HOW DO WE LEARN FROM PUBLIC HEALTH EMERGENCIES? TRAINING PUBLIC HEALTH PROFESSIONALS ON INTRA- AND AFTER-ACTION REVIEWS DURING THE COVID-19 PANDEMIC

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Abstract
Public health crises require continuous learning to improve preparedness and response to future public health threats. Intra- and after-action reviews (IAR/AAR), as part of the Monitoring and Evaluation Framework under the International Health Regulations (IHR, 2005), constitute important elements for initiating and implementing learning processes during and after public health events. However, in the early COVID-19 pandemic, experience with these formats was limited and there were few opportunities for exchange. As part of the Joint Action SHARP, we conducted two virtual trainings and a peer-to-peer review workshop in 2021 and 2022 to address this need. The trainings and workshop entailed an overview of the IAR/AAR methodology as well as practical exercises and interactive elements. Participants, generally, increased their understanding of IAR/AARS and welcomed the opportunity for networking and exchange. We conclude that such trainings should be offered more broadly and possibly be expanded to build and maintain workforce capacities for learning from crises.

Key words: Public health, emergency management, training, International Health Regulations, after-action review

Introduction
Serious public health events can develop into health emergencies lasting for years with significant consequences in many areas. If we do not succeed in learning from past and ongoing crisis, we will not be able to improve preparedness and response. Therefore, learning cycles during and after health emergencies are needed to ensure we face the next crisis better prepared than the last one.

Intra-action reviews (IARs) and after-action reviews (AARs), as part of the IHR (2005) Monitoring and Evaluation Framework (MEF) [1], play a significant role in learning from the past or ongoing response to a public health event [2]. It is worth noting that IARs were not part of IHR MEF tools prior to the COVID-19-pandemic. During the
In the early COVID-19 pandemic, experience with these IAR/AAR methodologies allowed for review of the ongoing response to an emergency whereas the AAR approach had focused on reviewing the response once the public health event/emergency was over. IARs and AARs can contribute to a deeper understanding of causal factors and to an improvement of preparedness and response. While there are currently discussions and processes ongoing that might lead to changes in the IHR (2005), IARs and AARs will most likely continue to be an important element of the MEF to be used in the evaluation and recovery phase of the crisis management cycle [3, 4].

IARs and AARs provide an opportunity for an open, participatory, systems- and process-analytical, and solution-oriented exchange of experiences. They are primarily qualitative, collective learning processes and aim to identify gaps, challenges as well as examples of good practice and to develop recommendations for action [5-7]. In addition, they can contribute to sustainable consensus building and networking among the various stakeholders involved. However, it is important to note that IARs and AARs are not an external evaluation of an individual’s or team's performance.

IARs and AARs can have a very different scope and focus, ranging from the analysis of individual components of the response to a health crisis and whether there was a sustained consensus building and networking among the various stakeholders involved. However, it is important to note that IARs and AARs are not an external evaluation of an individual’s or team's performance.

For these formats to be successfully implemented, public health professionals need to be familiar with the concepts and their application to facilitate learning within their organisation and beyond. Both the World Health Organization (WHO) and the European Centre for Disease Prevention and Control (ECDC) provide comprehensive IAR and AAR guidance on their websites to assist countries and institutions in planning and implementing those formats [5-11] as well as e-learnings on the organisations' respective learning platforms [12, 13].
Methods

We conducted the trainings using the online-platform Webex Meetings. The participants were recruited via the JA-SHARP project mailing list. Prior to the training participants received detailed information on the meeting platform as well as a course overview and suggestions for pre-course activities available online and free of charge. Moderators and facilitators of the training were provided with a more detailed agenda and a comprehensive facilitation guide as well as additional documents.

A collaborative and stimulating learning environment is essential to convey knowledge and competences for health professionals, especially in the pandemic-related limitation to online learning formats [15, 16]. We therefore aimed for an interactive and varied training format for all trainings to promote learning and cater for different needs, learning styles and preferences. Besides lectures and group discussions, numerous exercises in small groups were included to allow participants to repeat, reinforce and apply what they have learned. We used various online tools for visualisation and interactive collaboration. In addition to moderators and facilitators from the RKI, representatives from ECDC and WHO shared insights, experiences and additional information on specific topics and took part in facilitating the various break-out sessions.

After every training, there was a short hot wash for facilitators to establish what went well and where there was room for improvement. All trainings were evaluated via an anonymous online survey. Participants were asked to indicate how satisfied they were with the training overall and its components, and to what extent they considered the learning objectives of the training to have been met.
The three-hour online training aimed at increasing the awareness regarding the purpose, scope, and methods of an IAR and at facilitating the uptake of the IAR methodology during the COVID-19 response. The overall aim of the training was to enable participants to plan and conduct an online intra-action review in their country, and to adapting resources provided by WHO, ECDC and JA-SHARP for their specific needs.

After welcoming participants and some introductory remarks, we presented an overview of the IAR goals, scope, pillars/response areas and principles. In an interactive exercise, participants then brainstormed activities and tasks to be completed in each phase of an IAR in small break-out groups and discussed their results in plenary. Afterwards, we provided more detailed input on the phases of an IAR. We then explained an example for a time schedule for a three-hour online IAR and provided further information on the tools for planning and implementing IARs available by WHO and ECDC.

In the second part of the training participants practised applying the IAR methodology in break-out groups, with a particular focus on identification of challenges, gaps and good practices and developing recommendations. To facilitate this, they used a sample template and a root cause analysis technique before discussing their results and questions in plenary. The training concluded with an overview of important differences between on-site and online implementation of IARs and an exchange of good practices and methods related to VDIR, with an emphasis on the use of various online tools and facilitation methods that could be used for IARs. After the training, participants received all training materials (which are also available online).
ма IAR провера. Затим смо објаснили један пример временског распореда, односно плана за трочасовну онлайн IAR проверу и пружили додатне информације о алатах за планирање и спровођење IAR провера које су обезбедили СЗО и ECDC.

У другом делу обуке учесници су увежбавали примену IAR методологије у групама, са посебним освртом на идентификовање изазова, недостатака и добрих пракси, као и на израду препорука. Како би се ово олакшао, користили су пример предлошка и технику анализе основног узрока пре расправе о резултатима и питања на пленарној сесији. Обука је завршена прегледом значајних разлика између спровођења IAR провера онлайн и на лицу места, као и разменом добрих пракси у вези са виртуелним окружењем. Током читаве обуке, учећи су неколико принципа виртуелног учења и пружили додатне информације о коришћењу онлајн алата и метода фасилитације које су могуће употребити за IAR провере. Након обуке, учесници су добили све материјале за обуку (који су доступни на ЈА-SHARP онлајн платформи за учење).

Грађени 1. Резултати евалуационе анкете. Оцена укупног квалитета и корисности компоненти обуке. Евалуација JA-SHARP IAR обуке, 2021.

| Материјал за учеснике пре обуке | Pre-training material |
| Компоненте обуке | Plenary sessions |
| | Break out sessions |
| | Presentations/Video |
| | Duration of the training |
| | Planning and Organization |

Проценат учесника који су додељени одговору оцени за компоненте обуке

The training was evaluated very positively by the participants. A total of 13 participants of the training took part in the online evaluation (response rate = 35.1%). Asked about the overall usefulness and quality of the components of the training, participants were asked to allocate points from 1 (unsatisfactory) to 5 (excellent). The respondents assigned points exclusively on the range from 3 to 5.

Графикон 1. Резултати евалуационе анкете. Оцена укупног квалитета и корисности компоненти обуке. Евалуација JA-SHARP IAR обуке, 2021.
We also inquired, to what extent participants agreed with four statements that aimed to assess whether the learning objectives of the training were met. Participants mostly “strongly agreed” or “agreed” to the statements.

**Workshop on intra- and after-action reviews 2022**

The workshop was aimed at public health professionals from different sectors from the various JA-SHARP partner countries who planned to conduct an IAR or AAR in their country. Some participants were already familiar with the methodology, while others were new to the topic. In total, 22 people from 8 European countries took part in the training.

The workshop aimed at strengthening participants' competence to design, plan and implement IARs and AARs and thus enhance country capacity in this regard. It also intended to contribute to learning from the COVID-19 pandemic and therefore increasing preparedness for future health threats. Furthermore, the workshop provided a platform for sharing knowledge and experience among experts and relevant stakeholders.

Before the workshop, participants were advised to complete at least one of the e-learning courses available from WHO [17] or ECDC [18] on the subject of IARs and AARs. Based on the content of those trainings, the participants developed a rough concept for a potential IAR or AAR in...
сu омогућили CЗO [17] или ECDC [18] на тему IАR и AAR провера. На основу садржаја тих обука, учесници су развили грубе идеје за потенцијалне IАR или AAR провере у своој земљи на тренутно релевантну тему. Како би то учинили, учесници су добили бројне линкове и везе ка постојећим ресурсима CЗO и ECDC, као и PowerPoint шаблон за презентацију њихових идеја и упутства о препорученој структури. Учесници су не-дељу дана пре обуке послале организаторима тему својих IАR/AAR провера, као и кратак преглед IАR/AAR појмова. Ово је фасилитаторима дало прилику да пре-глядају идеје и осмисле одговарајући састав група за радионицу. Укупно је 22 учесника доставило 11 идеја, које покривају низ различитих здравствених ванредних ситуација и области/стубова одговора на IАR/AAR провере у различитим земљама (нпр. одговор на шумски пожар, спровођење јавноздравствених и друштвених мера [PHSM] током пандемије COVID-19, управљање епидемијама COVID-19 у окружењима са маргинализованом популацијом).

Радионица је почела кратким прегледом књучних аспеката у вези са фазама, форматима и добром праксама IАR/AAR провера. Након овог кратког увода, приступило се експертској провери идеја учесника која је спроведена у оквиру четири групе учесника, а фасилитатори су били стручњаци из ECDC, CЗO и Института „Роберт Кох“.

Учесници су обавиле кратку презентацију (максимално 10 минута) својих концептуалних нахра ће у мањој групи (максимално три идеје по групи; 3–6 особа плус фасилитатор). Након представе, фасилитатори су пита-ли излагаче шта мисле о својим идејама и које су им аспекти представљали изазов током припреме. Затим је сваки члан групе дао кратку повратну информацију о препорученом концепту. Групе су затим дискутовале о појединачним предлозима кроз размену искустава и колегијалних приступа. На краju, групе су прикупиле најважније поруке, изазове и добре праксе.

Групе су затим укратко представиле књучне поруке које су идентификовали на пленарној сесији и забележиле резултате помоћу онлайн алате за визуелизацију. Цела група је затим разговарала о преосталим питањима и изазовима са стручњацима. Након тога, модератори су дали неке додатне корисне савете и примере добре праксе пре него што су радионицу завршили финалном анкетом при чему су учеснике питали шта су са собом понели после радионице. Након радионице, свим учесницима су достављени материјали за обуку, који су такође доступни на JA-SHARP онлајн платформи за учење.

The workshop started with a summary of key aspects regarding phases, formats and good practices of an IAR/AAR. After this brief introduction, the peer-to-peer review of the particpants gave a short presentation (max. 10 minutes) of their conceptual outline in a small group (maximum of 3 concepts per group; 3-6 people plus facilitator). After the presentation the facilitators asked the presenters how they felt about their concepts and which aspects they had found challenging in the preparation. Then each group member gave a short feedback on the presented concept. The group then discussed the individual proposals in a peer-to-peer approach. Finally, the group collected the most important take-home messages, challenges and good practices.

The evaluation results showed, that overall, the satisfaction with the training was high. A total of 20 workshop attendees participated in the online questionnaire (response rate = 90.9%). The allocated points ranged from 76 to 100, with an average of 89 out of a possible 100 points. Participants could also indicate on a scale of 1-5, with 5 being the best, the degree to which they felt better prepared to perform an IAR/ AAR as a result of the training. Here, 59 % of the participants assigned five points, 35% four points and 6% three points.
Results of the evaluation survey. Degree to which participants felt better prepared to conduct an IAR/AAR after the workshop. JA-SHARP IAR/AAR workshop evaluation, 2022.

Discussion

The JA-SHARP online trainings on intra- and after-action reviews conducted in 2021 and 2022 provided basic knowledge on IARs/AARs and the opportunity for participants to actively engage with the training content and to try out and apply elements of the method to their specific context and needs. Although the short time format did not allow for the finalisation of an entire concept, it provided impulses, materials and starting points for putting the building blocks together. The conducted trainings show that it is possible to teach the methodology to many participants in relatively short sessions and at the same time provide a forum for exchange. Given the lack of staff and time during a crisis, this is essential to facilitate the identification and implementation of lessons learned.
The trainings and workshop contributed to improving participants’ awareness and skills with regard to IARs and AARs and thus also supported capacity building in European countries in this respect. They may have lowered the threshold for implementing these formats and facilitated networking to assist with the planning and implementation of IAR/AARs. Therefore, they represent a useful addition to existing resources and may support the uptake of IAR/AARs as part of the IHR (2005) MEF in participating countries.

A possible limitation of the trainings concerns their limited timeframe. Given the online format and the limited time resources of the participants due to the pandemic, the training content had to be conveyed in a quite compressed form. For future training, the trainings could be adapted to an on-site context, allowing even more time for interactive learning. However, especially during the COVID-19 pandemic, interactive online training methods like the ones described above contributed to strengthening professional competencies and networks across borders and provided space for the exchange of good practices and experiences between experts from various backgrounds and areas of work.

Conclusion

COVID-19 was only the latest example to show how important continuous learning and improvement is to face current and future challenges in public health. IARs and AARs provide a valuable method to facilitate those learning processes. There is a continued need to improve the implementation of IHR (2005) globally, and strengthen countries’ IHR (2005) core capacities, by applying the components of the IHR (2005) MEF and strengthening the public health workforce’s capacity in that regard.

High-quality interactive online trainings can contribute to this capacity building and facilitate the exchange of good practices that benefit all countries and institutions involved. We therefore recommend to continue developing and conducting such trainings and adapting them to possible future changes in the scope and content of the MEF and the respective training context. Trainings and workshops, as described above, should be provided regularly, to a broader number of participants, and possibly be expanded. Depending on the time resources, a longer, possibly on-site training format in pre- or post-crisis times might be beneficial in addition to shorter online formats during a crisis. This can help countries and institutions learn important lessons from crisis management so that they do not miss the opportunities for improvement that can arise from a crisis, but emerge stronger and better prepared for the next challenge.
за већи број учесника и евентуално их проширити. У зависности од временских ресурса, дужи формат обуке евентуално на лицу места у тренуцима пре или после крize може бити од користи као допуна краћим онлайн форматима током трајања кризе. Ово може помоћи земљама и институцијама да науче важне лекције из управљања кризом како се не би пропустиле прилике за побољшавање које могу произаћи из кризе, већ да из кризе изађу јаче и боље припремљене за наредни иза-зов.

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