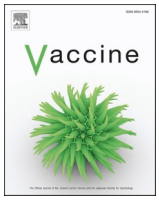
Vaccine 43 (2025) 126538

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine



How do national immunization technical advisory groups assess and use evidence: Findings from the SYSVAC survey

Antonia Pilic [a,b,*], Louise Henaff [c], Christoph Steffen [c], Ole Wichmann [a], Vanessa Piechotta [a], Thomas Harder [a]

[a] Robert Koch Institute, Immunization Unit, Berlin, Germany
[b] Charité - Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Berlin, Germany
[c] World Health Organization, Immunization, Vaccines and Biologicals department, Geneva, Switzerland

ARTICLE INFO

Keywords:
National Immunization Technical Advisory Groups (NITAG)
Evidence-based medicine
Vaccination recommendation
Methodology
Systematic review
Vaccination

ABSTRACT

National immunization technical advisory groups (NITAGs) develop evidence-based vaccination recommendations. Systematic reviews (SRs) are important tools in that process, but conducting them is very resource-intensive. Given the considerable number of immunization-related SRs published and to minimize duplication of effort, a more practical approach for NITAGs is to use existing SRs. Among multiple initiatives and resources to strengthen NITAGs, the freely accessible SYSVAC registry supports NITAGs in identifying suitable SRs when developing vaccination recommendations. Additional SYSVAC courses provide step-by-step training on how to use SRs.

This cross-sectional survey was conducted online and involved 108 participants globally. The aim was to explore NITAGs user experience with evidence retrieval, to assess impact and use of the SYSVAC resources and training needs. Data were collected using a structured questionnaire.

Most of the respondents were > 45 years old (75.9%) and represented 50 NITAGs from all six World Health Organization (WHO) regions. In total, 13/50 NITAGs (26.0%) had ease accessing full text publications. The preferred data sources to search for evidence were peer reviewed literature via PubMed and the WHO website (Strategic Advisory Group of Experts – SAGE – on Immunization). When developing vaccination recommendations, respondents stated using SRs mostly conducted by SAGE, other institutions or NITAGs (83.2%), recommendations of other countries (79.4%) and primary studies (73.8%). Respondents from 35 NITAGs stated to use the SYSVAC registry to search for evidence, leading to ≥69 recommendations being developed by NITAGs globally with its support. Aside existing SYSVAC courses on SR use, there was great interest in training on SR use in the development of vaccination recommendations.

Our survey gathered information on evidence use and training needs. Survey results serve as a starting point to improve support of NITAGs in developing recommendations.

1. Introduction

The body of evidence accompanying vaccine products accessible in the market is rapidly expanding in volume and complexity. Consequently, all countries are increasingly confronted by the need to assess the existing evidence to take informed decisions on new vaccine introductions, schedule adaptations and product optimization.

National Immunization Technical Advisory Groups (NITAGs), by advising Ministries of Health, are a key component of independent, transparent and country-owned decision-making on immunization [1]. The World Health Organization (WHO) recommends that all countries establish NITAGs to develop immunization policies using an evidence-

Abbreviations: AFR, African Region; AMR, Region of the Americas; AMSTAR 2, A Measurement Tool to Assess systematic Reviews 2; CDC, U.S. Centers for Disease Control and Prevention; EMR, Eastern Mediterranean Region; EUR, European Region; GNN, Global NITAG Network; IA2030, Immunization Agenda 2030; NITAG, National Immunization Technical Advisory Group; ROBIS, Risk Of Bias In Systematic reviews; SAGE, Strategic Advisory Group of Experts on Immunization; SEAR, South-East Asia Region; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology; WHO, World Health Organization; WPR, Western Pacific Region.

* Corresponding author at: Robert Koch Institute, Immunization Unit, Berlin, Germany.
E-mail address: pilicA@rki.de (A. Pilic).

https://doi.org/10.1016/j.vaccine.2024.126538
Received 2 August 2024; Received in revised form 13 November 2024; Accepted 14 November 2024
Available online 20 November 2024

based approach [1]. This role has been reemphasized in the Immunization Agenda 2030 (IA2030) endorsed by all WHO Member States in 2020 [2]. NITAGs ideally comprise 10–15 independent experts from diverse fields representing the life course approach (e.g. pediatrics, general medicine, infectious disease, epidemiology, public health, and immunology), supported by a technical secretariat with dedicated funding [1]. As of 2022, 170 WHO Member States reported having a NITAG in place, marking an 7.1% increase from 158 reported in 2019 [3,4]. However, many NITAGs, in particular those which have been established recently, face challenges in accessing technical resources for synthesizing and assessing relevant literature, essential to fulfilling their mandate [5].

Systematic reviews (SRs) are pivotal in the evidence-based development of vaccination recommendations. Drawing on the best-available evidence, SRs comprehensively summarize literature using systematic and transparent methodologies to identify relevant studies to a research question, select eligible studies for inclusion, appraise their quality and synthesize study findings [6]. Conducting SRs requires substantial resources, which many NITAGs do not have [7,8]. In the past, different NITAGs have conducted or commissioned SRs on similar immunization-related topics. As the number of SRs on immunization-related topics increased steadily over the past years [9], it is important to avoid duplication of efforts on identical subjects and to be able share the body of evidence across NITAGs in an easy and user-friendly manner.

Multi-partner initiatives across WHO regions and resources [10–13] such as the Global NITAG Network (GNN) exist to share NITAG experiences and best practices, to foster networking and capacity building through workshops and use of the NITAG Resource Center website [14–16]. To support NITAGs globally in identifying suitable SRs, the Robert Koch Institute jointly with WHO maintains up to date the SYSVAC registry of SRs on immunization topics, originally developed by the London School of Hygiene and Tropical Medicine, and offers e-learning courses (both freely accessible at the NITAG Resource Center: nitag-resource.org/sysvac-systematic-reviews) [9,17–19]. To be incorporated in this registry, SRs on immunization topics are identified through systematic searches on MEDLINE, Embase, The Cochrane Library, and the Living Overview of Evidence (L-OVE) repository. A quality assessment using *A Measurement Tool to Assess systematic Reviews 2* (AMSTAR 2) is applied to provide information on the methodological quality of included SRs [20]. Additionally, two online training courses are available providing knowledge on how to use the SYSVAC registry and SRs [17].

In this context our study aimed (a) to understand characteristics of users of the SYSVAC registry and e-learning courses, (b) to investigate users' experiences with searching, accessing and retrieving evidence, particularly SRs, and (c) to explore the extent to which the SYSVAC resources meet user needs when developing vaccination recommendations. Additionally, the study aimed (d) to determine users' experience with and interest in training related to SRs.

2. Methods

2.1. Study design

We conducted a cross-sectional survey using a revised Dillman survey methodology [21]. Reporting followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting standards for cross-sectional surveys [22]. The protocol for this survey was specified in advance and is available upon request.

2.2. Setting and participants

NITAG members, secretariats and experts involved in the development of vaccination recommendations (expanded immunization programme staff, EPI) globally were eligible to participate in the online survey from July, 10 to September, 04, 2023. Eligibility further required the contact ability via the WHO and adequate knowledge of English language.

The survey was hosted online through Voxco Survey Platform (Version 6.0.0.51), a secure software for managing online surveys and data collection [23]. Survey invitations including the generic survey link were sent to eligible individuals via mailing lists managed by WHO. The mailing lists included 437 NITAG members from 122 countries. After four weeks and five days before end of data collection, a reminder was sent to potential participants. Following online informed consent, participants answered a 20-min structured questionnaire. No personal data were collected, and all data were treated confidentially to maintain participants' anonymity.

2.3. Questionnaire

An electronic structured questionnaire consisting of 35 questions was developed and piloted by staff of the secretariat of the German NITAG and EPI to ensure adequacy and order of the questions, comprehensiveness of the contents, and skipping patterns. The questionnaire was structured into five sections: (i) user characteristics (5 questions), (ii) experience in searching for and accessing evidence (4 questions) and (iii) using evidence when developing vaccination recommendations (13 questions), (iv) feedback on SYSVAC resources (9 questions), and (v) experience with and interest in training on SR use (4 questions). Most questions were closed-ended following a 5-Point Likert scale from “always” to “never” (coded 0–4) with the addition of “don't know” (coded 5) or dichotomous (yes/no). Some questions were open-ended, e.g. suggestions for SYSVAC resource improvement. All questions were single choice and a skip logic or branching was implemented in the survey to tailor questions based on previous answers (see Appendix I for complete questionnaire). Participants were offered to complete the survey across multiple sessions by an interruption option using a randomly generated PIN when starting the survey.

2.4. Variables

User characteristic variables (section (i)) included age, country vaccination recommendations are developed for, WHO region, role, professional background, and main setting respondents work in. *Variables on experience searching for, accessing, and using evidence* (section (ii) and (iii)) included frequency of ease finding evidence, database use, favourite database, full text access, type of evidence use, number of SRs being involved in the past year, ease finding SRs, confidence using SRs, ease interpreting single or multiple SR, SR language, methodological quality or risk of bias assessment of SRs, tools being used for quality or risk of bias assessment, and ease of quality or risk of bias assessment. Feedback on *SYSVAC variables* (section (iv)) included frequency of registry use, ease finding SRs in registry and in comparison, to other databases, relevance of AMSTAR 2 assessment, vaccination recommendations developed with help of registry, helpfulness of further details on AMSTAR 2 assessment, and helpfulness of e-learning courses. *Variables on SR training (section (v))* included experience with any training, training on SR use, and interest in (additional) training on effective SR use. *Free text variables* included e.g. content or feature suggestions for improvement of SYSVAC registry and e-learning courses.

2.5. Data analysis

2.5.1. Statistical analysis

Completed and interrupted questionnaires were considered for analysis. Descriptive statistics were reported as mean, medians and percentages. Nominal data and ordinal data were described by calculating frequencies with percentages on an item-by-item basis. To enable trend estimation, responses on the 5-Point Likert scale were systematically collapsed. Responses designated as “always” and “often” (coded 0 and 1) were reported as percentage who agreed. Questions primarily

concerning individual behaviour were consistently aggregated on an individual level. Responses to questions pertaining to the operational methodologies of a NITAG as an entity were aggregated on country/NITAG level. Sensitivity analyses were performed of the mean respondents' responses per NITAG since participation of respondents attributable to a NITAG or NITAG secretariat was not limited. Subgroup analysis was used to compare responses between NITAGs across different WHO regions, and between SYSVAC users and non-users. Kruskal-Wallis test was performed to test for differences across WHO regions, and between SYSVAC user and non-user. To enhance sample size and statistical certainty, responses on the 5-Point-Likert scale were categorized as always/often, sometimes/rarely and never. P-values below 0.05 were considered statistically significant. All statistical analyses were carried out using Stata 17® [24].

2.5.2. Content analysis of open-ended responses

Two investigators reviewed and itemized each unique response based on a developed codebook into explicit categories. The coding strategy was refined following discussion with the co-authors. A frequency count was performed to quantify the number and proportion of responses in each category.

2.6. Data protection and ethics

Participants provided informed consent online. The study was approved by the Data Protection Office of Robert Koch Institute (No. DS-2023-095), and the Ethics Committee of Charité-Universitätsmedizin Berlin (No. EA2/126/23).

3. Results

3.1. Study population

A total of 108 participants partially or fully completed survey (Fig. 1). Withdrawn surveys were excluded from the analysis. The survey response rate was 42.1% (184 of 437 invited individuals started survey, Fig. 1). Characteristics of all participants, SYSVAC registry users, and SYSVAC course users are displayed in Table 1. The majority of participants were older than 45 years of age (75.9%). Fifty of 170 eligible countries having a NITAG in place (29.4%) (subsequently referred to as NITAGs) were represented by at least one participant in the survey [3]: Afghanistan, Albania, Argentina, Armenia, Australia, Azerbaijan, Belize, Benin, Bhutan, Canada, Colombia, Denmark, Djibouti, El Salvador, Eswatini, Ethiopia, Germany, Ghana, Guatemala, Honduras, India, Indonesia, Islamic Republic of Iran, Iraq, Ireland, Lebanon, Libya, Madagascar, Maldives, Mauritius, Montenegro, Morocco, Nepal, Netherlands, Nigeria, Oman, Paraguay, Qatar, Rwanda, Saudi Arabia, Senegal, Seychelles, Syrian Arab Republic, Thailand, Togo, Tunisia, United Arab Emirates, United States of America, Zambia and Zimbabwe.

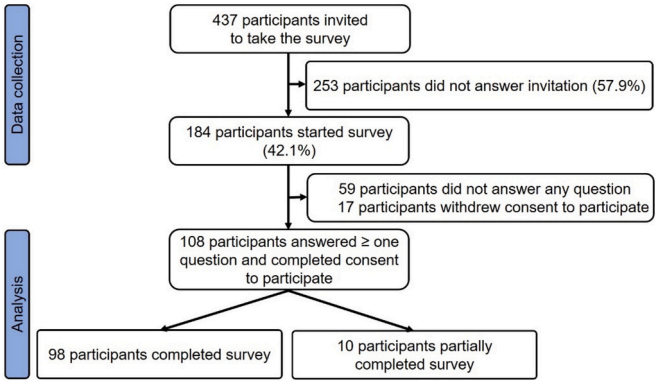


Fig. 1. Participant flowchart. Participant flowchart showing consent and completeness of participation in online SYSVAC survey.

Table 1
Participants characteristics in the SYSVAC survey.

Demographics	All responses $n = 108$		SYSVAC registry user $n = 57$		SYSVAC course user $n = 14$	
	n	%	n	%	n	%
Age group						
18–29 years	1	0.9	1	1.8	0	0
30–44 years	25	23.2	14	24.6	5	35.7
45–59 years	44	40.7	21	36.8	2	14.3
≥60 years	38	35.2	21	36.8	7	50.0
WHO region						
Africa[a]	21	19.4	8	14.0	3	21.4
Americas[b]	37	34.3	18	31.6	3	21.4
Eastern Mediterranean[c]	22	20.4	11	19.3	4	28.6
Europe[d]	20	18.5	14	24.6	2	14.3
South-East Asia[e]	7	6.5	5	8.8	2	14.3
Western Pacific[f]	1	0.9	1	1.8	0	0
Role						
NITAG Chair	19	17.6	11	19.3	4	28.6
NITAG Core Member	49	45.4	26	45.6	7	50.0
NITAG Secretariat	19	17.6	14	24.6	2	14.3
EPI staff serving as NITAG Secretariat	10	9.3	2	3.5	1	7.1
EPI staff not serving as NITAG Secretariat	11	10.2	4	7.0	0	0
Profession						
Clinical medicine[g]	28	25.9	20	35.0	5	35.7
Epidemiology	18	16.7	8	14.0	4	28.6
Health economics	1	0.9	1	1.8	0	0
Health systems and delivery	3	2.8	1	1.8	1	7.1
Immunization program	12	11.1	2	3.5	1	7.1
Immunology	6	5.6	4	7.0	1	7.1
Microbiology[h]	3	2.8	2	3.5	0	0
Occupational health	2	1.8	0	0	0	0
Public health	20	18.5	11	19.3	1	7.1
Vaccinology	9	8.3	5	8.8	0	0
Other[i]	6	5.6	3	5.3	1	7.1
Work setting						
Health service (e.g. hospital/clinics)	22	20.4	14	24.6	2	14.3
Ministry of Health	27	25.0	7	12.3	2	14.3
Non-governmental organization	9	8.3	3	5.3	3	21.4
Public health agency	19	17.6	14	24.6	3	21.4
Regulatory authority on medicines	2	1.8	1	1.8	1	7.1
University	23	21.3	14	24.6	2	14.3
Other[j]	6	5.6	4	7.0	1	7.1

[a] participants from 13/38 existing NITAGs (34.2%) [25]
[b] participants from 9/33 existing NITAGs (27.3%) [25]
[c] participants from 13/21 existing NITAGs (61.9%) [25]
[d] participants from 8/51 existing NITAGs (15.7%) [25]
[e] participants from 6/11 existing NITAGs (54.5%) [25]
[f] participants from 1/16 existing NITAGs (6.3%) [25]
[g] incl. pediatrics and adolescent medicine, adult medicine, geriatrics.
[h] incl. Virology.
[i] Other: Clinical medicine and epidemiology; Community medicine; Infectious diseases; Information sciences; Pediatric medicine and public health; Sociology and anthropology.
[j] Other: Ambulatory pediatrics; Consultancy; Health comission; Ministry of National Education; National Academy of Sciences; NITAG.

3.2. Users experience searching for, accessing and retrieving evidence

3.2.1. Searching for evidence

In general, the majority of participants (60.2%, 65/108) had ease finding evidence when developing vaccination recommendations. Among the 108 participants, PubMed was the most frequently used database when searching for evidence (75.9%), followed by the WHO SAGE website (72.3%) and Google/other search engines (64.9%). Less frequently used websites were the International prospective register of systematic reviews (PROSPERO, 15.8%), Embase (13.9%), and

Epistemonikos (8.3%). Other databases used are shown in Appendix II (Supplementary Table 1 + 2). The majority of respondents stated PubMed (41.7%) and the WHO SAGE website (34.3%) to be their favourite database/website to search for evidence (Fig. 2).

3.2.2. Accessing evidence

A total of 26.0% NITAGs (13/50) had easy access to full text of publications when they are behind a paywall (Fig. 3). In the subgroup analysis, access to full text publications varied between NITAGs across WHO regions from 7.7% of NITAGs in EMR (1/13) to 50.0% of NITAGs in EUR (4/8) (p = 0.45) (Fig. 3).

3.2.3. Retrieving evidence

Regarding type of evidence being used for the development of recommendations, among 107 participants with responses, 83.2% indicated to consult SRs, recommendations of other countries (79.4%) and primary studies (73.8%). Less frequently consulted resources were consumer/stakeholder input (31.8%) and industry reports (23.3%). Other resources consulted are shown in Appendix II (Supplementary Table 1 + 3). Use of recommendations of other countries (p = 0.04) and use of industry reports (p = 0.02) varied across WHO regions (for details see Supplementary Table 8, Appendix II). Among respondents using SRs as evidence source, 66.0% of NITAGs indicated using SRs conducted by SAGE (33/50), 54.0% by other institutions (27/50), and 52.0% by other NITAGs (26/50), respectively. Only a minority of NITAGs conduct (28.0%, 17/50) or commission (22.0%, 11/50) SRs by themselves (Fig. 4A). Conduct of SRs varied between NITAGs across WHO regions from 14.3% of NITAGs in SEAR/WPR (1/7) to 46.2% of NITAGs in AFR (6/13) (p = 0.91) (Fig. 4B). In the context of recommendation development, 80.5% of respondents (66/82) stated having being involved in ≥1 SR in the past year (see bar chart in Supplementary Fig. 1, Appendix II).

Regarding use of SRs, 37.0% of respondents (30/81) reported having ease finding SRs in general, and 57.6% (57/99) having confidence in using SRs effectively when developing recommendations. Furthermore, 45.5% of respondents (36/79) stated to easily interpret results of a single SR and 21.0% (16/76) stated ease interpreting results across multiple SRs, respectively. Most of the respondents (60.2%, 47/78) stated to frequently interpret findings across multiple SRs (further details in Supplementary Table 1, Appendix II). Additional free text responses posed the administrative challenge (n = 1) and the dependency of available resources or experience when searching for SRs (n = 4). Moreover, two respondents emphasized the caution needed when interpreting findings across SRs and to use multiple SRs if they are published from the same regional country (n = 1 each).

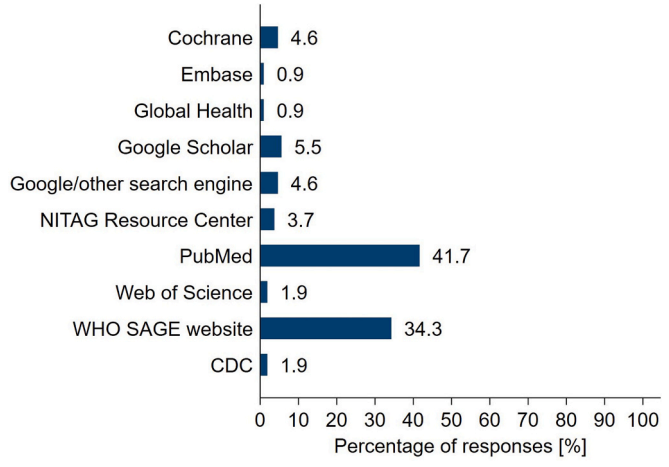


Fig. 2. Favourite database to search for evidence. Bar chart of responses from 108 participants. CDC: Centers for Disease Control and Prevention; NITAG: National Immunization Technical Advisory Groups; SAGE: Strategic Advisory Group of Experts on Immunization; WHO: World Health Organization.

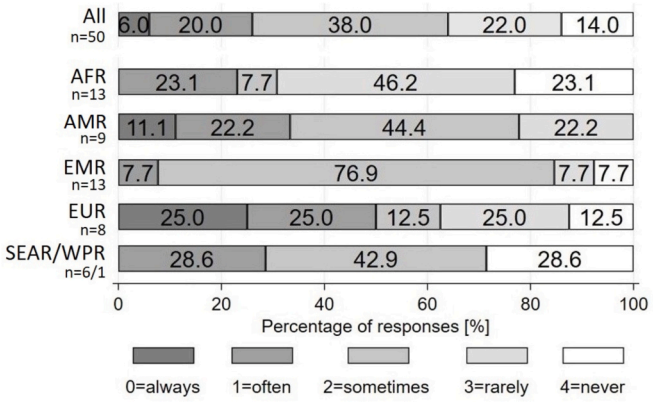


Fig. 3. Access to full text of publications found online. Stacked bar chart of mean responses per NITAG for all NITAGs and stratified by WHO region (n = 50, p = 0.45). AFR: African Region; AMR: Region of the Americas; EMR: Eastern Mediterranean Region; EUR: European Region; SEAR: South-East Asia Region; WPR: Western Pacific Region.

The majority of respondents indicated to use SRs written in English language (97.5%, n = 79), followed by SRs in Spanish (18.5%, n = 15) and French (14.8%, n = 12) (for further languages see Supplementary Table 1, Appendix II).

3.2.4. Quality assessment of SRs

Regarding methodological quality or risk of bias assessment of SRs (referred to as quality assessment subsequently), 67.9% of respondents (55/81) indicated to frequently conduct quality assessments, 32.4% of which use a tool or checklist for quality assessment (further details in Supplementary Table 1, Appendix II). Among those, the majority stated to use AMSTAR or AMSTAR 2 (29/48, 60.4%) and ROBIS (12/48, 25.0%). Refer to Supplementary Table 4 for other tools (Appendix II).

Only 24.0% of respondents (18/75) considered quality assessment performance as easy. One respondent indicated to seek advice from local experts during challenges in quality assessment, while three respondents emphasized unease finding respective information for quality assessment, its subjective assessment and difficulty understanding the quality tools themselves.

3.3. Feedback on SYSVAC resources

Regarding the SYSVAC resources, 57.6% of respondents (57/99) indicated to ever have used the registry for evidence search, representing 35 of participating NITAGs globally (9 NITAGs in EMR, 7 NITAGs in AFR and AMR each, 6 NITAGs in EUR and SEAR/WPR each) (Fig. 5). Among the SYSVAC users, 24.6% (14/57) stated to search the registry frequently. There was no difference in SYSVAC registry use across WHO regions (p = 0.25). However, 26.8% of respondents (17/56) stated to easily find SRs within the registry, and 34.0% (18/53) stated to find SRs easier within the registry compared to other databases. Reasons for not finding SRs easier within SYSVAC were familiarity to other databases and non-intuitiveness (each n = 1). The majority of respondents (74.5%, 41/55) emphasized the relevance of quality assessment in the context of recommendation development and 98.1% of respondents indicated providing further details on the methodological quality of SRs included in the SYSVAC registry to be helpful (further details in Supplementary Table 5, Appendix II).

Moreover, in terms of recommendation development, 50.0% of participating NITAGs (25/50) (71.4% among SYSVAC using NITAGs, 25/35) developed ≥1 recommendation with the help of the SYSVAC registry (Fig. 5). Thus, a total of ≥69 recommendations were developed

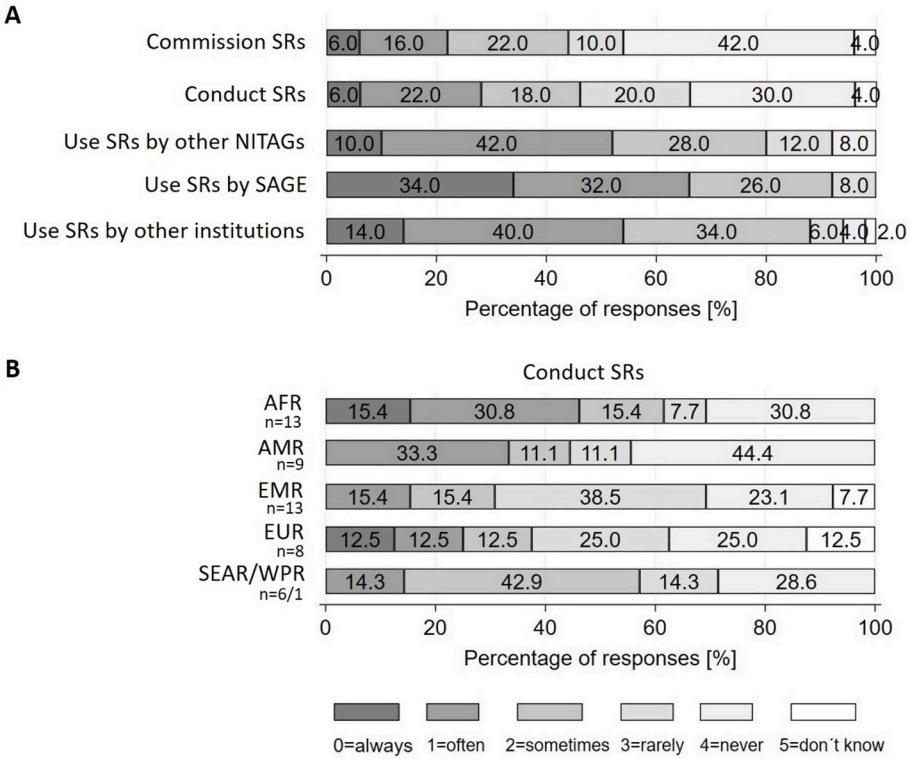


Fig. 4. Type of systematic review use. Stacked bar chart of mean responses per NITAG (A) for all NITAGs and (B) conduct of SRs stratified by WHO region (n = 50, p = 0.91). AFR: African Region; AMR: Region of the Americas; EMR: Eastern Mediterranean Region; EUR: European Region; NITAG: National Immunization Technical Advisory Groups; SEAR: South-East Asia Region; SAGE: Strategic Advisory Group of Experts on Immunization; SR: systematic review; WPR: Western Pacific Region.

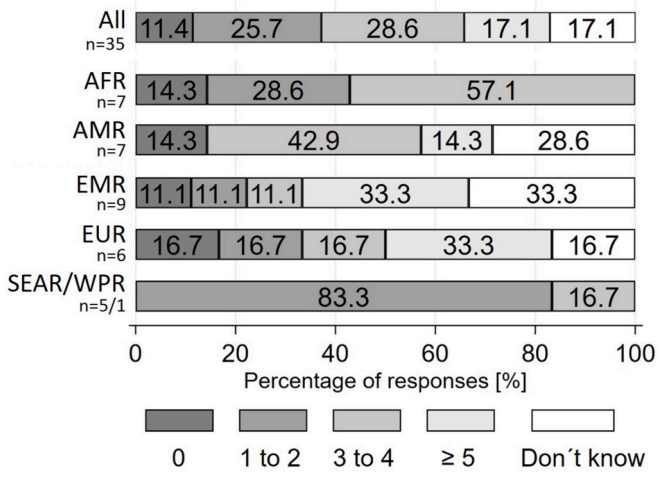


Fig. 5. Recommendations developed with the help of SYSVAC registry. Stacked bar chart of mean responses per NITAG indicated ever have used the SYSVAC registry (n = 35 AFR). African Region; AMR: Region of the Americas; EMR: Eastern Mediterranean Region; EUR: European Region; SEAR: South-East Asia Region; WPR: Western Pacific Region.

by NITAGs across all WHO regions using the SYSVAC registry (≥19 in EMR, ≥14 each in AFR, AMR, and EUR, and ≥ 8 in SEAR/WPR, Fig. 5).

Among non-SYSVAC users (n = 42), 78.6% of respondents indicated to search the NITAG Resource Center, in which the SYSVAC registry is embedded. Among the respondents who did not use the SYSVAC registry, 11 (64.7%) stated to be unaware of its existence and 6 (35.3%) not to need it.

Regarding SYSVAC e-learning courses, 20.2% of respondents (14/69) from 14 NITAGs (4 NITAGs in EMR, 3 NITAGs in AFR and AMR each, 2 NITAGs in EUR and SEAR/WPR each) stated to ever have conducted any SYSVAC courses. Among SYSVAC e-learning course users, 92.9% (13/14) found the courses helpful (further details in Supplementary Table 5, Appendix II). Furthermore, SYSVAC course users tended to have ease interpreting results from a single SR or multiple SRs more often than non-SYSVAC users, respectively (72.7% vs. 45.2%, p = 0.06, and 45.5% vs. 12.2%, p = 0.09).

3.3.1. *Improvement of SYSVAC resources*

A total of 8.3% of respondents (9/108) provided 10 analyzable responses to the open-ended questions which features or information to include in future updates of the SYSVAC registry, and 4.6% of respondents (5/108) provided 7 valid responses for improving the SYSVAC e-learning courses, respectively (for all responses see Supplementary Table A6, Appendix II). Suggestions for improving the registry included full text access of not open access publications (n = 2), to increase user-friendliness (n = 2), and for the e-learning courses to assess the suitability/translation of SR content (n = 2).

3.4. *Experience with and need for training on systematic review use*

In the context of training, 72.7% of respondents (72/99) had any experience with e-learning/online courses or training, of which 33.3% (33/99) had any training on SR use in particular. Irrespective of training experience, 88.1% (59/67) and 72.7% of respondents (24/33) stated having interest in initial training and additional training on using SRs when developing vaccination recommendations, respectively (for details see Supplementary Table 7, Appendix II). In free text, respondents indicated interest in advanced training and emphasized the dependency on the organizing institution (n = 1 each).

Sensitivity analyses showed no substantial change in the results of responses trends after analyzing the mean of responses per NITAG, indicating the robustness of the data (for details see Supplementary

Table 10 + 11, Appendix II).

4. Discussion

To our knowledge, this is the first global survey among NITAGs on experiences with evidence retrieval, SYSVAC and training needs on SR use in the context of vaccination recommendation development. Respondents representing a total of 50 NITAGs globally participated in this survey.

Our findings suggest that access to full text of scientific literature is a challenge to many NITAGs and varied between WHO regions. Besides limited access due to budget constraints or lack of institutional subscriptions, further reasons may be legal and copyright restrictions limiting access to full-text articles or language barriers. Surveyed respondents indicated that their NITAG mainly consult SRs, recommendations of other countries and primary studies when developing vaccination recommendations. Interestingly, along use of existing SRs conducted by other stakeholders, 14 NITAGs stated to conduct SRs frequently themselves. Even 60 respondents stated having been involved in ≥1 SR in the past year. SRs involve a rigorous and structured approach to synthesize evidence, which can be complex and multifaceted. Various definitions of evidence synthesis methodologies exist [26,27], which can lead to misunderstanding different aspects of the process, such as defining systematic searches as the conduct of SRs. Understanding the nuances of study selection, data extraction, and evidence synthesis requires a certain level of expertise in research methodology and evidence-based practice. However, a survey conducted among European countries from 2014 showed similar results in SR use [28]. In this survey, 25 of 26 NITAGs stated to self-conduct SRs and/or consult on SRs conducted by others when developing vaccination recommendations [28]. Additionally, this study showed that only five of 17 NITAGs conducting SRs reported to use quality appraisal tools for primary studies, and three of eight NITAGs using only SRs conducted by others use SR quality appraisal tools [28]. Generally, the guidance from the SYSVAC expert panel suggests if a suitable SR addressing the pertinent question already exist, NITAGs may focus their efforts on adapting its findings to local context and supplementing them with other relevant or more up-to-date information rather than conduct de-novo SRs [17].

The survey findings suggest that the SYSVAC registry is a practical tool for NITAGs to use and benefit from. A total of 57.6% of respondents from 35 NITAGs globally used the SYSVAC registry to search for evidence, and over 69 recommendations were developed with its support. The tool also appears to be straightforward to understand and meet users' needs, as suggestions made by respondents for improving the registry corroborate (for all responses see Supplementary Table 6, Appendix II). Similar results were obtained during a capacity building workshop conducted by WHO in June 2023 with NITAGs in EMR, where 15/20 participants rated the SYSVAC registry as a useful workshop topic (the remaining 5 participants rated it as neutral) [29]. Nonetheless, our findings suggest that there is a knowledge gap in terms of SYSVAC registry and courses among non-users. Most non-SYSVAC users stated to search the NITAG Resource Center for evidence, apparently being unaware of its association with SYSVAC. However, to effectively support NITAGs in the future, it will be important to guarantee the sustainability of the SYSVAC repository and to continue to actively promote the use of existing SRs by NITAGs globally.

Lastly, in our survey, respondents showed major interest in training on SR use when developing vaccination recommendations. To meet this demand, several steps can be taken. One approach may be to acknowledge and promote existing resources such as the SYSVAC online courses or further training tools that are freely accessible at the NITAG Resource Center [15]. Using this platform, NITAGs could collaborate more easily. Moreover, being part of the GNN network facilitates knowledge exchange and ongoing learning beyond the existing training resources [30].

This study has three main limitations. First, as this study was cross-sectional, only association and not causation can be inferred. Language barrier or differences in cultural perception may have led to misunderstandings of questions or responses. For example, the terminology of the conduct of a SR versus a systematic search (that may be part of a SR approach) might indicate that respondents could have interpreted the two terms and what they comprise in different ways. However, summarized answers per NITAG were analyzed within sensitivity analysis to avoid misinterpretation and to confirm that our findings were not driven by multiple participation per person per NITAG. Second, dissemination of survey invitations relied on WHO and NITAGs' registration to mailing lists. Possibly less engaged NITAGs in international collaboration and which are currently not part of the GNN have not responded to the survey. Third, we aimed to obtain a representative sample of NITAGs or staff involved in the development of vaccination recommendations globally by recruiting a random sample of NITAGs with unlimited participation. It is possible that individuals who chose not to participate in the survey had different characteristics and experiences regarding evidence use and SYSVAC. However, the characteristics and experiences were sometimes retrieved from one person per country and were self-reported and might not necessarily represent the view of the entire NITAG or other stakeholders involved in NITAG work. Moreover, significant turnover of NITAG secretariat staff and members requires continuous attention to sensitize colleagues in the NITAG space. Since this is the first survey examining NITAG characteristics on evidence and SYSVAC use, we believe that these views and information constitute a valuable starting point for further improvement of the SYSVAC resources and experiences with evidence use. Building on the results examined in this survey, future plans include maintaining resources by decreasing costs and work load through the utilization of artificial intelligence methodologies [31].

5. Conclusions

NITAGs use SRs, recommendations of other countries, and primary studies to develop vaccination recommendations. The SYSVAC resources have the potential to support NITAGs in identifying SRs on immunization-related topics effectively and to train them on the use of existing SRs. The dissemination of clear information and targeted training can help increase the visibility and awareness of SYSVAC. Results from this survey will inform future SYSVAC improvements to enhance the support of NITAGs in developing evidence-based vaccination recommendations and to contribute to the quality of immunization-related guidance in countries globally.

Disclaimer

The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated.

Funding

This work was supported by the German Federal Ministry of Health through the Global Health Protection Program (Grant number: ZM I 5 2519GHP713).

Credit authorship contribution statement

Antonia Pilic: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Louise Henaff:** Writing – review & editing, Conceptualization. **Christoph Steffen:** Writing – review & editing, Conceptualization. **Ole Wichmann:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Vanessa Piechotta:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Thomas Harder:** Writing – review & editing, Supervision,

Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

Above all, we thank all participants for their contribution to the study. Special thanks to Annika Falman, Teresa M. Nygren, and student assistants, Selina Teindl and Madeleine Batke, (all Robert Koch Institute) for giving valuable feedback on the survey questionnaire. Thank you to Achim Dörre for statistical support and Thorsten Rieck for methodological input (both Robert Koch Institute).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.vaccine.2024.126538.

References

[1] Duclos P. National Immunization Technical Advisory Groups (NITAGs): guidance for their establishment and strengthening. Vaccine 2010;28(Suppl. 1):A18–25. https://doi.org/10.1016/j.vaccine.2010.02.027.
[2] World Health Organization 2030. Immunization Agenda: A global strategy to leave no one behind. Geneva: WHO. https://www.who.int/teams/immunization-vaccines-and-biologicals/strategies/ia [Accessed 20 March 2024].
[3] IA2030 Technical Progress Report. IA2030 annual reports. https://www.immunizationagenda2030.org/images/documents/TPR23_vf.Sept23.pdf; 2023. Accessed 03 July 2024.
[4] WHO 2020. Global vaccine action plan - monitoring, evaluation and accountability. Secretariat annual report 2020, https://iris.who.int/bitstream/handle/10665/337433/9789240014329-eng.pdf?sequence=1; 2024. Accessed 03 July 2024.
[5] Steffen CA, Henaff L, Durupt A, Omeiri NE, Ndiaye S, Batmunkh N, et al. Evidence-informed vaccination decision-making in countries: Progress, challenges and opportunities. Vaccine 2021;39(15):2146–52. https://doi.org/10.1016/j.vaccine.2021.02.055.
[6] Lavis JN, Posada FB, Haines A, Osei E. Use of research to inform public policymaking. Lancet 2004;364(9445):1615–21. https://doi.org/10.1016/S0140-6736(04)17317-0.
[7] Bero LA, Jadad AR. How consumers and policymakers can use systematic reviews for decision making. Ann Intern Med 1997;127(1):37–42. https://doi.org/10.7326/0003-4819-127-1-199707010-00007.
[8] Moat KA, Lavis JN, Wilson MG, Rottingen JA, Barnighausen T. Twelve myths about systematic reviews for health system policymaking rebutted. J Health Serv Res Policy 2013;18(1):44–50. https://doi.org/10.1258/jhsrp.2012.011175.
[9] Fernandes S, Jit M, Bozzani F, Griffiths UK, Scott JAG, Burchett HED. A bibliometric analysis of systematic reviews on vaccines and immunisation. Vaccine 2018;36(17):2254–61. https://doi.org/10.1016/j.vaccine.2018.02.049.
[10] Adjagba A, Senouci K, Biellik R, Batmunkh N, Faye PC, Durupt A, et al. Supporting countries in establishing and strengthening NITAGs: lessons learned from 5 years of the SIVAC initiative. Vaccine 2015;33(5):588–95. https://doi.org/10.1016/j.vaccine.2014.12.026.
[11] van Zandvoort K, Howard N, Mounier-Jack S, Jit M. Strengthening national vaccine decision-making: assessing the impact of SIVAC initiative support on national immunisation technical advisory group (NITAG) functionality in 77 low and middle-income countries. Vaccine 2019;37(3):430–4. https://doi.org/10.1016/j.vaccine.2018.11.070.
[12] Jauregui B, Janusz CB, Clark AD, Sinha A, Garcia AGF, Resch S, et al. ProVac global initiative: a vision shaped by ten years of supporting evidence-based policy decisions. Vaccine 2015;33:A21–7. https://doi.org/10.1016/j.vaccine.2014.12.080.
[13] Hadler SC, Shefer AM, Cavallaro KF, Ebama M, Tencza C, Kennedy ED, et al. Supporting National Immunization Technical Advisory Groups (NITAGs) in development of evidence-based vaccine recommendations and NITAG assessments – new tools and approaches. Vaccine 2024. https://doi.org/10.1016/j.vaccine.2024.01.035.
[14] Adjagba A, MacDonald NE, Ortega-Pérez I, Duclos P. Strengthening and sustainability of national immunization technical advisory groups (NITAGs) globally: lessons and recommendations from the founding meeting of the global NITAG network. Vaccine 2017;35(23):3007–11. https://doi.org/10.1016/j.vaccine.2017.04.039.
[15] Global NITAG Network. NITAG resource center. https://www.nitag-resource.org/; 2024. Accessed on 25 April 2024.
[16] Adjagba A, Henaff L, Duclos P. The NITAG resource Centre (NRC): one-stop shop towards a collaborative platform. Vaccine 2015;33(36):4365–7. https://doi.org/10.1016/j.vaccine.2015.06.106.
[17] Pilic A, Reda S, Jo CL, Burchett H, Bastías M, Campbell P, et al. Use of existing systematic reviews for the development of evidence-based vaccination recommendations: guidance from the SYSVAC expert panel. Vaccine 2023;41(12):1968–78. https://doi.org/10.1016/j.vaccine.2023.02.027.
[18] Jo CL, Burchett H, Bastías M, Campbell P, Gamage D, Henaff L, et al. Using existing systematic reviews for developing vaccination recommendations: results of an international expert workshop. Vaccine 2021;39(23):3103–10. https://doi.org/10.1016/j.vaccine.2021.04.045.
[19] SYSVAC. https://www.nitag-resource.org/sysvac-systematic-reviews; 2024. Accessed on 25 April 2024.
[20] Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ 2017:358. https://doi.org/10.1136/bmj.j4008.
[21] Don A, Dillman JDS, Christian Leah Melani. Internet, phone, mail, and mixed-mode surveys: The tailored design method. 4th ed. New Jersey: Wiley; 2014.
[22] von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. Bmj 2007;335(7624):806–8. https://doi.org/10.1136/bmj.39335.541782.AD.
[23] Voxco. www.voxco.com; 2024. Accessed on 21 March 2024.
[24] StataCorp. Stata statistical software: Release 17. College Station TSL; 2021.
[25] World Health Organization. WHO/UNICEF joint reporting form. https://www.who.int/data/immunization; 2024. Accessed on 11 July 2024.
[26] Cochrane. Evidence synthesis - What is it and why do we need it?. https://www.cochrane.org/news/evidence-synthesis-what-it-and-why-do-we-need-it; 2024. Accessed on 03 May 2024.
[27] Medicine LSoHT. Evidence synthesis. https://www.lshtm.ac.uk/research/centres/centre-evaluation/evidence-synthesis; 2024. Accessed on 03 May 2024.
[28] Takla A, Wichmann O, Carrillo-Santisteve P, Cotter S, Levy-Bruhl D, Paradowska-Stankiewicz I, et al. Characteristics and practices of National Immunisation Technical Advisory Groups in Europe and potential for collaboration, April 2014. Euro Surveill 2015;20(9). https://doi.org/10.2807/1560-7917.es2015.20.9.21049.
[29] Mediterranean WROftE. Capacity building on roles and responsibilities of National Immunization Technical Advisory Groups (NITAGs) and their secretariat. Jordan: Amman; 11 to 13 June 2023 [Report. Unpublished. 2023].
[30] MacDonald NE, Duclos P, Wichmann O, Henaff L, Harnden A, Alshammary A, et al. Moving forward on strengthening and sustaining National Immunization Technical Advisory Groups (NITAGs) globally: recommendations from the 2nd global NITAG network meeting. Vaccine 2017;35(50):6925–30. https://doi.org/10.1016/j.vaccine.2017.10.048.
[31] Global Health Protection Programme. SENSE - strengthening national immunisation technical advisory groups and their evidence-based decision-making in the WHO European region and globally. https://ghpp.de/en/projects/sense/; 2024. Accessed on 26 April 2024.