as distinct stages, preserves the complex survey design, separates upstream context from cessation outcomes, uses dependence only in sensitivity analysis, quantifies geographic variation in support reach, and maps each finding to an operational FCTC/MPOWER response. The analysis therefore identifies not only who wants to quit, but where the cessation system may fail to convert motivation into support.

Implications of all the available evidence

Adolescent cessation should become a visible component of tobacco-control implementation in Zambia. Article 14 and MPOWER Offer can be operationalised through school-linked screening and brief advice, adolescent-friendly primary-care referral, confidential counselling, follow-up after quit attempts, and routine monitoring of support coverage. Articles 8, 12, and 20 remain essential because smoke-free environments, education, and surveillance shape whether cessation support can work and whether progress can be measured.

Introduction

The 2021 Zambia Global Youth Tobacco Survey (GYTS) confirms that tobacco use among school-going adolescents is not rare and that many young users already express a desire to stop. [1] Recent Zambian analyses show that current tobacco use is embedded in a socio-ecological environment that includes peer and household smoking, second-hand smoke, school influences, access, and commercial exposures. [2] Initiation begins early for some adolescents, creating a narrow window in which prevention and cessation must operate together. [3]

The wider African evidence also shows substantial heterogeneity in cigarette smoking and its correlates, arguing against assuming that cessation needs are uniform across settings. [4] In Zambia, school tobacco-related curriculum has been associated with smoking behaviour, suggesting that schools are not only exposure settings but potential intervention platforms. [5] High second-hand smoke exposure further indicates that adolescents trying to quit may return to homes, schools, and public settings where smoking remains visible. [6] At the same time, cigarette access and low-unit purchasing can keep tobacco readily available to adolescents who are trying to stop. [7]

Methodologically, GYTS analyses require explicit attention to survey weights, clustering, stratification, and theory-informed predictor selection. [8] Repeated surveillance is equally important: regional experience shows that long gaps in adolescent substance-use monitoring can leave policy implementation without timely feedback. [9]

The policy anchor for cessation is the WHO Framework Convention on Tobacco Control (FCTC). [10] Article 14 calls for accessible programmes to promote tobacco cessation and treatment of dependence, including through health-care and educational settings. [11] MPOWER translates this obligation into “Offer help to quit”. [12] Global GYTS analyses have shown that receipt of quit help varies substantially across countries, and more recent multi-country work suggests that adolescent cessation attempts and success are shaped by both individual and policy environments. [13,14] International evidence also links cessation activity with anti-tobacco education and smoke-free school environments. [15]

We therefore examined four distinct cessation outcomes among Zambian school-going adolescents: desire to stop tobacco smoking now, a quit attempt in the past 12 months, confidence in the ability to stop, and receipt of programme or professional help. Our objective was not to force these cross-sectional indicators into a longitudinal causal cascade, but to use them as an implementation dashboard that identifies where adolescent cessation policy can act and what future surveillance should measure.

Methods

Study design, setting, and reporting

We conducted a secondary cross-sectional analysis of the 2021 Zambia GYTS, a standardised nationally representative school-based survey implemented using a two-stage cluster design. The country report describes 6,499 participating students in grades 7–9. [1] Reporting was guided by STROBE. [16]

The public-use data include survey weights, strata, and primary sampling unit identifiers. All public-facing descriptions in this paper refer to the data source as the 2021 Zambia GYTS; internal worksheet or extraction names are implementation details only.

ACCEE framework and causal positioning of variables

We developed the Adolescent Cessation Continuum and Enabling Environment (ACCEE) framework (Figure 1). The framework separates context and equity (age, sex, grade, region), tobacco history and proximal motivation (ever trying cigarettes and future tobacco-use intention), social modelling (parent/guardian smoking in the home, teachers smoking at school, and friends smoking), protective information and education (anti-tobacco media exposure and school teaching about tobacco harms), dependence, and the cessation continuum of wanting to stop, attempting to quit, confidence in stopping, and receipt of programme or professional help. The framework is used to organise description and causal reasoning; descriptive inclusion is therefore broader than the covariate set used in any one adjusted model.

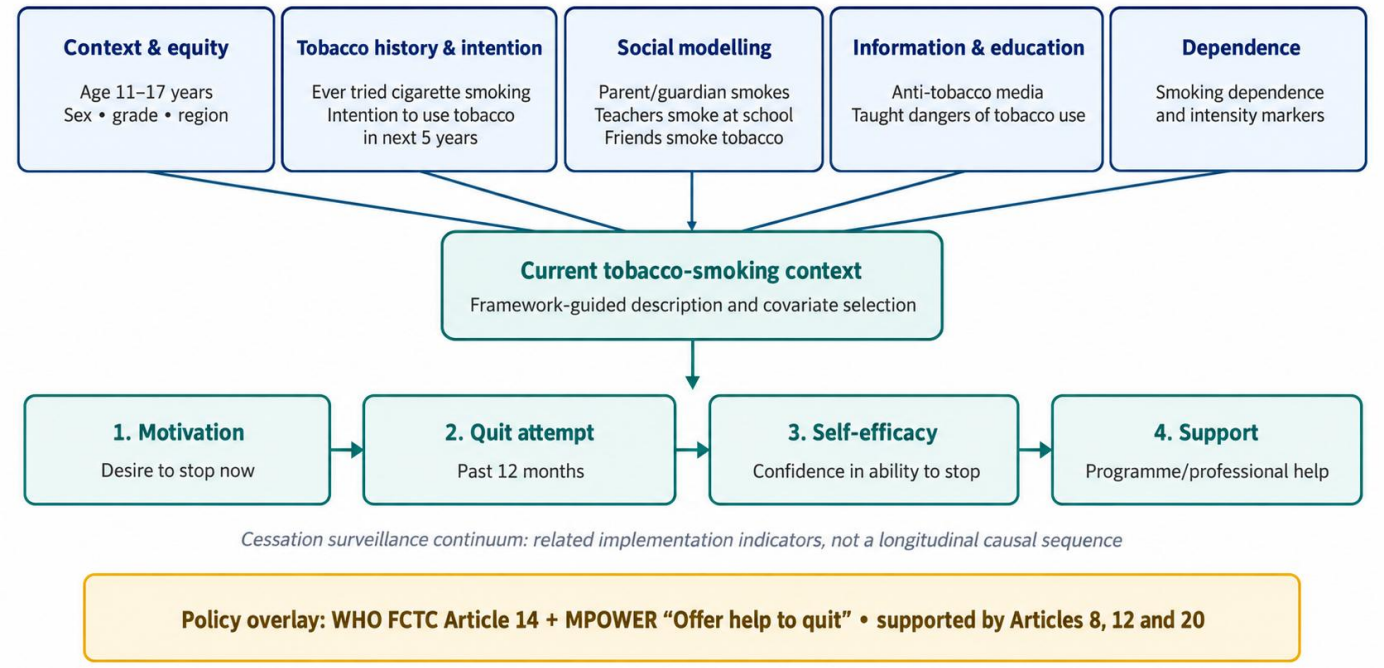


Figure 1. Adolescent Cessation Continuum and Enabling Environment (ACCEE) framework. The lower row is an implementation continuum, not a longitudinal causal sequence observed within the same respondent.

Outcomes and analysis populations

The primary outcomes were binary WHO-derived cessation indicators among their eligible smoking populations: desire to stop now; at least one quit attempt in the previous 12 months; confidence in ability to stop if desired; and receipt of programme or professional help/advice. Because GYTS skip patterns and indicator definitions create different eligible denominators, each outcome was analysed in its own eligible population. Estimates for ages 13–15 years were prespecified as the internationally comparable GYTS benchmark, while the full observed 11–17-year range was used for national contextual modelling.

Participant characteristics and contextual variables

To preserve comparability with the earlier Zambia GYTS analyses and to provide a complete policy-relevant description of the sample, we prespecified the following participant and tobacco-context characteristics for descriptive reporting: age (11–17 years), sex, grade, ever trying cigarette smoking, parent/guardian smoking in the home, intention to use tobacco in the next 5 years, exposure to anti-tobacco media messages, school teaching about the dangers of tobacco, seeing teachers smoking at school, and friends smoking tobacco. These variables were reported overall and by region. Their presence in Table 1 does not imply that every variable belongs in every adjusted model. In particular, ever trying cigarettes and future tobacco-use intention are proximal or downstream behavioural states and were not forced into the primary causal models; the framework determined model inclusion to reduce overadjustment and pathway blocking.

Statistical analysis

We estimated survey-weighted proportions and 95% confidence intervals using the final student weight and design information for strata and PSUs. For each cessation outcome, survey-weighted modified Poisson regression with robust design-based variance estimated adjusted prevalence ratios (aPRs). The prespecified core adjustment set included age group, sex, grade, region, second-hand smoke exposure at home, visible smoking at school, anti-tobacco media exposure, and school tobacco education. Complete-case analysis was outcome-specific. No automated p-value screening was used to define the conceptual model. Dependence was added in sensitivity models. Because several smoker-specific cells were small, subgroup estimates by sex, age, and region were treated as descriptive equity analyses rather than used for extensive interaction testing. Two-sided $p<0.05$ was considered statistically significant for the primary models; confidence intervals were emphasised over threshold-based interpretation.

Estimand, model discipline, and interpretation

The primary estimands were adjusted prevalence ratios for each cessation indicator within its eligible respondent population. The aim was explanatory and policy-oriented rather than predictive. Covariates were selected a priori from the ACCEE framework; automated stepwise selection was not used. Variables that could represent downstream stages of cessation were not adjusted for in models of earlier stages, and one cessation outcome was never used to predict another.

The internationally comparable 13–15-year estimates answer a surveillance question: how common is each cessation indicator in the standard GYTS age group? The full observed-age models answer a contextual question: which measured characteristics are associated with each indicator among eligible respondents? These are distinct inferential tasks and are reported separately.

Ethical considerations

The analysis used de-identified secondary survey data. No new contact with participants occurred. The original GYTS followed national and international procedures for school-based research with minors. Any additional institutional requirements for secondary analysis should be confirmed before submission.

Results

Participant characteristics and tobacco-related context

Table 1. Participant characteristics and tobacco-related context in the 2021 Zambia GYTS. Values are unweighted n (survey-weighted %). Binary characteristics show the "Yes" category; item-specific denominators vary because of non-response.

Characteristic	Overall	Lusaka	Rest of Country	Tobacco Regions
Age, years				
11	265 (4.1%)	53 (2.7%)	85 (3.8%)	127 (6.6%)
12	457 (7.4%)	176 (8.8%)	166 (7.5%)	115 (5.9%)
13	1,076 (16.5%)	389 (19.2%)	388 (16.4%)	299 (15.2%)
14	1,589 (24.7%)	498 (23.9%)	608 (24.9%)	483 (24.3%)
15	1,363 (21.0%)	432 (21.3%)	547 (21.3%)	384 (19.3%)
16	1,027 (15.9%)	289 (15.0%)	422 (15.9%)	316 (16.6%)
17	678 (10.4%)	182 (9.1%)	265 (10.2%)	231 (12.1%)
Sex				
Female	3,681 (49.9%)	1,212 (52.2%)	1,302 (49.7%)	1,167 (50.0%)
Male	2,725 (50.1%)	796 (47.8%)	1,169 (50.3%)	760 (50.0%)
Grade				
Grade 7	2,271 (43.3%)	731 (39.8%)	783 (43.4%)	757 (45.1%)
Grade 8	2,051 (28.8%)	566 (30.9%)	855 (28.6%)	630 (28.7%)
Grade 9	2,081 (27.9%)	708 (29.4%)	828 (28.1%)	545 (26.2%)
Ever tried cigarette smoking	1,083 (21.1%)	250 (14.8%)	381 (19.7%)	452 (32.7%)
Parent/guardian smokes in home	1,029 (16.8%)	244 (12.7%)	412 (16.8%)	373 (19.2%)
Intention to use tobacco in next 5 years	865 (13.1%)	187 (9.5%)	334 (12.6%)	344 (17.4%)
Exposure to anti-tobacco media messages	4,022 (62.1%)	1,286 (63.5%)	1,544 (62.1%)	1,192 (60.9%)
Taught about dangers of tobacco use	3,004 (46.3%)	1,013 (49.1%)	1,134 (46.5%)	857 (44.1%)
Saw teachers smoking at school	887 (14.0%)	198 (10.2%)	332 (13.5%)	357 (18.6%)
Friends smoke tobacco	1,609 (24.8%)	434 (22.2%)	624 (24.3%)	551 (28.7%)

The expanded descriptive profile shows a policy-relevant concentration of tobacco exposure and social modelling. Overall, 21.1% had ever tried cigarette smoking, 16.8% reported parent/guardian smoking in the home, 13.1% reported intention to use tobacco in the next 5 years, 14.0% saw teachers smoking at school, and 24.8% reported friends who smoked. Exposure to anti-tobacco media messages was 62.1%, while 46.3% reported school teaching about tobacco harms. Several contextual indicators were least favourable in Tobacco Regions, including ever trying cigarettes (32.7%), future intention (17.4%), seeing teachers smoking (18.6%), and friends smoking (28.7%). These estimates are descriptive and are not interpreted as causal regional effects.

Cessation continuum: strong motivation, frequent attempts, incomplete support reach

Indicator	Population	n	Weighted prevalence (95% CI)
Desire to stop smoking now	All observed ages (11-17 years)	363	67.3% (60.0–74.5)
Desire to stop smoking now	GYTS benchmark (13-15 years)	181	67.1% (56.9–77.4)
Quit attempt in past 12 months	All observed ages (11-17 years)	358	60.8% (51.2–70.4)
Quit attempt in past 12 months	GYTS benchmark (13-15 years)	177	58.4% (47.1–69.8)
Confidence in ability to stop	All observed ages (11-17 years)	350	70.4% (64.3–76.5)
Confidence in ability to stop	GYTS benchmark (13-15 years)	166	70.9% (60.0–81.7)
Received program/professional help	All observed ages (11-17 years)	587	52.0% (45.9–58.2)
Received program/professional help	GYTS benchmark (13-15 years)	290	48.7% (41.3–56.2)

Table 2. Survey-weighted cessation indicators among eligible tobacco-smoking adolescents in the 2021 Zambia GYTS.

Among 13–15-year-olds, approximately two-thirds wanted to stop and nearly three-fifths had attempted to quit in the previous year. Self-efficacy was also high: 70.9% believed they could stop if they wanted. Programme or professional help was reported by 48.7%. These proportions should not be subtracted from one another as if they were a longitudinal cascade because the

indicators have different eligible denominators. Taken together, however, they show that cessation demand and cessation action are already present at scale.

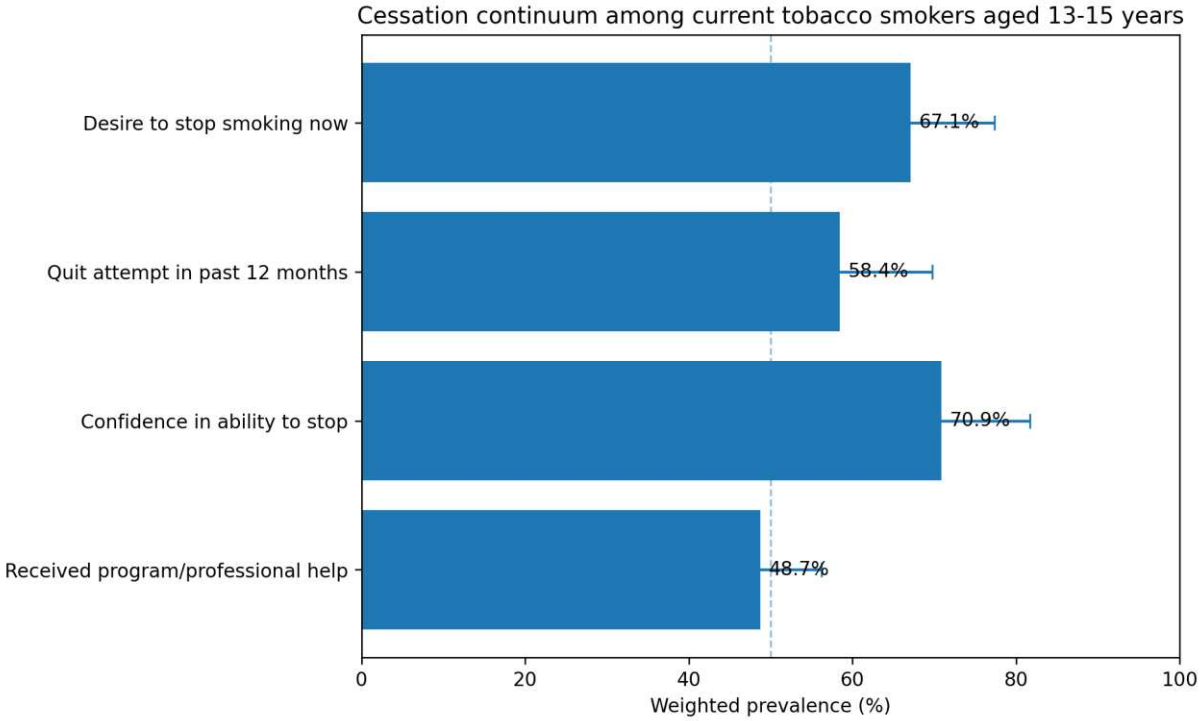


Figure 2. Weighted prevalence of four cessation indicators among eligible current tobacco smokers aged 13–15 years; error bars show 95% confidence intervals.

Equity and geographic patterning

Indicator	Domain	Group	n	Weighted prevalence (95% CI)
Desire to stop smoking now	Sex	Female	167	66.8% (51.4–82.2)
Desire to stop smoking now	Sex	Male	185	68.4% (58.1–78.7)
Desire to stop smoking now	Region	Lusaka	70	72.2% (60.5–83.9)
Desire to stop smoking now	Region	Rest of Country	126	64.3% (53.9–74.8)
Desire to stop smoking now	Region	Tobacco Regions	167	74.2% (65.5–82.8)
Received program/professional help	Sex	Female	282	53.8% (46.7–60.9)
Received program/professional help	Sex	Male	290	51.4% (43.0–59.8)
Received program/professional help	Region	Lusaka	111	34.2% (25.1–43.2)
Received program/professional help	Region	Rest of Country	201	55.9% (48.1–63.7)
Received program/professional help	Region	Tobacco Regions	275	45.9% (39.6–52.1)

Table 3. Descriptive equity patterning for cessation motivation and programme/professional help. These are survey-weighted subgroup estimates, not interaction tests.

Motivation to stop was similar by sex and exceeded 64% in each region. The clearest geographic contrast was in reported programme/professional help: 34.2% in Lusaka, 55.9% in the Rest of Country, and 45.9% in Tobacco Regions. Confidence intervals overlapped for some contrasts, but the pattern is policy-relevant because national coverage can conceal uneven pathways to support.

An implementation gap is visible before modelling

Among adolescents aged 13–15 years, 67.1% wanted to stop and 58.4% reported a quit attempt, whereas 48.7% reported programme or professional help. These percentages arise from different eligible denominators and therefore must not be interpreted as within-person transition probabilities. Nevertheless, taken together they show that cessation motivation and action are common while structured support is less consistently reported.

This distinction is policy-relevant: a tobacco-control programme can have high motivation to quit in the population while still underperforming on service reach. For this reason, we treat cessation support coverage as an implementation endpoint in its own right.

Adjusted correlates

Outcome	term	aPR (95% CI)	p value
Desire to stop smoking now	Age 15-16	1.49 (1.11–1.98)	0.009
Desire to stop smoking now	Age 17	1.66 (1.24–2.23)	0.001
Desire to stop smoking now	SHS at home	1.21 (1.00–1.45)	0.045
Received program/professional help	Age 17	1.42 (1.02–1.97)	0.038
Received program/professional help	Rest of Country	1.54 (1.08–2.19)	0.018
Received program/professional help	School tobacco education	1.26 (1.04–1.53)	0.019

Table 4. Statistically supported correlates from the prespecified primary modified Poisson models. Full models are reported in the Supplementary Appendix.

Older age was associated with greater reported desire to stop. Compared with ages 13–14 years, the adjusted prevalence of wanting to stop was 49% higher at ages 15–16 years and 66% higher at age 17 years. Second-hand smoke exposure at home was also associated with greater reported desire to stop, a finding that may reflect greater perceived harm, heavier exposure, unmeasured smoking intensity, or other factors and should not be interpreted as a beneficial effect of second-hand smoke. No independent correlate reached the prespecified significance threshold for quit attempts in the primary model.

For programme/professional help, adolescents in the Rest of Country reported greater support than those in Lusaka. Support receipt was also higher among 17-year-olds and among adolescents reporting school tobacco education. These associations identify where support is reported; they do not establish the effectiveness of school education or the content and quality of the support received.

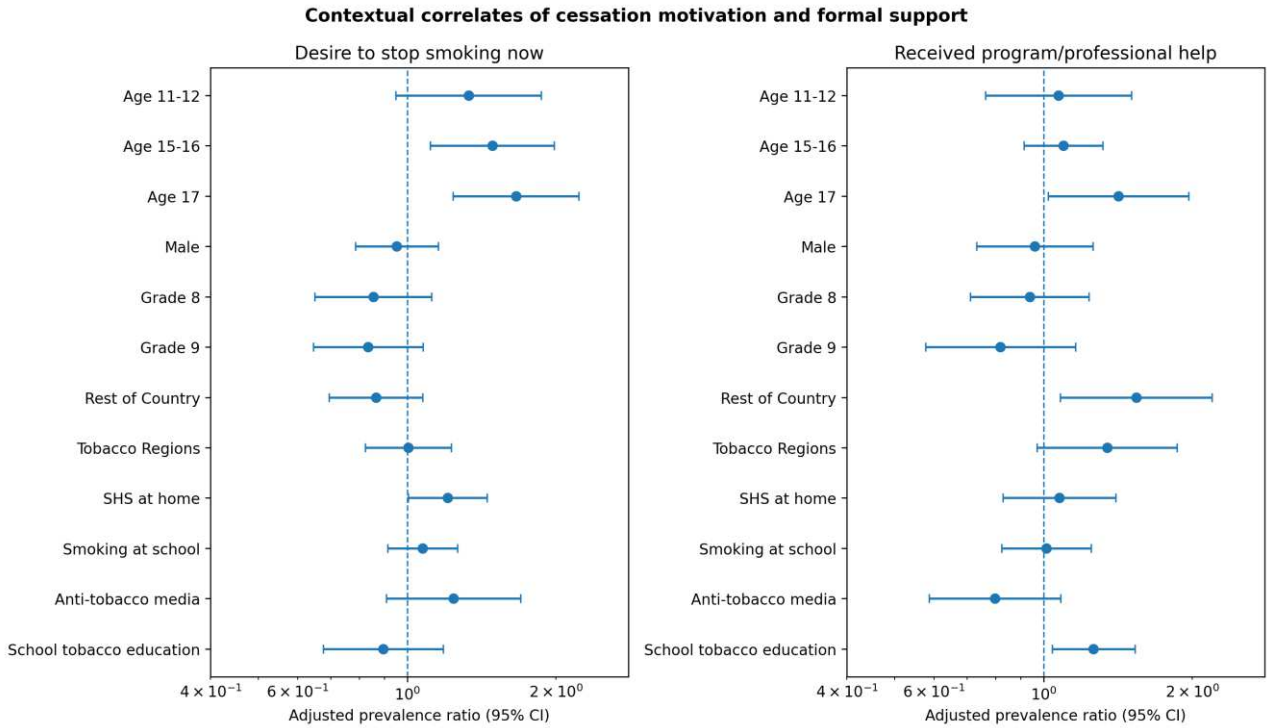


Figure 3. Adjusted prevalence ratios for selected cessation outcomes. Full models for all four outcomes are provided in the Supplementary Appendix.

Help pathways and sensitivity analysis

Specific sources of help were heterogeneous. Programme/professional/club support and friend/family support were each reported by roughly 18% of the eligible group, while teacher, school, and church sources were reported less often. Dependence-adjusted sensitivity models did not overturn the overall policy interpretation, although estimates were less precise because of smaller complete-case samples.

Discussion

Principal findings

The central finding is a service opportunity rather than a behavioural deficit. Many Zambian adolescents who use tobacco already want to stop, many have tried, and many believe they can stop. The weakest element of the implementation picture is not motivation but the reach, consistency, and equity of structured support. This distinction matters because prevention messaging alone cannot meet the needs of adolescents who are already using tobacco.

What the findings add to the Zambian evidence base

The present study complements, rather than duplicates, Zambia's growing GYTS evidence base. Current-use analyses identify multi-level behavioural and environmental exposures. [2] Initiation analyses identify early adolescence as a critical period for prevention. [3] The African comparative literature places Zambia within a heterogeneous regional context. [4] The 2011 curriculum study supports the school as an intervention platform, while recent second-hand smoke evidence shows that adolescents remain embedded in environments that may normalise smoking. [5,6] Access research further shows that cigarettes can remain readily available to young people, complicating cessation. [7]

The association between school tobacco education and receipt of programme/professional help is therefore policy-generating rather than proof of causality. It suggests that schools may be practical points for identification, brief advice, and referral, but the next step should be implementation research that distinguishes curriculum exposure from actual cessation-service delivery.

From motivation to an adolescent cessation pathway

Policy translation: four priorities for Zambia

Observed signal	Policy meaning	Action now
Large demand for quitting	Cessation is already an adolescent health need, not only an adult service issue.	Add routine tobacco-use and quit-readiness screening to adolescent-friendly school and primary-care contacts.
Frequent quit attempts	Unassisted attempts create a need for follow-up and relapse-prevention support.	Use brief advice, planned follow-up, and referral pathways rather than one-off health education.
Uneven support reach	National averages can hide geographic differences in service access.	Track support coverage by region and link GYTS indicators to programme dashboards.
Smoking environments remain visible	Cessation support works within social and environmental constraints.	Pair Article 14 services with Article 8 smoke-free schools/public places and family-facing communication.

WHO FCTC Article 14 provides the most direct policy route. Zambia can operationalise it for adolescents through confidential brief advice, clear referral criteria, youth-responsive primary care, and school-linked support. Adult cessation guidance can inform health-system organisation, but pharmacotherapy recommendations for minors should not be extrapolated automatically from adult guidance without age-appropriate clinical protocols.[18]

Adult Zambian evidence that provider cessation advice is associated with quit attempts supports the broader health-system rationale for structured advice and referral, although it does not establish adolescent effectiveness. [17]

Surveillance and accountability

Cessation should be monitored as a programme outcome, not only discussed as individual intention. Future GYTS rounds should preserve the four core cessation indicators and add programme-facing measures where feasible: whether a health worker or teacher asked about tobacco use, whether brief advice was offered, whether referral occurred, whether adolescents used another nicotine product during a quit attempt, and whether support was confidential and acceptable. The Malawi surveillance experience shows why long gaps in adolescent substance-use data weaken policy accountability.[9]

Research priorities

The next evidence step is not another cross-sectional association model alone. Zambia needs prospective and implementation research that follows adolescent quit attempts over time, distinguishes spontaneous from supported attempts, measures relapse and product switching, and evaluates the acceptability and effectiveness of school-linked and primary-care cessation pathways.

Future surveillance should also include out-of-school adolescents, document whether support was confidential and youth-appropriate, and distinguish brief advice, behavioural counselling, digital support, peer/family support, and clinically supervised treatment. These additions would allow Article 14 implementation to be evaluated as a service system rather than inferred from a single survey item.

Policy accountability dashboard

Domain	GYTS indicator	2021 signal	What programme monitoring should show
Quit motivation	Desire to stop now	67.1% among ages 13–15	Sustain high identification of quit-ready adolescents; interpret alongside attempts and support.

Quit action	Quit attempt in past 12 months	58.4% among ages 13–15	Track whether attempts receive follow-up and relapse-prevention support.
Self-efficacy	Confidence in ability to stop	70.9% among ages 13–15	Use confidence as an engagement opportunity, not proof of likely abstinence.
Support reach	Programme/professional help	48.7% among ages 13–15	Increase equitable coverage and document source, quality, confidentiality, and follow-up.
Equity	Support by region	34.2% Lusaka; 55.9% ROC; 45.9% Tobacco Regions	Monitor geographic coverage with confidence intervals and programme delivery data.

Policy accountability indicators derived from the 2021 Zambia GYTS. These are monitoring indicators, not causal targets or performance thresholds.

Strengths and limitations

Strengths include nationally representative survey data, external benchmark checks for ages 13–15 years, preservation of weights/strata/PSUs, a framework that separates cessation outcomes from upstream correlates, outcome-specific denominators, descriptive equity analysis, dependence sensitivity analysis, and reproducible R and Python workflows.

Several limitations are important. The cross-sectional design precludes causal ordering and cannot determine sustained abstinence. The four cessation indicators have different eligible populations and do not form a longitudinal cascade within the same individuals. All measures are self-reported, the survey excludes adolescents not attending school, and smoker-specific sample sizes are modest. “Programme or professional help” does not measure intervention content, duration, quality, confidentiality, or treatment effectiveness. Some subgroup estimates are imprecise, and complete-case regression can introduce bias if missingness is related to both exposures and outcomes. Finally, the study cannot determine whether higher reported motivation among adolescents exposed to second-hand smoke reflects harm awareness, smoking intensity, or unmeasured confounding.

Conclusion

Zambia already has an essential ingredient for adolescent cessation: many young tobacco users want to stop and are trying to do so. The high-impact gap is therefore not motivation alone but the service bridge between motivation, supported quit attempts, and sustained abstinence. Zambia should make adolescent cessation a visible Article 14 implementation programme, with routine screening, confidential brief advice, school-linked and primary-care referral, follow-up, smoke-free enabling environments, and repeated GYTS monitoring. Success should be judged not only by lower tobacco prevalence, but by whether adolescents who want to quit can reliably reach effective, equitable support.

Ethics

This study used de-identified secondary data from the 2021 Zambia Global Youth Tobacco Survey. The original survey followed national and international procedures for school-based research involving minors. No direct participant contact occurred in this secondary analysis. Authors should confirm the journal’s preferred wording and any national secondary-analysis requirements before submission.

Consent to publish

Not Applicable

Contributors

WFN, SM, and CZ contributed to conceptualisation and interpretation. WFN and CZ contributed to the analysis framework and reproducibility workflow. All authors should confirm final CRediT roles before submission.

Declaration of interests

The authors should reconfirm competing-interest declarations before submission. No competing-interest statement has been inferred from the data.

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Role of the funding source

The authors had full access to the data and final responsibility for the decision to submit.

Data availability

The 2021 Zambia GYTS public-use data are available through the WHO NCD Microdata Repository, subject to repository terms. The reproducibility package containing the analysis-ready variables used in this manuscript, data dictionary, R and Python code, derived outputs, figures, and supplementary files is available at https://doi.org/10.5281/zenodo.22742543.

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References

1. World Health Organization Regional Office for Africa. Zambia 2021 Global Youth Tobacco Survey (GYTS) Country Report. Brazzaville: WHO Regional Office for Africa; 2025.
2. Ng'ambi WF, Chigere A, Zyambo C. Factors associated with current tobacco use among Zambian adolescents using the 2021 Global Youth Tobacco Survey. Discover Public Health. 2026;23:1371. doi:10.1186/s12982-026-02763-8.
3. Ng'ambi WF, Chigere A, Zyambo C. A survival analysis of factors associated with tobacco initiation among school-going adolescents in Zambia using the 2021 Global Youth Tobacco Survey. Discover Public Health. 2026;23:762. doi:10.1186/s12982-026-02062-2.
4. Sinyangwe J, Ng'ambi WF, Zyambo C. Prevalence and predictors of cigarette smoking among school-going adolescents in Africa: a cross-sectional analysis of the Global Youth Tobacco Survey 2001–2021. Population Medicine. 2026;8(2):10. doi:10.18332/popmed/222369.
5. Zyambo C, Olowski P, Mulenga D, Liamba F, Syapiila P, Siziya S. School tobacco-related curriculum and behavioral factors associated with cigarette smoking among school-going adolescents in Zambia: results from the 2011 GYTS study. Tobacco Induced Diseases. 2022;20:42. doi:10.18332/tid/146960.
6. Ng'ambi WF, Mutasha S, Chigere A, Zyambo C. Higher exposure to secondhand smoke among adolescents living in Zambia: a cross-sectional analysis of the 2021 Global Youth Tobacco Survey. Public Health Toxicology. 2026;6(1):4. doi:10.18332/pht/220974.
7. Luputa C, Ng'ambi WF, Zyambo C. Cigarette availability and affordability among school-going adolescent smokers in Zambia: results from the 2011 Global Youth Tobacco Survey. International Journal of Noncommunicable Diseases. 2024;9(3):126–133. doi:10.4103/jncd.jncd_49_24.
8. Ng'ambi WF, Zyambo C, Kazembe L. Methodological guidance for predictor variable selection for adolescent smoking outcomes in Global Youth Tobacco Survey using R and Python. Frontiers in Applied Mathematics and Statistics. 2026;12:1895038. doi:10.3389/fams.2026.1895038.
9. Ng'ambi WF, Chinkhumba J, Udedi MM, Zyambo C, Muula AS. Strengthening substance use surveillance among adolescents in Malawi: a public health and policy imperative. Malawi Medical Journal. 2026; online first.
10. World Health Organization. WHO Framework Convention on Tobacco Control. Geneva: World Health Organization; 2003.
11. WHO Framework Convention on Tobacco Control. Guidelines for implementation of Article 14: demand reduction measures concerning tobacco dependence and cessation. Geneva: World Health Organization; 2013.
12. World Health Organization. MPOWER: a policy package to reverse the tobacco epidemic. Geneva: World Health Organization; 2008.
13. Arrazola RA, Seidenberg AB, Ahluwalia IB. Percentage of current tobacco smoking students receiving help or advice to quit: evidence from the Global Youth Tobacco Survey, 56 countries, 2012–2015. Tobacco Prevention & Cessation. 2019;5:5. doi:10.18332/tpc/102994.
14. Country-level prevalence of and factors associated with smoking cessation among adolescents across 91 countries. 2025. PubMed PMID:40770458.
15. Tobacco cessation, anti-tobacco education, and smoke-free schools: findings from the Global Youth Tobacco Survey. 2024. PubMed PMID:39575320.
16. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Lancet. 2007;370:1453–1457.
17. Zyambo C, Siziya S, Ng'ambi W, Gakumo AC, Burkholder GA, Hendricks PS. Receipt of healthcare provider's advice for smoking cessation and quit attempts in Zambia. Population Medicine. 2023;5:1. doi:10.18332/popmed/157138.
18. World Health Organization. Clinical treatment guideline for tobacco cessation in adults. Geneva: World Health Organization; 2024.