



Alerts, Warnings, and Notifications Cycles of Warning

Science and Technology Directorate

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1.0 Introduction

The purpose of the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Alerts, Warnings, and Notifications (AWN) Cycles of Warning is to provide public safety officials with timeless and actionable alerting guidance. The AWN Cycles of Warning will:

- Assist alerting stakeholders with developing, updating, and/or implementing comprehensive alerting plans over time;
- Facilitate increased alerting systems interoperability;
- Facilitate a more consistent dialogue and increased information sharing between the components of the public safety ecosystem on alerting issues; and
- Support the minimization of alerting message delays (issuance, dissemination and protective action).

Background

In the fall of 2018, the Corner Alliance Team (the Team) completed a Report on Alerting Tactics to provide recommendations on effective combinations of alerting tactics for various incident types based upon lessons learned from public safety, alert originator and academic practitioners. The Team engaged 80+ stakeholders from Federal, state, local government and academia through one-on-one interviews, workshops, and conferences. A major outcome of this research and analysis included identifying the need for national level AWN guidance to allow for practitioners to identify gaps and make improvements. In order to address this stakeholder-driven requirement, a DHS S&T AWN Working Group was convened to advise the development of the AWN Cycles of Warning. The alerting subject matter experts (SMEs) that comprise the DHS S&T AWN Working Group met monthly from February – August 2019 to develop the AWN Cycles of Warning.

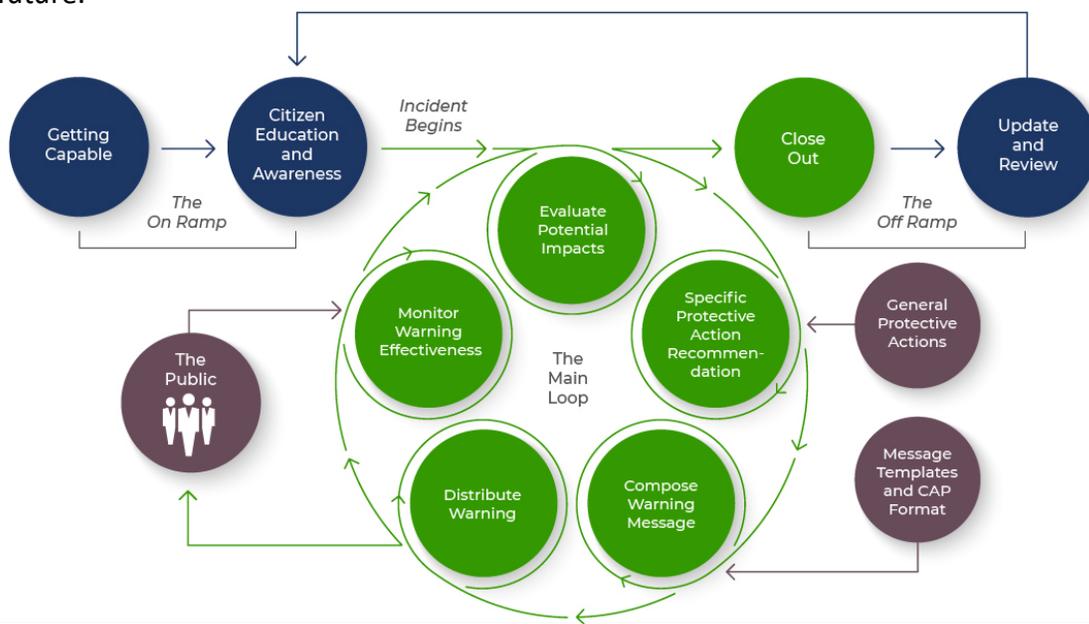
2.0 Cycle of Warning: Alert Origination

Background

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) released a Report on Alerting Tactics and outlined recommendations of effective combinations of alerting tactics for various incident types. These recommendations were based upon lessons learned from public safety, alert originator, and academic practitioners that resulted in identifying the need for national level Alerts, Warnings, and Notifications (AWN) guidance. In order to address this stakeholder-driven requirement, a DHS S&T AWN Working Group was convened that comprised of a nationwide group of alerting subject matter experts (SMEs) who were tasked with advising the development of the AWN Guidance Materials. The alerting SMEs met monthly for 7 months to develop the Cycle of Warning: Alert Origination graphic and supporting text.

About the Cycle of Warning: Alert Origination

The purpose of the Cycles of Warning: Alert Origination is to outline the full ecosystem of an AWN from the perspectives of an alert originator and help reduce the amount of time that people delay taking a protective action. The cycle graphic and supporting text provide simple, easy to understand, step-by-step details of what happens when an incident occurs and an AWN is sent to the public. The cycle begins with the On Ramp and Getting Capable (in blue). As an incident begins, alert originators enter the Main Loop (in green) and begin the process of distributing a warning message. The outside circles (in plum) represent factors that should be kept in mind throughout the process. After the incident ends, it is important to Close Out and perform updates and reviews. It is recommended that these educational materials are used to help alert originators better understand, enhance, and streamline AWN operations now and in the future.



Please note, steps in the cycle can happen concurrently or multiple times throughout the alert origination process.

The cycle begins ahead of time on the On Ramp:

1. **Getting Capable:** Put a system (multiple, diverse message delivery channels comprised of a mix of technologies, tested methods, and special ways to reach unique sub-populations) in place for generating and distributing alerts. Alerting authorities set policies and procedures by which knowledgeable alert originators can call for protective public action. Train and credential potential issuers and support staff on policies and procedures.
2. **Citizen Education and Awareness:** Educate the public on alerts and warnings delivery channels and common threats before an incident. Public education minimizes confusion and ensures citizens understand the purpose and importance of alerts. Tell the public what to expect from alerting channels and what actions they might need to take. Update citizens when the threat probability rises. A warning is more effective when it does not come as a complete surprise.
3. When an incident arises, enter the Main Loop.

The Main Loop:

1. **Evaluate Potential Impacts:** This may start out as an impression (for example, looks like that whole neighborhood could get burnt over), or as a calculation (for example, flood forecasts or hazmat dispersion models). Evaluations should occur in collaboration with other monitoring agencies for both routine or non-routine events. Oftentimes the potential impacts will fall inside identifiable geographic areas. If so, those areas will be the core of your geographic targeting for sending out any warnings, where possible.
2. **Specific Protective Action Recommendations:** What can we ask people at risk to do that will help reduce loss or injury? What details will those people need to know to take protective action safely? The type of recommended protective action contained in the message influences how much time people delay in initiating a protective action. Citizens delay taking protective action unless the message provides a clear explanation of the need for an immediate response. The vast majority of situations can be addressed by one of a short list of common protective actions: evacuation, shelter-in-place, avoid-the-area, observe-and-report, etc.
3. **Compose the Warning Message:** Templates containing pre-written messages of different lengths will help ensure a complete, comprehensive, and effective warning message. Pre-scripted fill-in-the-blanks templates and the Common Alerting Protocol (CAP) format can make this much easier. There are five essential topics for an alert or warning message template that are recommended by the Federal Communications Commission (FCC)¹, which are listed and defined below. For additional template

¹ Commission Documents. "Improving Wireless Emergency Alerts and Community-initiated Alerting"
<https://bit.ly/30Bvr7k>. Accessed July 2019.

information, see the Federal Emergency Management Agency (FEMA) PREPTalks titled "[Discussion Guide, Modernizing Public Warning Messaging.](#)"²

- a. **Hazard:** Description of the event;
 - b. **Location:** Where the event took place (e.g. street names, landmarks);
 - c. **Time:** By when public action should begin and on what timeframe;
 - d. **Guidance:** Information provided to the recipient on recommended protective action; and
 - e. **Source:** Who the message is from.
4. **Distribute the Warning Message:** In order to maximize public compliance, send out the same message over as many different delivery channels as possible. Not every channel will deliver every detail, so alert messages should be as consistent as possible.
 5. **Monitor Warning Effectiveness:** Track whether the at-risk public are taking the recommended protective actions and whether the current warning is still the best possible as the incident proceeds. Additional warnings may be necessary, as may corrections or supplemental information. Examples for tracking protective action include assessing: car volume along the recommended evacuation routes, additional volume in shelters, increased hotel occupancy rates near affected geographic areas, and social media posts about the event.
 6. Repeat until protective actions are no longer anticipated.

Then take the Off Ramp:

1. **Close Out:** Let people know when they can stop sheltering, evacuation, or any other measures. Provide reentry information after an evacuation.
2. **Update and Review:** Post updates on all social media channels and make sure warning channels are transitioned to an "all-clear" state. Review the incident and make plans for improvement. Begin writing reports as required.
3. Resume at "Citizen Education and Awareness," above.

² PREPTalks. "Discussion Guide, Modernizing Public Warning Messaging." Federal Emergency Management Agency, bit.ly/2ltkQ5M. Accessed May 2019.

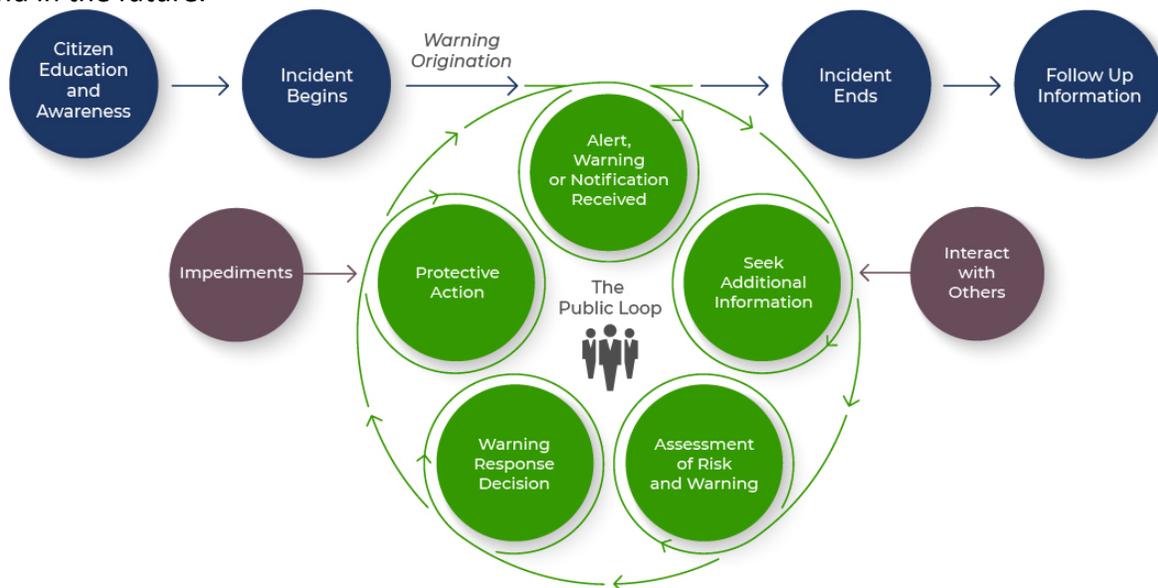
3.0 Cycle of Warning: Public Response

Background

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) released a Report on Alerting Tactics and outlined recommendations of effective combinations of alerting tactics for various incident types. These recommendations were based upon lessons learned from public safety, alert originator, and academic practitioners that resulted in identifying the need for national level Alerts, Warnings, and Notifications (AWN) guidance. In order to address this stakeholder-driven requirement, a DHS S&T Awn Working Group was convened that comprised of a nationwide group of alerting subject matter experts (SMEs) to advise the development of the Awn Guidance Materials. The alerting SMEs met monthly for 7 months to develop the Cycle of Warning: Public Response graphic and supporting text.

About the Cycle of Warning: Public Response

The purpose of the Cycles of Warning: Public Response is to outline the full ecosystem of an Awn from the perspectives of the public to help reduce the amount of time that people delay taking a protective action. The cycle graphic and supporting text provide simple, easy to understand, step-by-step details of what happens when an incident occurs, Awn are sent to the public, and the resulting actions from the public. The cycle begins with Citizen Education and Awareness (in blue) before an incident begins. The Public Loop (in green) details the steps the public takes once they have received an Awn. The outside circles (in plum) show additional information about what the public is doing during each step. The cycle ends when the incident ends and follow-up information is sent. It is recommended that these educational materials are used to help alert originators better understand, enhance, and streamline Awn operations now and in the future.



Please note, steps in the cycle can happen concurrently or multiple times throughout the alert origination

The cycle begins ahead of time on the On Ramp:

1. **Citizen Awareness and Education:** The public understands the purpose and importance of alerts. Citizens receive general information about alerting dissemination methods year-round over multiple channels (for example, events, social media); participate in localized, public tests of alert awareness to increase familiarity; and have seen specialized education and outreach campaigns ahead of major events (for example, preparedness week, scheduled test, roll out of a new alerting channel). Education materials include how to prepare the public for an incident before it occurs, such as: what to expect from alerting channels, what actions people might need to take to prepare for common hazards, and how to prepare and respond to a variety of possible events in their specific geographic or demographic area.
2. **Incident Begins:** The public hears an incident occurring from an authoritative source, family friend, news source, or from environmental/social cues (for example, dark clouds, people running).
3. When warning origination begins, enter the Public Loop.

The Public Loop:

1. **First Alert, Warning, or Notification (AWN) Received:** The intended public audience receives the alert, warning, or notification and understands it, including how to take protective action. The public may receive the AWN from a friend or family member as hearsay, or directly from an alerting authority. The more varied alerting channels that are used (e.g., technologies, tested traditional methods), the greater the chance an individual will receive and pay attention to the message. The completeness of the warning message has the strongest effect on public compliance with the recommended protective action.
 - a. Accessibility: Access Functional Needs (AFN) and Limited English Proficiency (LEP) populations may face challenges in receiving particular AWN; interpreting AWN; or in taking protective action.
 - b. Reliability of Source and Channel: The intended public audience will not be as likely to respond to an AWN unless they are sure it is reliable and accurate.
 - c. Warning Message Repetition: Message repetition through independent sources or differing channels will corroborate the initial AWN.
2. **Seek Additional Information and Interact with Others:** People (as individuals or in small groups, like families) search for additional information about the potential hazard (for example, turn on the radio or search online) and interact with one another (for example, call to share information or use social media). The more complete information the AWN contains, the less time people will spend seeking additional information and interacting with others, resulting in quicker initiation of the protective action.

3. **Assessment of Risk and Warning:** People evaluate the message in their own context.
 - a. Perceived Relevance of Warning: Demographic differences (for example, gender, sex, age, ethnicity, and/or socioeconomics) and past experiences can affect the evaluation of an AWN.
 - b. Social, Familial and Economic Factors: Outside factors (for example, peer pressure, pet obligations, and/or economic obligations) can affect the evaluation of an AWN.
 - c. Perceived Context: The current environment for the intended public audience (for example, environmental and social cues, time to impact, and/or time of day) can affect the evaluation of an AWN.
 - d. Perceived Personalization of the Risk: Whether or not the AWN message content provides individuals with clear information to determine whether or not they are at risk.
4. **Warning Response Decision:** People decide what to do, if anything.
5. **Protective Action:** People initiate the protective action they have decided to take. Impediments to initiating protective action may delay initiation (for example, reuniting with family and pets, packing in the event of evacuation).
6. Alert originators, based on new event information, send follow up AWN to likely impacted populations. Those in safe areas are aware of the risk and know which areas to avoid. Repeat until the incident ends.

Then take the Off Ramp:

1. **Incident Ends:** People hear an “all-clear” from alert originators, family, friends, or other sources (for example, news or social media) that they can stop any protective measures.
2. **Follow Up Information:** Alert originators, based on new event information, send follow up alerts, warnings, and notifications to impacted populations about the end of the incident.
3. Resume at “Citizen Education and Awareness,” above.