

RAPID REVIEW

Best Practices for Conducting In- and After-Action Reviews as part of Public Health Emergency Management

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Key Findings

- An After-Action Review (AAR) is a qualitative review conducted *after* the end of an emergency response to identify best practices, gaps, and lessons learned. AARs allow stakeholders to reflect on shared experiences and perceptions of a response, and work together to identify what worked well, what did not work, why, and areas for improvement.
- An Intra- or In-Action Review (IAR) is a qualitative review conducted *during* an emergency response to identify opportunities for ongoing learning and allow for implementation of actionable items to improve the response. The IAR is a tool to promote agility during an emergency response that is iterative in nature. The IAR and AAR process is similar except the IAR is smaller in scope, follows a shorter timeframe, and can inform a longer-term response.
- IARs/AARs are not intended to evaluate a team or organization's performance, but rather to collect information to improve preparedness and response capabilities for the future through constructive, collective learning.
- There is general consensus around some common principles that should be followed when carrying out an IAR/AAR:
 - AARs should be conducted in a timely manner - shortly after an event ends, but certainly within three months. IARs should be conducted throughout the event to assess the ongoing response.
 - IARs/AARs rely on open, honest, and equal interaction among participants.
 - Data for IARs/AARs can be collected in mixed methods formats.
 - The IAR/AAR can (and should) lead to the creation of a repository of key challenges, best practices, and recommendations, and an action plan for future emergency planning.

Objective and Scope

As public health agencies prepare for the next phase of COVID-19 pandemic response and recovery, this document aims to summarize relevant guidance and/or tools pertaining to AAR best practices, alongside some examples of AARs/IARs used in real-world public health events. This review of practices may be relevant and useful to organizations interested in conducting an emergency response-related AAR.

- Public Health Ontario (PHO), in collaboration with the Timiskaming Health Unit, conducted a rapid review to identify best practices of IARs/AARs, and to highlight some examples of reviews completed for real-world public health emergencies/events.
- Best practices and examples of AARs (and IARs) were included from both the published and the grey literature.
- This review is intended to serve as a resource, guide, and/or tool for public health agencies and other organizations that are interested in conducting an IAR or AAR of an emergency response (e.g., COVID-19).

Background

After-Action Reviews

There is no standard definition or approach to conducting an AAR. Drawing from the United States military where it was initially designed, the AAR is defined as a “professional discussion of an event, focused on performance standards, that enabled soldiers to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses”.¹ After the Ebola Virus Disease outbreak in West Africa (2014-2016), the World Health Organization (WHO) recommended that for public health emergencies, organizations “move from exclusive self-evaluation, to approaches that combine self-evaluation, peer review and voluntary external evaluations involving a combination of domestic and independent experts.”² The WHO Guidance for AARs defines the approach as “the qualitative review of actions taken to respond to an emergency as a means of identifying best practices, gaps, and lessons learned,” with emphasis on the need to implement in-depth reviews of significant disease outbreaks and public health events.³ From this, the WHO secretariat developed the International Health Regulations Monitoring and Evaluation Framework, which is made up of four complementary components – one of which is the AAR.⁴

For more than a decade, formal AARs have been required by several agencies in the United States that fund, oversee, or regulate aspects of public health emergency preparedness and response (e.g., Assistant Secretary for Preparedness and Response, Centers for Disease Control and Prevention, the Joint Commission).⁵ The Federal Emergency Management Agency’s (FEMA) Homeland Security Exercise Evaluation Program (HSEEP) requires linking lessons observed to the planned execution of improvement efforts, so that lessons learned and mistakes are not repeated in future emergency responses. While AARs can serve multiple purposes for organizations, they are primarily useful for process improvement.⁶ They aim to act as a key system improvement and learning tool in emergency management by providing a means to observe and review actions undertaken in response to a real event of public health concern.⁷

The WHO AAR process includes “a structured facilitated discussion or experience sharing to critically and systematically review what was in place before the response, what happened during the response, what went well, what went less well, why events occurred as they did, and how to improve.”³ By identifying (and later addressing) weaknesses, organizations can improve preparedness, response, and recovery capacities and capabilities to improve the outcomes and impacts of future events.⁸ AARs are meant to bring together key stakeholders that were involved in the response for collective learning, identifying and documenting lessons learned and challenges, and institutionalizing best practices seen during the response.^{3,9}

The AAR serves three main purposes: documenting, assessing and improving. To address these purposes, discussions can be guided by the following overarching questions: ¹⁰

1. What should have happened?
2. What actually happened?
3. What worked well (and why)?
4. What did not work (and why)?
5. What action(s) should be taken to improve response capacities?

These AAR questions are intended to build on each other iteratively;¹¹ however, questions should only provide a roadmap for organizations, effective implementation of AARs and the questions asked are likely more complex.¹²

The AAR process is more in-depth than a debrief and answers the additional question of “why” (i.e., *why* did some processes work well, while others did not). However, the term ‘debrief’ may be used throughout this paper when reporting on specific articles, so as not to change the meaning of the data.

Benefits of AARs

AARs are described as useful tools for system improvement in public health emergency preparedness.¹³ Gathering insights and experiences of individuals that participated in an emergency response through collective learning provides an opportunity to identify common and/or recurring system-level challenges. AARs provide an opportunity to develop a mandate for organizations to address challenges and create plans for future improvements within the emergency planning process. In fact, Tannenbaum and Cerasolli (2013) found that teams engaging in a form of debrief, including AARs, tended to outperform those that did not, with activities improving team effectiveness by 25% through learning and performance improvement.¹⁴

Both planning and carrying out AAR activities are processes described as beneficial to organizations, helping to build awareness of roles and responsibilities of those involved in an emergency response.⁷ By creating and enhancing opportunities for dialogue across sectors and among those needed to strengthen preparedness and response to public health emergencies, AARs identify gaps, best practices and challenges, while also helping to pinpoint the root causes of preparedness gaps.

Reviews Specific to the COVID-19 Context: In-Action Reviews

COVID-19 has resulted in devastating morbidity and mortality globally, and caused broad social, education and economic disruptions. With the ongoing COVID-19 pandemic, it is important for countries and organizations responding to the pandemic to continually reflect on response strategies.⁷ AARs can be a useful and important activity after outbreaks; however, this methodology is generally applied after a response concludes, requiring adaptation for longer duration emergencies such as the COVID-19 pandemic.⁷ Applying an adapted AAR approach (i.e., In-Action Review [IAR]) during a pandemic can allow for quicker identification of successes and challenges, and provide an opportunity to address areas for further development and/or improvement. With the length of the current COVID-19 pandemic, it is important that organizations take the necessary time to reflect on their response strategies, and use the feedback to adapt their approach in real-time to strengthen preparedness and response capacities.⁷

The WHO and the European Centre for Disease Prevention and Control (ECDC) published guidance and tools for conducting a COVID-19 IAR to better control outbreaks, protect at-risk groups, and mitigate the impact of COVID-19 on the economy during the pandemic.¹⁵ IARs can provide important opportunities for ongoing learning and allow for the implementation of actions to improve response. IARs can act as a tool for decision-makers and emergency managers to capture, inform and clearly communicate progress in responding to and recovering from a broad range of health or humanitarian emergencies. IARs seek to collect candid feedback from those involved in a response, and to take a collective approach to answer four main questions:

1. What is happening?
2. What emerging issues are on the horizon?
3. What can be learned?
4. What should change?

The responses to these questions can help to quickly identify readily-implementable actions to immediate and pressing issues that can serve to improve the current response. An IAR does not replace the need for a post-event evaluation (AAR, post-outbreak debrief, other). Both AARs and IARs can help demonstrate technical areas that require immediate improvement to guide decisions in subsequent waves or future outbreak responses.

As previously mentioned, the scope of an IAR is smaller than that of an AAR. While an AAR typically focuses on multiple 'pillars' (i.e., broad categories that combine several specific technical areas or functions, around which a review might be structured; examples include surveillance, laboratories, coordination and emergency response, communication and community engagement, case management, public health measures),³ an IAR only focuses in on one or two 'pillars' to keep the scope manageable.¹⁵ For trigger questions for each pillar, refer to the annex by the WHO³ and ECDC.¹⁶

Methods

A search of both peer-reviewed and grey literature was conducted between May and July 2021 to identify best practices for, and examples of, in- or after-action reviews specific to a public health emergency response or public health emergency management system. Of note, articles solely discussing debriefs were not included in this report, as debriefs are more high-level and less time-intensive than IARs/AARs and are a focus of a PHO separate knowledge product. Only articles that used the term 'debrief' and 'AAR' interchangeably were included and this lack of distinction is noted where applicable in the results section below.

The literature search was limited to one database (MEDLINE) and to articles published since 2015. Search terms for the indexed literature included (but were not limited to): debriefs, after action review or report, civil defense or COVID-19 or disaster planning and program evaluation. The indexed literature search yielded 184 records for review. From the 184 titles and abstracts screened, 57 full-text articles were reviewed, and nine were included in this final review. Three additional articles were hand-picked from reference lists.

For the grey literature search, five custom search engines were searched in July 2021 using multiple search strings. There was no date restriction for the grey literature search. The first 100 results from each search string were assessed for relevance. A complete search methodology is available upon request. Descriptive and methodological data as well as key findings were extracted for each relevant record. The authors reviewed each record independently and consensus on the included resources was reached through discussion.

Results

Best Practices

Fourteen resources from the grey literature and nine articles from the indexed literature that discussed best practices for conducting an AAR and/or IAR met the inclusion criteria. Generally, the resources were published by public health organizations (e.g., WHO, ECDC) in the global North (e.g., United States, Canada, Switzerland, England). Most (n=19) discussed AARs exclusively,^{3,5-9,11-13,17-26} while three focused exclusively on IARs,^{15,27,28} and the remaining resource discussed best practices for both AAR/IARs.¹⁶ Sixteen resources examined best practices for conducting an AAR or IAR specific to the public health context,^{3,5-7,11-13,15-17,19,22-24,27,28} while seven discussed^{8,9,18,20,21,25,26} conducting an AAR in terms of general emergency preparedness.

TIMING OF AN AAR/IAR

Consistent across resources, best practice and guidance documents encourage organizations to carry out the AAR as soon as possible^{7,11} and/or within three months of the end of an event.^{3,7,9,16,24} There were two exceptions to this guidance: first, one resource reported conducting the AAR within two weeks of the end of the event; however, this resource used the terms debrief and AAR interchangeably,¹⁹ and debriefs tend to be completed immediately with less planning and structure. Second, one resource referred to the WHO timeframe (i.e., three months from the declared end of an emergency), but noted the difficulty in defining an event end date or the complexity of events that might extend a timeframe.¹³

The reason for this general immediacy is so that the unfolding of the event activities are fresh in participants' minds²⁴ and that there is less recall bias.

Since COVID-19 is an ongoing incident, organizations are encouraged to conduct IARs to learn throughout the process, and multiple IARs may be beneficial over the course of the event to assess the ongoing response.^{15,27} For example, one resource recommended IARs be conducted when national or subnational response plans are updated.¹⁵

THE AAR/IAR PROCESS

The various steps of an AAR/IAR process, including planning and set up, conducting the AAR (in the chosen format), writing the report, and following up, each contribute to the overall timeline. Eight resources discussed guidance for the recommended time to allocate for completing various steps of the process.^{3,9,15,16,19,20,24,27} The planning and design stage occurs first, and should begin at least two to four weeks before the AAR itself is carried out.^{3,27} For a successful AAR, it is important to clearly define the purpose, scope, and objectives of the AAR at this stage.⁷ Preparation for the AAR might require one to three days.³ Carrying out the AAR itself depends on the type of emergency and the size of the response, but recommendations suggest that it should take anywhere from 15 minutes to five days.^{3,9,19,20,24,27} Finally, results should be summarized immediately or within two weeks of completion.³

Public health emergencies such as infectious disease outbreaks are often longer in duration and lack clear beginning and end dates; thus, an AAR may not be feasible within a short, discrete timeline.⁶ While the HSEEP recommends AAR submission within 60 days, this might be too difficult or rushed for public health agencies to conduct thorough analyses of their response. Further, given the ongoing (and prolonged) nature of the COVID-19 pandemic, public health response efforts might benefit from utilizing IARs, which are smaller in scope and therefore require less time.¹⁶ The IAR allows for regular periodic reviews to continually reflect and revise response strategies.²⁸ The same steps are involved in completing both an IAR and AAR, but the IAR is implemented in a shorter timeframe. The design and preparation is reported as typically occurring one week before the IAR begins,¹⁵ and the IAR should be carried out within a span of one half to two days,^{15,27} with results shared back immediately or within two weeks of completion.¹⁵ Both AARs and IARs involve continuous follow-up as needed in order to help facilitate, address, and action the areas identified for improvement.^{3,15}

BUILDING AN AAR/IAR TEAM

The AAR/IAR team is responsible for planning, facilitating, and writing the final report.²⁴ Twelve resources included guidance on how to build an AAR/IAR team, including the roles, responsibilities, respective knowledge and types of positions held within an organization,^{3,9,15,16,19-22,24-27} and the importance of defining roles to conduct a successful AAR/IAR.¹⁶ Although the size of the team will depend on the format and scope of both the public health emergency being reviewed and the review itself,^{3,16} the team conducting the review should include:

- Overall team lead^{3,16,24,27}
- Lead facilitator^{3,16,24,27}
- Additional facilitators^{3,9,16,19-22,24,27}
- Note-takers^{15,16,21,22,24,26,27}
- Analyst with mixed methods expertise (i.e., survey and qualitative analysis)^{3,9,16,26,27}
- Report-writer^{3,16,24,27}

Virtual support might be required for those conducting their AARs or IARs in the virtual space.²⁷

The team lead is responsible for various activities, including initiating the process, determining the scope, and supervising and coordinating all activities and team members.^{3,24} The lead facilitator is responsible for developing the trigger questions and briefing other facilitators,^{3,24} all of whom must be unbiased with an ability to guide discussions and summarize key themes.^{3,24} While not mandatory, some of the best practice guidance recommends that the lead and other facilitators have familiarity with the subject matter^{9,25,26} and that facilitators had maintained some distance from the direct response (or were not involved in the response at all) to ensure a more neutral facilitation.^{3,9,16,19,21} There were suggestions in some of the resources that senior management not take on the role of facilitator,⁹ but rather should be involved throughout the entire process, ensuring coordination and providing support,^{3,15,26} to demonstrate to their organizations the importance of conducting these types of reviews. The note-taker is responsible for documenting discussions,^{3,24} and the report-writer is responsible for preparing the final report.^{16,24} If capacity allows, multiple roles can be delegated to one individual.^{3,16,27}

Two resources listed that a subject matter expert might be a valuable addition to the team, though this role and their responsibility on the team was not defined.^{16,27} Overall, resources suggested the importance of the team having experience conducting these types of reviews and/or other evaluation processes.^{9,16} Finally, it was also noted that external experts, such as those from WHO and ECDC, could be consulted when planning for and carrying out AAR or IARs.^{15,16} In addition to providing the personnel and capacity, external consultants can help to provide a necessary neutrality that allow for more candid responses and an enhanced comfort of staff to be honest and open, while also offering more objective analysis that internal staff might not have if they had been involved in or affected by the response activities.⁶ External evaluators sometimes have a better ability to facilitate deeper discussi

ons to identify root causes to help discern what went well and areas that need improvement.⁶

Overall, it is reported that a structured evaluation and reporting process can help to ensure ownership over the findings.⁷

STAKEHOLDER PARTICIPATION IN AN AAR/IAR

Ten resources included guidance on the number and type of stakeholders to invite as participants in an AAR/IAR.^{3,9,13,15,16,20,22,24,25,27} While there is no prescribed number of participants to be included, the resources list anywhere from 10-20 participants,¹⁵ up to 20-50 participants,²⁰ depending on the scope of the event being reviewed, the AAR/IAR itself, and the organization's response. Including fewer participants can help to maximize efficiency of the process by balancing requirements for diversity and expertise with the importance of maintaining response capacity itself. All resources do; however, include recommendations and highlight the importance of including and acknowledging contributions from a wide range of stakeholders involved in the response, regardless of their expertise or position, to ensure that all opinions are considered throughout the process.^{3,9,13,15,16,25} These stakeholders should range from those working on more technical areas of the response^{3,16} to those in managerial roles.^{3,16} If an incident management system (IMS) was set up for the response, it is especially crucial for those deployed to the IMS to participate.³ Some other important listed stakeholders include: individuals within different aspects of the health sector,³ financial partners,³ external organizations involved in preparedness activities,²⁴ frontline workers,²² and other individuals affected by the response that can provide valuable perspectives on response, recovery, and other related activities.^{9,22} Of note, not all of those invited need to participate in the discussion, some can simply observe the discussion.³

One important note from the WHO guidance document was that the participants should have proven first-hand experience with, as well as depth of knowledge about, the different levels of responsibility and the areas that are being reviewed.¹⁵ A stakeholder matrix is a tool that can be used to assist in stakeholder selection by organizing potential stakeholders in a table format with a list of response areas in the first column (e.g., laboratory systems and testing strategies, research and development) and a list of organizations involved in the response across the top row (e.g., Ministry of Health, border control and airports).^{16,27} This matrix format is helpful in identifying groups of individuals that should be involved, while also documenting the selection process, thereby contributing to the overall methodological validity of AARs.¹⁶

COMMON AAR/IAR METHODOLOGY

The resources mentioned a wide range of methods that can be used to carry out AARs and IARs, including interviews,^{3,9,25,26} focus groups and/or facilitated discussions or workshops,^{3,9,15,16} questionnaires/surveys,^{3,9,16,25,26} hot washes (i.e., discussion immediately after an event ends),^{25,26} task analysis data gathering processes,⁹ debriefing workshops,^{16,27} observations,^{9,26} public consultations,¹⁶ and document reviews.^{16,26} One article by Skryabina et al. (2018) suggested that the method selected should match the purpose and context of the AAR.¹⁸ Another important consideration is that all participants have an opportunity to contribute and have their voice heard regardless of the method selected.¹¹ For example, participants should be given sufficient time to collect their thoughts, and reflect on their perspectives throughout a discussion.¹¹

The facilitated discussion or workshop method (i.e., focus group) was described in two ways: (1) a facilitated look back method, which involves a neutral facilitator that helps stakeholders reflect on their shared experiences;^{8,13,16,27} and (2) a peer assessment review where external peers are brought in to review the response objectively.^{8,13} Some exercises to help facilitate discussions include root cause analysis,^{8,20,22} pain-point mapping,²² realist evaluation,⁸ bow-tie analysis,⁸ and mapping challenges and best practices.²² To enhance validity of the AAR/IAR, some additional recommendations include the use of triangulation, negative case analysis, peer debriefing, and respondent/participant validation.¹⁶

Root cause analysis is the most commonly used AAR exercise and is a component of HSEEP AAR guidance and training. It is a qualitative, retrospective, quality improvement tool, and a method used to better understand the underlying reasons behind an identified issue to support the development of actionable solutions to problems identified in the AARs.^{17,26} Savoia and colleagues (2012) describe the importance of taking a lessons-learned approach via an AAR to avoid duplicating mistakes in emergency preparedness.⁵ After reviewing 55 AARs focused on the response to H1N1, they identified that AARs should collect more detailed examples of response challenges, that the processes should better utilize root cause methodology, and that recommendations provided should be translatable into concrete actions, rather than presented as too generic. Singleton et al. (2014) reviewed 62 AAR and Improvement Plans submitted by 50 states and 8 United States territories against the HSEEP template, and identified that the more complete AARs were those that frequently addressed root causes, were more specific, measurable, and time-bound than AARs that were only partially complete.¹⁷

HELPFUL RESOURCES FOR HOSTING AN AAR/IAR

Five of the best practice guidance documents included recommendations for resources required or helpful in conducting an AAR/IAR,^{3,16,19,20,24} which will vary depending on the format chosen for the review (e.g., virtual, in-person).¹⁶ For example, funding might be required to cover the cost of the AAR/IAR team wages (especially if an external consultant is leading the AAR/IAR),^{3,16,24} other materials or supplies,²⁴ food or beverage offered during the AAR/IAR,²⁴ technology (e.g., projector),²⁴ participant attendance,^{16,24} and the cost of any required venue^{16,24} or conference room.¹⁶ It is important to set the budget early on in the planning to ensure there is enough time for management to secure the required funds.^{3,16} A successful AAR/IAR that is hosted in person requires an appropriate venue,^{3,19} large enough to fit all of the participants, as well as wall space to post AAR results if there is a facilitated discussion with active participation.³ Again, depending on the format chosen for the AAR, different resources will be required, ranging from flip charts with sticky notes to printed templates.^{20,24} A checklist with the resources required can help organize and streamline the AAR/IAR process.²⁴ Depending on the context (i.e., COVID-19), there might be a need to adapt methods and conduct the IAR/AAR in the virtual space.²⁷

AAR/IAR DATA ANALYSIS AND DISSEMINATION

Five of the resources suggested that thematic analysis of the qualitative data collected during AAR/IARs should be completed to synthesize the results into a final report, with an incorporated action plan that includes recommendations for key activities and follow-up actions.^{3,9,16,26,27} Though the length of an AAR report varies, some of the commonly included report sections are: executive summary, background information, learning objectives/scope of the review, methods, findings, conclusions, and an action plan for next steps (separated into short and long term).^{22,24} Some additional elements that might be helpful when summarizing the findings include a repository of key challenges, best practices, and lessons learned to help build institutional memory.^{3,13} The final report should be shared with as many partners as possible, including those that participated in the AAR/IAR activities, to ensure their opinions and feedback were accurately captured.^{11,15,19,21,27} Specifically, it is pertinent to share the findings and deliver the final AAR report to senior management/leadership and senior government officials to ensure further resource allocation, advocacy, and improvement.^{3,24} It is also helpful to share AAR/IAR activities between organizations (or countries) to support others' preparedness for public health emergencies,^{3,9,15,16} and to maintain a tracking list of partners that have received the report findings.²¹

Follow-up after sharing the results is critical to ensure that progress is being made on the action plan.^{3,11,16,20,24} The suggested timeline for follow-up is three months after completion of the AAR and every three months thereafter, for accountability and to track progress on implementing recommendations.³

Real World Examples of AAR and IARs

The search resulted in 40 examples from the grey literature of AARs and IARs conducted on real public health events between 2009 and 2021, mostly in the US (n= 27). The most reviewed public health event was the COVID-19 pandemic (n= 28), followed by the H1N1 pandemic (n= 11) and the Ebola Virus Disease outbreak (2014)(n=1). The two main tools used to guide the AARs and IARs were from HSEEP and WHO. The methodology used for the reviews varied, including interviews, surveys/questionnaires, focus groups, debriefs, and document reviews.

There were four main frameworks discussed in the 40 examples: HSEEP (n= 10),^{17,29-37} the WHO's IAR guidance and tools (n= 8),³⁸⁻⁴⁶ National Response Framework from Homeland Security (n=3),⁴⁷⁻⁴⁹ material published by the Centers for Disease Control and Prevention (n=2)^{31,50} and other frameworks (n=4).⁵¹⁻⁵⁴ Thirteen of the examples either did not use a framework for their review, or did not mention or list their framework.^{6,48,54-64} The frameworks were described as helpful in providing resources, guiding the process, and suggesting methods for data collection. One AAR discussed the HSEEP as an effective tool for exercises, but less effective for a public health response to a complex and long-lasting event, such as H1N1.⁶ Participants of the same AAR reported that a benefit of the HSEEP is that it does include a lessons learned section allowing for deeper analysis, but it is optional and might not have been used consistently.⁶

Across the 40 examples from the grey literature, a variety of methods were mentioned to carry out their AARs and IARs, including surveys/questionnaires (n=19),^{6,29-32,48-52,54,55,57,58,60,61,63,65,66} interviews (n=13),^{6,30,40,43,48-50,52,54,55,60,65,66} document reviews (n=9),^{6,48,49,52,59,60,62,65,66} focus groups/discussions (n=8),^{30,31,45,54,58,61,63,64} debriefing sessions/feedback (n=5),^{6,29,30,56,61} conferences/ workshops (n=4),^{37,41,45,55} hotwashes (n=3),^{6,34,50} and meetings (n=2).^{41,44} Eight of the examples did not include any information about their selected method,^{17,33,35,36,39,42,46,47} while 19 of the examples mentioned using multiple methods to carry out their reviews^{6,29-31,40,48-50,52-58,60,61,63,65} (e.g., mixed-methods: document review, online survey, and stakeholder interviews²), with most using up to four methods to better capture participants' experiences. In most of the examples, interviews and surveys were the most common methods used together. These findings are consistent with the findings from a review by Copper et al. (2020), where the authors gathered and reviewed AARs from the WHO, and identified that there were inconsistencies in format, structure, and methodologies.⁷ They further reported that epidemic and pandemic AARs are most commonly carried out using a working group format, a debrief, or using mixed methods to reach conclusions on overall strengths, challenges, and recommendations.⁷ In a methodology appraisal to enhance reporting of AARs after public health emergencies, the authors found that the most common data collection methods used to review influenza or pandemics were document review (preparedness plans, protocols), focus groups, in-depth interviews, public discussion forums, questionnaires, site visits, and workshops.⁸

Ten of the examples included some information about the types of questions asked during their AARs.^{37,40,41,44,52,54,58,60,61,64} Common questions listed in the examples matched those of the AAR process overall, focusing on what worked well during the response, what did not work well, what could be done differently next time, and challenges encountered. Additionally, questions also focused on participants' experiences, concentrating on their feedback on the effectiveness of their local-level interventions and recommendations for planning and responding to future emergencies. Other types of questions listed in the examples were related to concerns with conducting business, ways service delivery might have changed during the emergency response, impacts to performing essential services,⁵² and about internal processes and response capabilities.⁵⁴

Results from the AAR examples were used to educate stakeholders,^{30,57,58} guide next steps,^{40,41} identify weaknesses/challenges,^{37,49,53,58,64,66} identify strengths,^{54,60} recommend improvements,^{6,43,45,46,50,54,58,61,64,65} evaluate the process,^{17,37,50,53,54} and develop a plan for next steps.^{54,61} More specifically, some of the AARs were used to eliminate bottlenecks and introduce new measures to overcome existing challenges and improve response efforts,^{6,40,43,49,53,58,64,65} create improvement plans through identified strengths and areas for improvement,^{17,37,50,54,60,61} and contribute to improving future emergency preparedness and response plans.^{41,45,46} Only four examples indicated where the final AAR report was delivered, including to a local commissioner⁵⁵ or local emergency services,⁵⁷ or shared via stakeholders at meetings.^{40,55} In a review of AARs carried out on different events (anthrax bioterror attacks, H1N1 pandemic, Severe Acute Respiratory Syndrome, Ebola), authors noted that the AAR results revealed patterns of repeated weaknesses and failures, suggesting organizations had "lessons observed but not lessons learned." They suggest the importance of understanding that AARs are not isolated actions, but that lessons learned must be incorporated into preparedness planning cycles in order to improve future responses.¹²

Conclusion

With the ongoing COVID-19 pandemic, it is critical to continually reflect on response strategies and to adapt approaches as necessary to strengthen preparedness and response capacities.⁷ When conducted throughout a response, IARs provide opportunities for learning and implementing practical steps for immediate remediation and improvement of an ongoing response. In addition, at the conclusion of an event, it is important for organizations to gather insights and experiences of those that participated in an emergency response through collective learning and discussion activities through an AAR. The AAR provides opportunities to reflect on successes and challenges, to improve, and to create plans for future emergency response and planning. There is no one-size-fits-all approach to conducting an IAR/AAR, and the application of the methods during the COVID-19 pandemic are expected to vary from previous types of emergencies. However, some of the recommendations and best practices provided in this rapid review might offer support for organizations interested in conducting an IAR/AAR on their local response.

References

1. Headquarters Department of the Army. A leader's guide to after-action review [Internet]. Washington, DC: Headquarters Department of the Army; 1993 [cited 2021 Oct 15]. Available from: https://www.acq.osd.mil/dpap/ccap/cc/jcchb/Files/Topical/After_Action_Report/resources/tc25-20.pdf
2. World Health Organization. Implementation of the International Health Regulations (2005): report of the review committee on second extensions for establishing national public health capacities and on IHR implementation: report by the Director-General [Internet]. Geneva: World Health Organization; 2015 [cited 2021 Oct 10]. Available from: <https://apps.who.int/iris/handle/10665/251717>
3. World Health Organization. Guidance for after action review (AAR) [Internet]. Geneva: World Health Organization; 2019 [cited 2021 Sep 08]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/311537/WHO-WHE-CPI-2019.4-eng.pdf?sequence=1&isAllowed=y>
4. World Health Organization, Regional Office for Europe. IHR: monitoring and evaluation [Internet]. Copenhagen: World Health Organization; 2021 [cited 2021 Oct 15]. Available from: <https://www.euro.who.int/en/health-topics/health-emergencies/international-health-regulations/monitoring-and-evaluation>
5. Savoia E, Agboola F, Biddinger PD. Use of after action reports (AARs) to promote organizational and systems learning in emergency preparedness. *Int J Environ Res Public Health*. 2012;9(8):2949-63. Available from: <https://doi.org/10.3390/ijerph9082949>
6. Stoto MA, Nelson C, Higdon MA, Kraemer J, Singleton CM. Learning about after action reporting from the 2009 H1N1 pandemic: a workshop summary. *J Public Health Manag Pract*. 2013;19(5):420-7. Available from: <https://doi.org/10.1097/PHH.0b013e3182751d57>
7. Copper FA, Mayigane LN, Pei Y, Charles D, Nguyen TN, Vente C, et al. Simulation exercises and after action reviews—analysis of outputs during 2016–2019 to strengthen global health emergency preparedness and response. *Global Health*. 2020;16(1):115. Available from: <https://doi.org/10.1186/s12992-020-00632-w>
8. Davies R, Vaughan E, Fraser G, Cook R, Ciotti M, Suk JE. Enhancing reporting of after action reviews of public health emergencies to strengthen preparedness: a literature review and methodology appraisal. *Disaster Med Public Health Prep*. 2019;13(3):618-25. Available from: <https://doi.org/10.1017/dmp.2018.82>
9. World Health Organization. The global practice of after action review: a systematic review of literature [Internet]. Geneva: World Health Organization; 2019 [cited 2021 Sep 08]. Available from: https://api.healthsecuritynet.org/get/file/WHO_systemic%2520review_2019.pdf?id=34

10. World Health Organization, Regional Office for Europe. After action review [Internet]. Copenhagen: World Health Organization; 2021 [cited 2021 Oct 15]. Available from: [https://www.euro.who.int/en/health-topics/health-emergencies/international-health-regulations/monitoring-and-evaluation/after-action-review#:~:text=The%20After%20Action%20Review%20\(AAR,corrective%20actions%20for%20future%20responses](https://www.euro.who.int/en/health-topics/health-emergencies/international-health-regulations/monitoring-and-evaluation/after-action-review#:~:text=The%20After%20Action%20Review%20(AAR,corrective%20actions%20for%20future%20responses)
11. Goodyear C. After-action review: a critical tool for leaders to get to the next normal. *Nurs Manage.* 2020;51(12):44-8. Available from: <https://doi.org/10.1097/01.NUMA.0000724912.83093.c6>
12. Parker GW. Best practices for after-action review: turning lessons observed into lessons learned for preparedness policy. *Rev Sci Tech.* 2020;39(2):579-90. Available from: <https://doi.org/10.20506/rst.39.2.3108>
13. Stoto MA, Nelson C, Piltch-Loeb R, Mayigane LN, Copper F, Chungong S. Getting the most from after action reviews to improve global health security. *Global Health.* 2019;15(1):58. Available from: <https://doi.org/10.1186/s12992-019-0500-z>
14. Tannenbaum SI, Cerasoli CP. Do team and individual debriefs enhance performance? A meta-analysis. *Hum Factors.* 2013;55(1):231-45. Available from: <https://doi.org/10.1177/0018720812448394>
15. World Health Organization. Guidance for conducting a country COVID-19 intra-action review (IAR) [Internet]. Geneva: World Health Organization; 2020 [modified 2020 Jul 23; cited 2021 Sep 08]. Available from: https://apps.who.int/iris/bitstream/handle/10665/333419/WHO-2019-nCoV-Country_IAR-2020.1-eng.pdf?sequence=1&isAllowed=y
16. European Centre for Disease Prevention and Control. Conducting in-action and after-action reviews of the public health response to COVID-19 [Internet]. Stockholm: European Centre for Disease Prevention and Control; 2020 [cited 2021 Sep 08]. Available from: <https://www.ecdc.europa.eu/sites/default/files/documents/In-Action-and-After-Action-Reviews-of-the-public-health-response-to-COVID-19.pdf>
17. Singleton CM, Debastiani S, Rose D, Kahn EB. An analysis of root cause identification and continuous quality improvement in public health H1N1 after-action reports. *J Public Health Manag Pract.* 2014;20(2):197-204. Available from: <https://doi.org/10.1097/PHH.0b013e31829ddd21>
18. Skryabina E, Riley P, Reedy G, Amlôt R. A scoping review of evaluation methods for health emergency preparedness exercises. *Am J Disaster Med.* 2018;13(2):107-27. Available from: <https://doi.org/10.5055/ajdm.2018.0292>
19. NHS England. Resource a; part 3 - check debrief template [Internet]. Redditch, England: NHS England; 2016 [cited 2021 Sep 08]. Available from: <https://www.england.nhs.uk/wp-content/uploads/2016/03/prt4-act-resrc-a-debrief-temp.pdf>
20. World Health Organization. Introduction to after action review (online course) [PowerPoint presentation]. Geneva: World Health Organization; 2018 [cited 2021 Sep 08]. Available from: http://terrance.who.int/mediacentre/data/ebola/AAR_Storyboard_Draft_v003.pptx

21. Government of British Columbia. Debrief after an emergency [Internet]. Victoria, BC: Government of British Columbia; 2017 [cited 2021 Sep 08]. Available from: <https://www2.gov.bc.ca/gov/content/safety/emergency-management/local-emergency-programs/after-action-review>
22. Mathematica. COVID-19 after action review toolkit [Internet]. Princeton, NJ: Mathematica; 2021 [cited 2021 Sep 08]. Available from: <https://www.mathematica.org/features/covid-19-after-action-review-toolkit>
23. US. Department of Health and Human Services (HHS), Office of the Assistant Secretary for Preparedness and Response Technical Resources, Assistance Center and Information Exchange. COVID-19 after action review (AAR) elements, ASPR TRACIE technical assistance request [Internet]. Washington, DC: US. Department of Health and Human Services (HHS); 2021 [modified 2021 Mar 22; cited 2021 Sep 08]. Available from: <https://files.asprtracie.hhs.gov/documents/aspr-tracie-ta---covid-19-ltc-aar-elements-3-22-21.pdf>
24. Inter Tribal Council of Arizona Inc. After action review / improvement plan: strategic planning toolkit [Internet]. Phoenix, AZ: Inter Tribal Council of Arizona Inc.; 2020 [cited 2021 Sep 08]. Available from: <https://itcaonline.com/wp-content/uploads/2020/11/ITCA-AAR-Toolkit-Final-09.01.2020.pdf>
25. California Governor's Office of Emergency Services. Part III. Supporting documents Standardized Emergency Management System (SEMS) guidelines after action reports [Internet]. Mather, CA: California Governor's Office of Emergency Services; 2011 [modified 2011 Jun 22; cited 2021 Sep 09]. Available from: https://www.caloes.ca.gov/PlanningPreparednessSite/Documents/01%202006-SEMSGdlnesAAR_Part%20III.pdf
26. United States Department of Homeland Security, Federal Emergency Management Agency. Homeland Security Exercise and Evaluation Program (HSEEP) [Internet]. Hyattsville, MD: United States Department of Homeland Security, Federal Emergency Management Agency; 2020 [cited 2021 Sep 08]. Available from: <https://www.fema.gov/sites/default/files/2020-04/Homeland-Security-Exercise-and-Evaluation-Program-Doctrine-2020-Revision-2-2-25.pdf>
27. European Centre for Disease Prevention and Control. One-day in-action review (IAR) protocol in the context of COVID-19 [Internet]. Stockholm: European Centre for Disease Prevention and Control; 2021 [cited 2021 Sep 08]. Available from: <https://www.ecdc.europa.eu/sites/default/files/documents/One-day-in-action-review-protocol.pdf>
28. Mayigane LN, de Vázquez CC, Vente C, Charles D, Copper FA, Bell A, et al. The necessity for intra-action reviews during the COVID-19 pandemic. *Lancet Glob Health*. 2020;8(12):e1451-2. Available from: [https://doi.org/10.1016/S2214-109X\(20\)30414-9](https://doi.org/10.1016/S2214-109X(20)30414-9)
29. Fox Valley Healthcare Emergency Readiness Coalition. After action report / improvement plan COVID 19 - phase 2 - October 2020-March 2021 testing>patient surge>vaccine [Internet]. Appleton, WI: Fox Valley Healthcare Emergency Readiness Coalition; 2021 [cited 2021 Sep 08]. Available from: https://fvherc.org/resource/resmgr/docs/2021/fvherc_aarip_final_2.docx

30. Litaker Group. Final after action report Texas department of state health services response to the novel H1N1 pandemic influenza (2009 and 2010) [Internet]. Austin, TX: The Litaker Group; 2010 [cited 2010 Aug 30]. Available from: https://www.cidrap.umn.edu/sites/default/files/public/php/566/566_aar.pdf
31. Northwest Wisconsin Healthcare Emergency Readiness Coalition. Northwest WI Healthcare Emergency Readiness Coalition (NWWIHERC) multi-disciplinary COVID-19 response pandemic intervals framework 1-4 [Internet]. Menomonie, WI: Northwest Wisconsin Healthcare Emergency Readiness Coalition; 2020 [cited 2020 Sep 21]. Available from: http://www.wiherc.org/webfiles/fnitools/documents/aar_covid_final_march-junej_2020.pdf
32. Region 3 Healthcare Coalition Alliance. COVID-19 after-action report/improvement plan [Internet]. Jacksonville, FL: Region 3 Healthcare Coalition Alliance; 2020 [cited 2021 Sep 08]. Available from: <https://www.flregion3hcc.org/wp-content/uploads/2020/12/Final-Region-3-Alliance-COVID-19-AAR-IP-Dec-2020.pdf>
33. Vermont Healthcare Emergency Preparedness Coalition. COVID-19 pandemic response after-action report/improvement plan [Internet]. Burlington, VT: Vermont Healthcare Emergency Preparedness Coalition; 2020 [modified 2020 Aug 20; cited 2021 Sep 08]. Available from: https://static1.squarespace.com/static/5dbedd7dc94ab670239a0fb9/t/5f3aeae7685088745f23514e/1597696745556/VHEPC+COVID+19+Response+AAR+IP_DRAFT.pdf
34. Pima County Health Department. 2009 H1N1 flu response - after action report/improvement plan [Internet]. Pima County, AZ: Pima County Health Department; 2010 [modified 2010 Mar; cited 2021 Sep 08]. Available from: https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Health/Health%20Data,%20Statistics%20and%20Reports/After%20Action%20Report-Improvement%20Plan%20%282009%20H1N1%20Flu%20Response%29.pdf
35. Regional Hospital Resource Center. Metro Health & Medical Preparedness Coalition COVID-19 pandemic: phase 2 [Internet]. St. Paul, MN: Regional Hospital Resource Center; 2021 [modified 2021 Apr 29; cited 2021 Sep 08]. Available from: <https://www.metrohealthready.org/wp-content/uploads/2021/05/Metro-Region-COVID-19-AAR-April-2021.pdf>
36. Health-ISAC Inc. Capturing lessons learned: COVID-19 after-action report and improvement plan [Internet]. Ormond Beach, FL: Health-ISAC Inc.; 2020 [modified 2020 Apr 17; cited 2021 Sep 08]. Available from: <https://h-isac.org/capturing-lessons-learned-covid-19-after-action-report/>
37. Mase WA, Bickford B, Thomas CL, Jones SD, Bisesi M. After-action review of the 2009-10 H1N1 influenza outbreak response: Ohio's public health system's performance. *J Emerg Manag*. 2017;15(5):325-34. Available from: <https://doi.org/10.5055/jem.2017.0340>
38. Talisuna AO, Iwu-Jaja CJ, Okeibunor J, Stephen M, Onuche EM, Herring BL, et al. Intra action review of the COVID-19 pandemic response in Africa: best practices, challenges, and perspectives for the future. SSRN 3876269 [Preprint]. 2021 Jun 29 [cited 2021 Nov 19]. Available from: <http://dx.doi.org/10.2139/ssrn.3876269>

39. World Health Organization. Intra-action review of Indonesia's response to COVID-19 [Internet]. Geneva: World Health Organization; 2021 [cited 2021 Nov 19]. Available from: https://cdn.who.int/media/docs/default-source/searo/indonesia/intra-action-review-report-of-indonesia-s-response-to-covid-19.pdf?sfvrsn=d3756cbc_1&download=true
40. Sorbello S, Bossi E, Zandalasini C, Carioli G, Signorelli C, Ciceri F, et al. After action reviews of COVID-19 response: case study of a large tertiary care hospital in Italy. *Int J Health Plann Manage*. 2021;36(5): 1758-71. Available from: <https://doi.org/10.1002/hpm.3258>
41. Republic of Rwanda. Ministry of Health; World Health Organization. Rwanda COVID-19 intra-action review (IAR) [Internet]. Kigali, Rwanda: Republic of Rwanda; 2020 [cited 2021 Sep 08]. Available from: https://www.rbc.gov.rw/fileadmin/user_upload/annoucement/Intra-Action%20Review.pdf
42. Gooding O. Sierra Leone completes COVID-19 intra-action review. *Awoko Newspaper* [Internet], 2020 Nov 24 [cited 2021 Sep 08]. Available from: <https://awokonewspaper.sl/sierra-leone-completes-covid-19-intra-action-review/>
43. World Health Organization Thailand; Thailand. Ministry of Public Health. Joint intra-action review of the public health response to COVID-19 in Thailand [Internet]. Nonthaburi, Thailand: World Health Organization Thailand; 2020 [cited 2021 Sep 08]. Available from: <http://35.190.29.12/uploads/publish/1126020210329040752.pdf>
44. Zambia National Public Health Institute. Intra action review (IAR) of the Zambia COVID-19 outbreak response [Internet]. Lusaka, Zambia: Zambia National Public Health Institute; 2020 [cited 2021 Sep 08]. Available from: http://znphi.co.zm/news/wp-content/uploads/2021/01/Zambia_IAR_Report.pdf
45. Bevera Bulk Limited. COVID-19 response review in the Republic of Moldova informs next steps [Internet]. Cambridge, ON: Bevera Bulk Limited; 2021 [modified 2021 Feb 23; cited 2021 Sep 08]. Available from: <https://beverabld.com/covid-19-response-review-in-the-republic-of-moldova-informs-next-steps/>
46. NDTV. Gujarat one of the best performing states in covid vaccinations: WHO. NDTV [Internet], 2021 Feb 12 [cited 2021 Sep 08]; New Delhi. Available from: <https://www.ndtv.com/india-news/who-hails-gujarat-for-responding-to-second-wave-of-covid-19-2368652>
47. US. Department of Homeland Security. DHS H1N1 after action report: executive summary [Internet]. Monterey, CA: Department of Homeland Security; 2020 [cited 2021 Sep 08]. Available from: <https://www.hsdl.org/?view&did=783079>
48. State of Oregon. State of Oregon after-action review enterprise response to COVID-19 [Internet]. Salem, OR: State of Oregon; 2020 [modified 2020 Nov; cited 2021 Sep 08]. Available from: <https://olis.oregonlegislature.gov/liz/201911/Downloads/CommitteeMeetingDocument/227575>
49. World Health Organization. Mini-COVID-19 vaccine post-introduction evaluation (mini-cPIE) [Internet]. Geneva: World Health Organization; 2021 [modified 2021 Apr 05; cited 2021 Sep 08]. Available from: [https://www.technet-21.org/fr/library/main/7011-mini-cpie,-aka-covid-19-vaccination-intra-action-review-\(iar\)](https://www.technet-21.org/fr/library/main/7011-mini-cpie,-aka-covid-19-vaccination-intra-action-review-(iar))

50. Delaware Division of Public Health. Novel H1N1 influenza Delaware response April 2009 to March 2010: after action report/improvement plan [Internet]. Smyrna, DE: Delaware Division of Public Health; 2010 [modified 2010 Jun 01; cited 2021 Sep 08]. Available from: <https://dhss.delaware.gov/dhss/dph/php/files/h1n1aar.pdf>
51. Camden and Islington NHS Foundation Trust. After action review of C&Is response to COVID-19 [Internet]. London: Camden and Islington NHS Foundation Trust; 2020 [cited 2021 Sep 08]. Available from: https://www.candi.nhs.uk/sites/default/files/Documents/Board%20papers/2.1%20After%20action%20review%20of%20C%26I%27s%20reponse%20to%20COVID-19_0.pdf
52. City of Kirkland, Washington. First in the nation: COVID-19 initial reponse after action report (AAR) [Internet]. Kirkland, WA: City of Kirkland, Washington; 2020 [cited 2021 Sep 08]. Available from: <https://www.kirklandwa.gov/files/sharedassets/public/fire/emergency-mgmt/plans/kirkland-covid-19-initial-aar-11-2020.pdf>
53. Spokane Regional Health District. COVID-19 interim after-action report [Internet]. Spokane, WA: Spokane Regional Health District; 2020 [cited 2021 Sep 08]. Available from: <https://srhd.org/media/images/07A-SRHD-AAR-Executive-Summary.pdf>
54. Oregon Department of Human Services, Public Health Division. State of Oregon September 2009 to July 2010 H1N1 response after action report / improvement plan [Internet]. Portland, OR: State of Oregon; 2010 [cited 2021 Sep 08]. Available from: <https://www.oregon.gov/oha/PH/PREVENTIONWELLNESS/VACCINESIMMUNIZATION/Documents/AAR.pdf>
55. National Homeland Security Consortium. COVID-19 pandemic: after-action report [Internet]. Washington, DC: National Homeland Security Consortium; 2021 [cited 2021 Nov 19]. Available from: https://www.astho.org/COVID-19/NHSC-COVID-19-Pandemic-After-Action-Report/?_zs=OnnQc&_zl=jgQe2
56. Government of New Brunswick. 2009 pandemic H1N1 immunization campaign: after action report [Internet]. Fredricton, NB: Government of New Brunswick; 2010 [cited 2021 Sep 08]. Available from: <https://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/en/CDC/Epidemiology/H1N12009AfterActionReport.pdf>
57. City of Palo Alto. COVID-19 emergency operations center after-action review, March 16 - June 30, 2020 [Internet]. Palo Alto, CA: City of Palo Alto; 2020 [cited 2021 Sep 08]. Available from: <https://www.cityofpaloalto.org/files/assets/public/agendas-minutes-reports/reports/city-manager-reports-cmrs/year-archive/2020-2/id-11833.pdf>
58. Public Health Sudbury & Districts. Board of health meeting 05-20 [Internet]. Sudbury, ON: Public Health Sudbury & Districts; 2020 [modified 2020 Sep 17; cited 2021 Sep 08]. Available from: https://www.phsd.ca/wp-content/uploads/2020/09/20-05_Full_BoardEffect_BOH_Meeting_Package_2020-09-17.pdf
59. City of Burlington. COVID-19 pandemic response after action report [Internet]. Burlington, VT: City of Burlington; 2021 [modified 2021 Jun 04; cited 2021 Sep 08]. Available from: <https://www.burlingtonvt.gov/sites/default/files/COVID19%20After%20Action%20Report%2006042021.pdf>

60. Regional Emergency and Disaster Healthcare Coalition. COVID-19 REDi Healthcare Coalition gap analysis [Internet]. Spokane, WA: Spokane Regional Health Districts; 2020 [cited 2021 Sep 08]. Available from: https://srhd.org/media/documents/Gap_Analysis_REDi_HCC_Final.pdf
61. Arizona Department of Health Services. Ebola virus community preparedness forum after-action report/improvement plan [Internet]. Phoenix, AZ: Arizona Department of Health Services; 2015 [modified 2015 Jan 30; cited 2021 Sep 08]. Available from: <https://www.azdhs.gov/documents/preparedness/emergency-preparedness/conferences/2014/evd-community-preparedness-forum-after-action-report-plan.pdf>
62. Maine Center for Disease Control and Prevention. Maine CDC 2009 H1N1 pandemic influenza response after action report [Internet]. Augusta, ME: Maine Center for Disease Control and Prevention; 2011 [cited 2021 Sep 08]. Available from: <https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/influenza/maineflu/documents/piop/AAR%20MECDC%202009%20H1N1%20Pandemic%20.11.pdf>
63. Safeguard Iowa Partnership. After-action report: Iowa responds to H1N1 across the public and private sectors April-May 2009 [Internet]. Pleasant Hill, IA: Safeguard Iowa Partnership; 2009 [cited 2021 Sep 08]. Available from: https://safeguardiowa.wildapricot.org/Resources/Documents/Response/Disasters/2009/iowa_responds_to_h1n1_across_the_public_and_private_sectors-after_action_2009.pdf
64. NAPSG Foundation. COVID-19 tech & GIS after action report & improvement plan [Internet]. Washington, DC: NAPSG Foundation; 2021 [modified 2021 Jan 08; cited 2021 Sep 08]. Available from: <https://www.napsgfoundation.org/resources/covid-19-tech-gis-after-action-report-improvement-plan/>
65. State of Oregon. State of Oregon after-action review of the joint information center and communications in the COVID-19 response [Internet]. Salem, OR: State of Oregon; 2020 [cited 2021 Sep 08]. Available from: <https://olis.oregonlegislature.gov/liz/2021R1/Downloads/CommitteeMeetingDocument/231482>
66. State of Oregon. State of Oregon after-action review of the joint information center and communications in the COVID-19 response [Internet]. Salem, OR: State of Oregon; 2021 [cited 2021 Sep 08]. Available from: <https://olis.oregonlegislature.gov/liz/2021R1/Downloads/CommitteeMeetingDocument/231482>

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