

Smoking prevalence in the Eastern Mediterranean Region

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Abstract

Background: Three global reports issued by the World Health Organization (WHO) track and report on trends in the prevalence of tobacco smoking from 2000 to 2025 based on data from national surveys.

Aims: This review aimed to compare regional and country-level projections for current tobacco smoking as presented in the WHO trend reports. These changes were considered in the context of improved monitoring and tobacco control policies.

Methods: Regional and country-level results in the WHO trend reports were considered in terms of the projected percentage point increase of current tobacco smoking between 2000 and 2025. Data on national surveys and policy implementation came from the relevant WHO reports.

Results: In the 2019 trend report, the prevalence of current tobacco smoking among males is projected to decrease by less than 2 percentage points by 2025. Eight countries featured in both the 2015 and 2019 WHO trend reports. Seven of these countries indicated a more encouraging projection (a decline in their projected increase between 2000 and 2025) for current male tobacco smoking in the 2019 report than in the 2015 report. For five out of these seven countries, their monitoring and tobacco control policy implementation improved over the same period.

Conclusion: Countries in the Region should implement additional national surveys to improve the accuracy of prevalence estimates, allow further projections to be performed and motivate policy-makers to make positive policy changes. Solutions to under-reporting biases during surveys should be considered. Governments should use trend projections to guide effective tobacco control policies to reduce tobacco use in the Region.

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Introduction

As one of the leading preventable causes of morbidity and premature mortality in the world, tobacco contributed to 8 million deaths globally in 2017 (1). Approximately 80% of these deaths occur in low and middle-income countries. In 2013, the World Health Assembly endorsed the World Health Organization (WHO) Global Monitoring Framework for non-communicable diseases (NCDs) and an associated voluntary global target of a 30% relative reduction in tobacco use worldwide among those 15 years or older by 2025 (with 2010 levels as baseline) (2).

Updated data on tobacco use are necessary to identify key policy gaps. To overcome this challenge, WHO and the US Centers for Disease Control and Prevention, have developed a number of surveys designed to track tobacco use among youths (13–15 years) and adults, including the Global Youth Tobacco Survey (GYTS), Global Adult Tobacco Survey (GATS) and STEPwise Surveillance of NCD Risk Factors Survey, for implementation at the country-level (3).

WHO has issued three global reports, in 2015, 2018 and 2019 (4–6), which track trends in the prevalence of tobacco smoking from 2000 to 2025 based on data from national surveys (hereafter referred to as the ‘trend reports’). These WHO trend reports can be considered

companions to the biennial WHO Report on the Global Tobacco Epidemic (7). This provides the opportunity to compare tobacco control policy developments with the prevalence projections presented in the trend reports.

This review compares regional and country-level projections for current tobacco smoking presented in the WHO trend reports. It highlights how the projected prevalence of tobacco smoking in the Eastern Mediterranean Region (EMR) has changed over time and in the context of globally recognized targets for tobacco use reduction. The changing results presented in the three WHO trend reports are considered in the context of the implementation of country-level surveillance systems and the implementation of national tobacco control policies. This provides relevant and detailed insights regarding current and future tobacco smoking in EMR and the likely impact of improved monitoring efforts and policy changes on projected prevalence rates. It also allows specific recommendations to be made, for both future tobacco use surveillance systems and tobacco control policy-making.

Methods

The three WHO trends reports contain globally comparable national estimates for tobacco smoking prevalence for the years 2000–2025. In these reports these estimates are

summarized into global and regional prevalence estimates and projections. For the projection analysis, the reports use data from nationally representative surveys of tobacco use (or tobacco smoking) published since 1990. The full details of the method for producing trend estimates and projections is described in the trend reports themselves (4–6). In the 2015 trend report eight countries in the Region had sufficient survey data for the projection to be performed. In the 2018 and 2019 trend reports, 14 countries had sufficient data for the projection to be performed.

This review focuses on tobacco smoking because it is the indicator used in all three trend reports (unlike tobacco use). It is also by far the most common form of tobacco use in the EMR (6). The regional projections for overall male and female current tobacco smoking in the three reports are compared primarily in terms of projected percentage point increase between 2000 and 2025. Country-level projections for current tobacco smoking presented in the 2015 and 2019 trend reports are also considered, again in terms of projected percentage point increase between 2000 and 2025. For country-level figures, current male tobacco smoking is the only figure reviewed. Male smokers make up the vast majority of smokers in the region (6) and there are possible concerns about the reliability of data for current female smoking (see Limitations). In all cases, the projected percentage point increase for current tobacco smoking between 2000 and 2025 was calculated by subtracting the estimated current tobacco smoking prevalence in 2000 from the projected prevalence in 2025. Country-level results from the 2015 and 2019 trend reports are compared in terms of changes between the reports in the projected percentage point increase for current male tobacco smoking between 2000 and 2025.

Changes between the 2015 and 2019 reports in country-level projected percentage point increases for current male tobacco smoking are compared with national monitoring of tobacco use through a review of the implementation of national surveys in the countries of the Region. Data on national tobacco surveys comes from the WHO Report on the Global Tobacco Epidemic and the trend reports (4,6,7). The countries for which there is a decline in the projected percentage point increase for current male tobacco smoking (2000–2025) between the two reports are identified. Such countries can be regarded as having a more encouraging projection in the 2019 report than in the 2015 report.

Changes between the 2015 and 2019 trend reports in country-level projected percentage point increases for current male tobacco smoking are also compared with changes in national tobacco control policy between 2015 and 2019. These positive changes are identified from the WHO Reports on the Global Tobacco Epidemic 2015 and 2019, using progress in the implementation of any WHO “demand-reduction” MPOWER measure as the metric (7,8). The “demand-reduction” MPOWER measures are the five policy recommendations included in the WHO MPOWER package shown to reduce the prevalence of tobacco use when implemented (i.e., all of the MPOWER

measures except the Monitoring measure) (7).

Results

In the latest trend report (6), decreases in overall tobacco smoking rates are projected in all WHO regions. The smallest decrease is expected in the EMR, where the overall tobacco smoking prevalence is projected to drop from 18.3% in 2010 to 16.3% in 2025, if current tobacco control efforts continue. This amounts to an 11% relative reduction in overall tobacco smoking prevalence. For males, which make up the vast majority of all tobacco smokers in the Region, the prevalence of current tobacco smoking is projected to decrease by less than 2 percentage points from 33.1% in 2010 to 31.2% in 2025 (Figure 1). Tobacco smoking rates among females in the Region are low and expected to decrease further (Figure 2) (6).

Unlike the 2019 trend report, both the 2015 and 2018 trend reports projected an increase in overall tobacco smoking prevalence between 2010 and 2025 (of 5 percentage points in the 2015 report and less than 1 percentage point in the 2019 report) (4,5). All three WHO trend reports projected that the EMR is unlikely to achieve a 30% relative reduction in tobacco smoking prevalence by the year 2025 (4–6).

For country-level projections of male current tobacco smoking prevalence in the 2015 trend report (Table 1), rates in all but one country were projected to increase in percentage point terms between 2000 and 2025. This ranged from an increment of 9.9 percentage points (Pakistan) to 68.8 percentage points (Bahrain). Only in the Islamic Republic of Iran was the prevalence rate projected to decrease, by 8.2 percentage points.

For country-level projections of current male tobacco smoking prevalence in the 2019 trend report (Table 2), rates in four countries were projected to increase in percentage point terms. All of these increases were of less than 4 percentage points, with the highest increase projected for Oman (3.7 percentage points). Rates in the remaining 10 countries were projected to decrease. These range from a decrease of 2.1 percentage points for Bahrain to a decrease of 27.4 percentage points for Tunisia.

Of the eight countries that were provided with trend projections in both reports (Bahrain, Egypt, Islamic Republic of Iran, Lebanon, Morocco, Oman, Pakistan and Saudi Arabia), all but one country (Islamic Republic of Iran) saw a decline in the projected percentage point increase for current male tobacco smoking between 2000 and 2025 (Table 1 and Table 2). For three out of these seven countries, this decline in the projected increase between 2000 and 2025 was actually sufficient to take the country from a projected increase in current male tobacco smoking prevalence in the 2015 trend report to a projected decrease in the 2019 report. For the remaining four countries, current male tobacco smoking prevalence was still projected to increase in percentage point terms between 2000 and 2025 in the 2019 report, but to a lesser extent than in the 2015 report.

Of the six countries for which the projection was only

Figure 1 Age-standardized fitted and projected smoking prevalence rates for males aged 15 years, by WHO region, 2000–2025

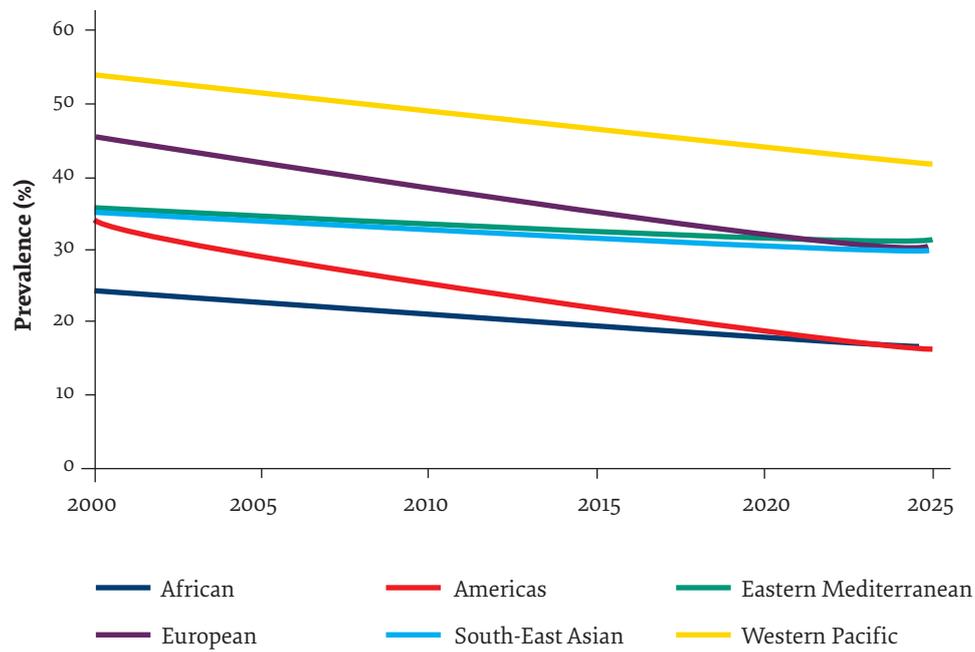


Figure 2 Age-standardized fitted and projected smoking prevalence rates for females aged 15 years, by WHO region, 2000–2025

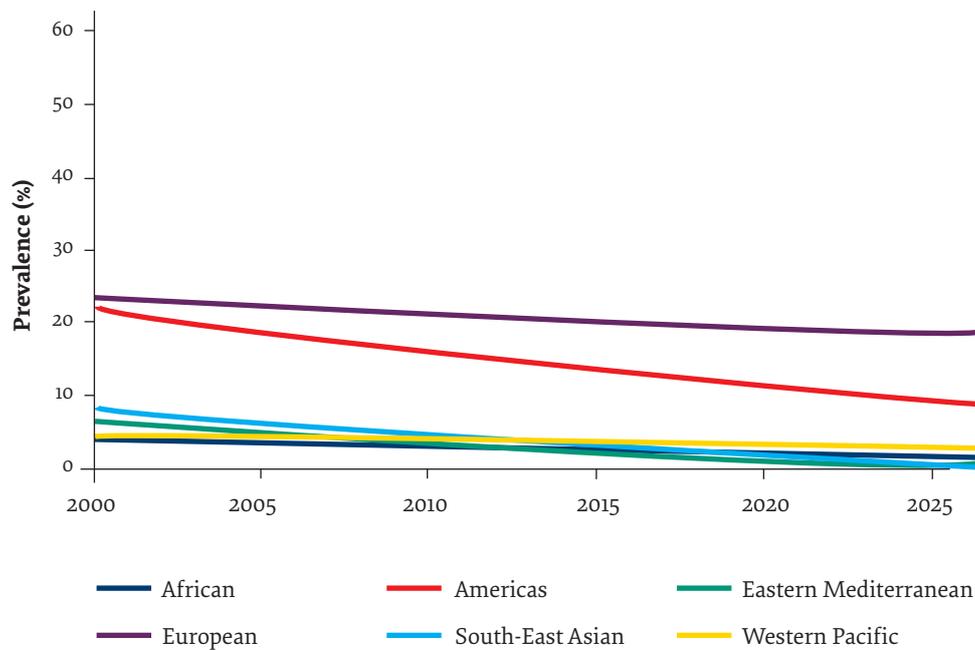


Table 1 Country-level projections for current male tobacco smoking, 2000–2025, WHO Trend Report 2015

Country	Estimated current male tobacco smoking 2000 (%)	Projected current male tobacco smoking 2025 (%)	Absolute percentage point increase*
Bahrain	18.4	87.2	68.8
Egypt	34.2	62.9	28.7
Islamic Republic of Iran	26.7	18.5	-8.2
Lebanon	34.4	57.1	22.7
Morocco	34	57.6	23.6
Oman	12.8	33.3	20.5
Pakistan	35.2	45.1	9.9
Saudi Arabia	21.1	36.1	15

*a negative value amounts to a projected decrease in projected prevalence between 2000 and 2025.

performed in the 2019 report but not in the 2015 report, all were projected to see a percentage point decrease in current male tobacco smoking between 2000 and 2025.

Over the same period (2015–2019) there has been increased implementation of country-level tobacco use surveys and surveillance systems in several countries in the Region. As noted above, the projection could be performed for six further countries in the 2018 and 2019 trend reports than in the 2015 report (4–6). This indicates that many more countries now have more robust data on tobacco use and smoking, of the kind that allows useful trend projections to be calculated.

Of the countries for which the projected percentage point increase for current male tobacco smoking prevalence between 2000 and 2025 declined between the two trend reports (as described above), the number of recent national adult surveys since 2000 used to calculate country specific trends increased for five of them: Egypt (from 5 to 6), Lebanon (from 4 to 5), Morocco (from 4 to 5), Oman (from 2 to 3), and Pakistan (from 3 to 5) (4,6,7). The number of such surveys stayed the same for Bahrain and Saudi Arabia.

Of the countries for which the projected percentage point increase between 2000 and 2025 for current male tobacco smoking declined between the 2015 and 2019 trend reports (as described above), five out of seven improved their performance for at least one of the five “demand-reduction” MPOWER measures between 2015 and 2019 (7,8). Bahrain and Pakistan improved their performance for one measure each; Egypt and Oman improved their performance for two measures each; and Saudi Arabia improved its performance for four measures.

Discussion

As described above, for seven countries of the Region, the 2019 trend report yields a more encouraging projection to 2025 for current male tobacco smoking as compared to the 2015 trend report. It is reasonable to suppose that this improved outlook is at least in part due to improved monitoring simply providing a more accurate picture of

actual current tobacco use. There was only approximately a four year difference in the cut-off points for national tobacco surveys used as datapoints by the 2015 and 2019 trend reports (the years 2014 and 2018 respectively), making it unlikely that actual tobacco use reduction via policy change is solely responsible for these changes.

Nevertheless, considering changes in the country-level projections presented in the 2015 and 2019 trend reports in the context of tobacco control policy implementation is still important. It is likely that for many of the countries having more encouraging projections in the 2019 trend report compared to the 2015 report, their improved tobacco control policies have played a key role (including in Bahrain, Egypt, Oman, Pakistan and Saudi Arabia). In general, many countries have moved forward with MPOWER policy strengthening between 2015 and 2019, including for the Monitoring measure (7,8).

Despite this, there are a number of countries that have not achieved any legal policy improvement since the publication of the 2015 trend report and the 2015 edition of the WHO Report on the Global Tobacco Epidemic (7,8). This includes some of the countries that have more encouraging projections in the 2019 trend report than in the 2015 report (as noted above, this is likely due to improvements in monitoring). This is in addition to other countries in the Region that have moved backwards with respect to key tobacco control policies since 2015, or implemented moderate policy changes that are substantially less likely to have an effect on reducing prevalence, such as banning tobacco use in some, but not all, public places (7).

The above, as well as the fact that all but one of the countries in the Region are not projected to achieve the 30% relative reduction in tobacco use target (6), are likely symptoms of the following factors. First, there is not a steady and systematic approach to moving forward with tobacco control across the whole region (9) and countries regularly make regressive changes to their tobacco control policies, even while other positive policy changes are being made (7,10). Second, in many cases a multi-sectoral approach is missing (2). Third, there is often a lack

Table 2 Country-level projections for current male tobacco smoking, 2000–2025, WHO Trend Report 2019

Country	Estimated current male tobacco smoking 2000 (%)	Projected current male tobacco smoking 2025 (%)	Absolute percentage point increase*
Bahrain	36.6	34.5	-2.1
Egypt	40.3	42.6	2.3
Islamic Republic of Iran	25.9	18.3	-7.6
Iraq	38.1	33.5	-4.6
Kuwait	41	36.7	-4.3
Lebanon	40.2	41.4	1.2
Morocco	39	23.4	-15.6
Oman	13.6	17.3	3.7
Pakistan	37.2	27.6	-9.6
Qatar	26.2	23.9	-2.3
Saudi Arabia	23.3	25.4	2.1
Tunisia	64.2	36.8	-27.4
United Arab Emirates	35.7	28.5	-7.2
Yemen	35.5	24	-11.5

*a negative value amounts to a projected decrease in projected prevalence between 2000 and 2025.

of comprehensiveness in the approach to tobacco control, with policy-makers cherry-picking policies to implement, which is not effective for prevalence reduction (11). Fourth, the emergency situation in many countries is affecting progress across the whole region, as recently addressed by a WHO Framework Convention on Tobacco Control (FCTC) Report to the FCTC Conference of Parties (12). Individually these countries are unable to move forward in tobacco control and they also make it harder for other countries to continue to improve.

As outlined in the trend results, there were considerable gender differences in tobacco smoking habits in the EMR. Jarallah et al. suggest that this difference is attributable to social stigma attached to smoking among females in countries of the Region (13). The standardized survey methods call for family visits to collect responses regarding smoking behaviour. In the presence of male members of the family, females may be reluctant to reveal their true smoking behaviour and are therefore more likely to underreport compared to their male counterparts due to sociocultural factors (14).

Smoking prevalence among adolescent females is notably higher in comparison to that of adult females (15). This could be a result of less underreporting among this younger population due to increased openness regarding smoking (14). It could also reflect some bias related to exclusion of non-school-going adolescent females from the school-based surveys. Another factor may be the relative anonymity of the data collecting process of the adolescent population. Unlike adolescents, respondents to adult surveys, where data are typically collected in the home, may feel anonymity is less assured. Smoking rates among young people can reach 42% among males and 31% among females in the Region (15). This also applies to waterpipe smoking, which is in fact more popular among

young people than cigarettes (15).

Extrinsic factors such as religious beliefs might also play a crucial role in influencing smoking behaviour in the Region. The effect of such factors on tobacco use behaviour is, however, not sufficiently studied (16).

Limitations

Of all WHO regions, the EMR has the lowest level of coverage for national surveys monitoring smoking. Since 2013, only 15 out of 22 countries have completed a nationally representative survey of adults that measures some form of tobacco use, and made these results public (6). Three countries (Afghanistan, Libya and Sudan) have no results in the WHO trend reports because they have done only one survey to date, needing a second survey to calculate a trend. Somalia is among the six countries globally that have produced no nationally representative data on tobacco use among adults (5).

Other indicators of tobacco use, such as smokeless tobacco use, waterpipe use and cigarette use by children aged 13–15 years, were not projected in the trend reports. Despite the fact that Parties to the WHO FCTC are required to monitor all forms of tobacco use, some are technically and logistically challenged to implement the recommended surveys. Out of the 181 Parties to the Convention, only 76 countries regularly monitor all types of tobacco use in both adult and young populations, covering only 40% of the world's population (5). Data on use of electronic nicotine delivery systems (ENDS), including electronic cigarettes, are just beginning to be collected.

The reliance of all tobacco use surveys on self-reporting of tobacco use is another limitation, especially if various cultural factors make it likely that tobacco use is under-reported. According to Gorber et al., who

compared the prevalence estimates of smoking produced from self-reported data against the prevalence estimates based on measured smoking biomarkers, self-reported smoking often leads to under-reporting, so much so that the true smoking figures can be underestimated by up to 47% (17).

Recommendations

Compared to a high ($\geq 95\%$) probability of a decline in smoking prevalence for most countries in the Americas, European, and Western Pacific regions for both males and females, the possibility of an increase in prevalence in the EMR is high, especially among males (6). With the hesitant decline of smoking rates in the EMR, and the slow pace of implementation of tobacco control measures in many countries, the EMR is faced with an escalating economic burden attributed to tobacco-related diseases (18). This will in turn prevent most countries in the Region from achieving a 30% reduction in tobacco use by 2025 and cripple attempts to progress universal health coverage goals (19). Continued monitoring is crucial for informing and sensitizing decision-makers from the Region about this public health epidemic, the socio-economic burdens caused by tobacco use, as well as the growing use among youth and females that has not been anticipated (18).

Incomplete data remains one of the greatest

challenges, as some countries in the EMR have not conducted a national survey for over a decade. In addition, some surveys do not report sufficient details, such as tobacco use by age. Efforts to monitor tobacco using cost-effective solutions, such as including Tobacco Questions for Surveys within other surveys that countries are already implementing, should be considered (20).

Solutions to the problem of under-reporting could involve ensuring respondents have complete privacy during the survey. Another method would be to manually identify individuals that are likely to have misreported, such as females during pregnancy, and ignore or correct their testimony, e.g., by identifying current smoking using cotinine blood tests or exhaled breath CO monitors (21). While likely under-reporting continues, governments should take it into consideration in their policy-making.

Data on the nature and scale of the tobacco epidemic should be used to implement targeted and effective policies to reduce the use of tobacco, including the “demand-reduction” MPOWER measures (7). It is clear that all countries in the Region could do more to strengthen and improve implementation of these proven tobacco control policies.

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Prévalence du tabagisme dans la Région de la Méditerranée orientale

Résumé

Contexte : Trois rapports mondiaux publiés par l'Organisation mondiale de la Santé (OMS) rendent compte des tendances en matière de prévalence du tabagisme entre 2000 et 2025 sur la base de données issues d'enquêtes nationales.

Objectifs : La présente analyse visait à comparer les projections au niveau des régions et des pays concernant le tabagisme durant la période d'étude, comme présenté dans les rapports de l'OMS sur les tendances en la matière. Ces modifications sont examinées dans un contexte d'amélioration des politiques de surveillance et de lutte antitabac.

Méthodes : Les résultats au niveau des régions et des pays fournis par les rapports de l'OMS sur les tendances ont été pris en compte en termes d'augmentation prévue d'un point de pourcentage du tabagisme entre 2000 et 2025. Les données sur les enquêtes nationales et l'application des politiques provenaient de rapports pertinents publiés par l'OMS.

Résultats : Selon les projections du rapport 2009 sur les tendances, la prévalence du tabagisme chez les hommes au moment de l'analyse devrait baisser de moins de deux points de pourcentage d'ici 2025. Huit pays de la Région étaient représentés dans les deux rapports sur les tendances de 2015 et 2019. Sept des huit pays indiquaient une projection plus encourageante (à savoir une diminution de la projection relative à l'augmentation entre 2000 et 2025) pour le tabagisme chez les hommes en 2019, par rapport à 2015. Cinq de ces sept pays ont connu une amélioration de l'application de leurs politiques de surveillance et de lutte antitabac.

Conclusion : Les pays de la Région devraient réaliser des enquêtes nationales supplémentaires pour améliorer la précision des estimations de la prévalence, permettre la réalisation de nouvelles projections et inciter les responsables de l'élaboration des politiques à les faire évoluer positivement. Des solutions devraient être envisagées quant au biais de sous-notification lors des enquêtes. Les gouvernements devraient utiliser les projections de tendances pour orienter l'élaboration de politiques de lutte antitabac efficaces et réduire le tabagisme dans la Région.

معدل انتشار التدخين في إقليم شرق المتوسط

هبة فؤاد، أليسون كومار، رندة حمادة، فاطمة العوا، زي شن، تشارلز فريزر

الخلاصة

الخلفية: ثلاثة تقارير عالمية صادرة عن منظمة الصحة العالمية ترصد اتجاهات معدل انتشار تدخين التبغ وتتبعها من عام 2000 إلى عام 2025 بناءً على بيانات من دراسات استقصائية وطنية.

الأهداف: كان هذا الاستعراض يهدف إلى عقد مقارنة بين التوقعات الإقليمية والقُطرية للمعدل الحالي لتدخين التبغ التي وردت في تقارير المنظمة عن الاتجاهات، ودراسة هذه التغييرات في سياق تحسُّن الرصد وسياسات مكافحة التبغ.

طرق البحث: تُدرَس النتائج الإقليمية والقُطرية الواردة في تقارير المنظمة عن الاتجاهات من حيث الزيادة المثوية المتوقعة في المعدل الحالي لتدخين التبغ بين عامي ٢٠٠٠ و٢٠٢٥. وتُستقى البيانات الخاصة بالدراسات الاستقصائية الوطنية وتنفيذ السياسات من التقارير ذات الصلة الصادرة عن المنظمة.

النتائج: من المتوقع في تقرير الاتجاهات لعام ٢٠١٩ أن ينخفض المعدل الحالي لتدخين التبغ بين الذكور بنسبة تقل عن ٢٪ بحلول عام ٢٠٢٥. وتناول كلا تقريرَي المنظمة بشأن الاتجاهات لعامي ٢٠١٥ و٢٠١٩ ثمانية بلدان. وفي سبعة من هذه البلدان كانت توقعات المعدل الحالي لتدخين التبغ بين الذكور في تقرير ٢٠١٩ تبعث على الأمل بدرجة أكبر مقارنةً بتقرير ٢٠١٥ (إذ حدث انخفاض في الزيادة المتوقعة بين عامي ٢٠٠٠ و٢٠٢٥). وقد شهدت خمسة من هذه البلدان السبعة تحسُّناً في كل من الرصد وتنفيذ سياسة مكافحة التبغ.

الاستنتاج: ينبغي لبلدان الإقليم تنفيذ دراسات استقصائية وطنية إضافية لتحسين دقة التقديرات الخاصة بمعدل الانتشار، والسماح بإجراء مزيد من التوقعات، وتحفيز واضعي السياسات على إجراء تغييرات إيجابية في السياسات. وينبغي النظر في إيجاد حلول للتحيزات التي يوجد تقصير في الإبلاغ عنها خلال الدراسات الاستقصائية. وينبغي للحكومات أن تسترشد بالتوقعات الخاصة بالاتجاهات في وضع سياسات فعالة لمكافحة التبغ من أجل الحد من تعاطي التبغ في الإقليم.

References

1. Institute for Health Metrics and Evaluation. Findings from the Global Burden of Disease Study 2017. Seattle, WA: Institute for Health Metrics and Evaluation, 2018.
2. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013–2020. Geneva: World Health Organization, 2013.
3. US Centers for Disease Control and Prevention. Smoking & tobacco use: about GTSS. Atlanta, GA: US Centers for Disease Control and Prevention, 2018 (<https://www.cdc.gov/tobacco/global/gtss/index.htm>, accessed 17 October 2019).
4. World Health Organization. WHO global report on trends in prevalence of tobacco smoking 2015. Geneva: World Health Organization, 2015.
5. World Health Organization. WHO global report on trends in prevalence of tobacco smoking 2000–2025, 2nd edition. Geneva: World Health Organization, 2018.
6. World Health Organization. WHO global report on trends in prevalence of tobacco smoking, 2000–2025, 3rd edition. Geneva: World Health Organization, 2019.
7. World Health Organization, WHO report on the global tobacco epidemic 2019. Geneva: World Health Organization, 2019.
8. World Health Organization. WHO report on the global tobacco epidemic. Geneva: World Health Organization, 2015.
9. El-Awa F, Vinayak P, Bettcher D. Moving away from the comfort zone of tobacco control policies to the highest level of implementation. *East Mediterr Health J.* 2016;22(3): 161–2
10. Hedyari G, Zaatar G, Al-Lawati JA, El-Awa F, Foud H. MPOWER, needs and challenges: trends in the implementation of the WHO FCTC in the Eastern Mediterranean Region. *East Mediterr Health J.* 2018;24(1):63–71
11. World Health Organization. WHO building blocks for tobacco control: a handbook. Geneva: World Health Organization, 2004.
12. Convention Secretariat to the WHO FCTC, FCTC/COP8/13: WHO FCTC Implementation during complex emergency situations, Geneva: WHO FCTC, 2018.
13. Jarallah JS, Al-Rubeaan KA, Al-Nuaim AR, Al-Ruhaily AA, Kalantan KA. Prevalence and determinants of smoking in three regions of Saudi Arabia. *Tob Control.* 1999;8(1):53–6.
14. Idris A, Al-Saadi T, Turk T, Alkhatib M, Zakaria M, Sawaf B, et al. Smoking behaviour and patterns among university students during the Syrian crisis. *East Mediterr Health J.* 2018;24(2):154–160
15. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Reducing tobacco use to prevent and control noncommunicable diseases in the Eastern Mediterranean Region. Cairo: WHO/EMRO; 2015 (<http://www.emro.who.int/fr/noncommunicable-diseases/publications/questions-and-answers-on-reducing-tobacco-use-to-prevent-and-control-noncommunicable-diseases-in-the-region.html>, accessed 20 December 2019).
16. Fouda S, Kelany M, Moustafa N, Abushouk AI, Hassane A, Sleem A, et al. Tobacco smoking in Egypt: a scoping literature review of its epidemiology and control measures. *East Mediterr Health J.* 2018;24(2):198–215
17. Sechidis K, Sperrin M, Petherick ES, Luján M, Brown G. Dealing with under-reported variables: an information theoretic solution. *Int J Approx Reason.* 2017;85:159–177.
18. Bilano V, Gilmour S, Moffiet T, Tursan d'Espaignet E, Stevens GA, Commar A, et al. Global trends and projections for tobacco use, 1990–2025: an analysis of smoking indicators from the WHO Comprehensive Information Systems for Tobacco Control. *The Lancet.* 2015;385(9972):966–76

19. World Health Organization. Tracking universal health coverage: first global monitoring report. Geneva: World Health Organization, 2015.
20. US Centers for Disease Control and Prevention. Global Adult Tobacco Survey Collaborative Group, "Tobacco questions for surveys: a subset of key questions from the Global Adult Tobacco Survey (2nd Edition)." Atlanta: US Centers for Disease Control and Prevention, 2011.
21. Gorber SC, Schofield-Hurwitz S, Hardt J, Levasseur G, Tremblay M. The accuracy of self-reported smoking: a systematic review of the relationship between self-reported and cotinine-assessed smoking status. *Nicotine Tob Res.* 2009;11(1):12–24