Study of Emergency Notification in Maryland Public Schools

Table of Contents

Executive Summary

During the Summer and Fall of 2023, the Maryland Center for School Safety (MCSS), in coordination with the University of Maryland Center for Health and Homeland Security (CHHS), undertook a study related to emergency notifications in Maryland schools. The study was an outgrowth of SB0677, proposed in the 2023 Maryland General Assembly legislative session, which would have established a Statewide Secure Schools Emergency Response Program, funded by annual appropriations in the State budget.

As part of the study, MCSS and CHHS convened a working group of stakeholders from a diverse set of institutions for a series of meetings to discuss existing school notification systems and the feasibility and desirability of instituting such a program statewide in Maryland.
CHHS conducted research into school emergency communications in other States, including States that have adopted versions of Alyssa's Law. One such State, North Carolina, had recently implemented a legislatively mandated school emergency notification system, and the workgroup solicited input from representatives of the North Carolina Office of Emergency Management and the North Carolina Department of Information Technology.

CHHS also conducted a review of the after-action reports (AARs) of previous high-profile school-based emergencies (mostly active assailant events) to determine whether an app-based or centralized "panic button" or school-based emergency notification system would have been useful in preventing or mitigating the casualties of those events.

Additionally, MCSS and CHHS hosted two smaller group forums to discuss school emergency communications in depth and draft a series of recommendations. Participants in these meetings, which included representatives from a diverse set of state and local officials, agreed unanimously on the following recommendations:

1. The State of Maryland should not institute a legislatively mandated single product emergency communication program. The burden and cost of setting up a "panic button" or similar statewide emergency notification system outweigh the potential benefits.
2. Invest in improved and reliable intercom/public address systems.
3. Invest in BDA (Bi-Directional Amplifiers) to enhance on-site cellular/radio coverage.
4. Invest in interoperability improvements in public safety communications systems, including CAD (Computer-Aided Dispatch)-to-CAD communications.

Introduction and Background

During the 2023 legislative session of the Maryland General Assembly, legislators considered Senate Bill 677, "Maryland Center for School Safety – Statewide Secure Schools Emergency Response Program – Established."[1] The bill would have established the statewide secure schools emergency response program ("SSSERP") within the Maryland Center for School Safety (MCSS). The Maryland 9-1-1 board would have been required to establish procedures to integrate this new program into existing 9-1-1 systems. The bill also would have required the Governor to appropriate $4.5 million in the first year of the program, and $1 million each year thereafter. The bill did not advance through the legislature during the 2023 session.

The legislative proposal was part of a broader nationwide effort to enact model school safety emergency notification systems through "Alyssa's" laws.[2] While the exact language of these laws would vary from state to state, the purpose of the effort would be to require public elementary and secondary school buildings to be equipped with a silent panic alarm connected to local law enforcement.[3]

Scope and Limitations

The authors of this study strongly believe that local governments and school systems are best situated to make decisions about locally used and implemented emergency communications systems. Many units of local government have used local funding, or even state and/or federal grant funding for such systems, and *nothing in this report* should be read as discouraging those entities from investing in safety and security projects to fit local needs.

This study was only concerned with whether the General Assembly should mandate that the state procure, implement, manage, and fund one system for use statewide and require that system to integrate with Maryland's many different public safety answer point systems.

The State has implemented and funded statewide school safety programs. Specifically, a statewide school safety tipline, Safe Schools Maryland[4]. However, that system does *NOT* need to integrate with existing notification or emergency communication systems. It requires only training of locals on how to use this standalone user notification and tip management system.

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[1] SB 0677, "Maryland Center for School Safety – Statewide Secure Schools Emergency Response Program – Established" https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/sb0677?ys=2023RS
[2] Alyssa's laws are named after Alyssa Alhadeff, a 14-year-old student at Marjory Stoneman Douglas High school in Parkland, Florida who died during the February 2018 mass shooting.
[3] https://alyssas-law.com
[4] Safe Schools Maryland is an anonymous and free reporting system available to students, teachers, school staff members, parents, and the general public to report any school or student safety concerns. http://safeschoolsmd.org/

Additionally, this study focused solely on communications systems and equipment. The group did not discuss, in detail, how other mitigation, prevention, or preparedness efforts (equipment, planning, training and exercise) impact incident response coordination.

Any questions about other school safety initiatives or priorities outside the scope of this report can be directed to MCSS.

Study Process and Methodology

Once the 2023 legislative session ended, MCSS undertook a study to determine the feasibility and desirability of setting up an SSSERP system. MCSS contracted with the University of Maryland Center for Health and Homeland Security (CHHS) to lead stakeholder meetings, research enacted and proposed legislation relating to school safety in other jurisdictions, and to assist in drafting the recommendations in this report. The objectives of the study were to:

- identify the current status of emergency notification, alert, and warning technology, including equipment and software, used in Maryland public schools;
- identify the current capabilities for outgoing emergency alerts, notifications, and warnings to public and nonpublic schools from public safety answering points, public safety agencies, or other local or state government agencies;
- identify the costs required to plan, test, implement, manage, and operate a school-based emergency communication alert system;
- identify the best practices, policies, procedures, or additional research that may be needed for school-based emergency communication systems; and
- identify any other recommendations to improve the safety of schools.

To assist with this study, MCSS invited stakeholders from a diverse set of institutions to provide input on a proposed SSSERP system. Representatives were invited to participate in the discussion including:

- State and local School Safety offices
- Maryland 9-1-1 Board
- Local and State Emergency Management offices
- Local Emergency Services and Public Safety Answering Points

In addition to stakeholder meetings, MCSS and CHHS reached out to representatives from the Department of Information Technology and the Office of Emergency Management in the state of North Carolina. The representatives presented their perspective on North Carolina's emergency notification system during a meeting in late September 2023.

Finally, CHHS staff reviewed the After-Action Reports (AARs) from some of the deadliest school shootings in U.S. history, including Columbine High School (1999), Virginia Tech University (2007), Sandy Hook Elementary (2012), Marjory Stoneman Douglas High School (2018), and

Robb Elementary (2022). The AARs offered insight into whether some type of panic button or similar notification system would have saved lives or prevented injuries.

Findings

As part of this study, we spoke to a wide variety of stakeholders in the State of Maryland and did research on both the application of school-based emergency notification systems, as well as research on the AARs of the deadliest school shootings. Our research indicates that there is insufficient evidence to determine that a state managed single product panic button or similar system would be an efficient and cost-effective way to save lives and prevent injuries.

Stakeholder Input

During a July 31, 2023 meeting, the research team asked representatives from several Maryland counties a series of questions to evaluate current school-based emergency communication systems, and to understand how the jurisdictions may be helped by a statewide system. The responses to the questions are summarized below. The answers have been anonymized to protect the confidentiality of the stakeholders.

- Several stakeholders said that they would just call 9-1-1 instead of using any notification system. In most cases, they would be able to convey more information. To the extent that 9-1-1 has not been reliable, it is because 9-1-1 call centers are short-staffed. Stakeholders noted it would be a better use of resources to fully staff 9-1-1 call centers.
- Many stakeholders also use Text-to-9-1-1, which is still in its relative infancy. Several participants noted that there was a decreased chance of accidental emergency notifications with either calling or texting 9-1-1.
- To the extent that there had been previous communications difficulties during either previous emergencies, or exercise play, it was usually due to a lack of proper coordination between responding agencies. Several participants noted that it might be a better use of resources to train school personnel and first responders in Incident Command System (ICS).

North Carolina Experience

The stakeholders met virtually with representatives from the North Carolina Office of Emergency (OEM) Management and the North Carolina Department of Information Technology to discuss their experience with a state-supported school-based emergency notification system. The North Carolina state legislature passed a bill first requiring a study of how to build out a system, and then provided funding to get the system in place. Once the OEM completed a study on the program, the legislature passed a new law granting OEM the power to procure a vendor and implement a program. Per the legislation, no school or school district is required to use this notification system. Participation is entirely voluntarily.

The state chose RAVE Mobile Safety as its vendor through a competitive procurement process, and the program had been online and available to schools for six months at the time of our meeting. So far, over 1700 schools across 89 school districts have opted in to the program. Any school wishing to opt in to the program can get a full operational system within two weeks.

The representatives did note that some schools were hesitant to opt into the program because of data privacy concerns and some school staff were hesitant to download software onto their personal devices. Additionally, North Carolina reported some connectivity issues in some schools due to poor cellular service or Wi-Fi coverage. The estimated cost to implement the program was $2.5 million, with an added annual cost of $2.3 million for ongoing maintenance. Because implementation is in its infancy, there is not yet sufficient data as to whether this system has improved public safety.

The group of Maryland stakeholders, including representatives from state agencies and local governments, were appreciative of speaking with the North Carolina representatives. However, they expressed concern that so far, there is no data showing such a statewide-system facilitates more rapid emergency services response. The price of both implementation and maintenance could be a major obstacle in Maryland. Already, a significant number of Maryland school systems (12) have implemented some form of localized panic button solutions compatible with existing infrastructure (i.e., access control, radio communication, etc.). The stakeholder group determined that imposing a single, statewide system would not provide the most effective use of resources at this time. This decision factored in the diversity of existing solutions, potential compatibility issues, and potential redundancy resulting from a statewide mandate.

Study of Previous School Shootings

CHHS, led by Research Assistant Quinn Laking, reviewed the After-Action Reports (AARs) for some of the worst school shootings in recent U.S. history. The review included AARs from the following school shooting incidents:

- Columbine High School (1999)
- Virginia Tech University (2007)
- Sandy Hook Elementary School (2012)
- Marjory Stoneman Douglas High School (2018)
- Robb Elementary School (2022)

A review of these AARs reveals some common themes, none of which would persuasively argue for the type of statewide emergency notification system at issue in this study. In each of the studied incidents, students, faculty, and staff were able to reach 9-1-1 to request emergency assistance without delay. There have generally not been issues contacting emergency services rapidly, which is the purported problem a new emergency notification system would be intended to solve.

Rather, the issues in communication were of a different manner entirely. In many cases, first responders were unable to communicate with one another because they lacked interoperable communications. This has been the case especially at institutions (like universities) that have their own police forces. During these large-scale emergencies, 9-1-1 call centers are often overloaded with calls, resulting in delayed responses and the inability to take new calls. In some cases, 9-1-1 call centers are forced to transfer calls to neighboring jurisdictions, which further delays response times. Additionally, there were major issues in schools' ability to communicate directly with students and staff at the outset of events, delaying lockdown or shelter-in-place procedures. In many of these instances, the schools did not have working intercom systems. In other scenarios, schools were unable to send out real-time alert texts or emails because of poor Wi-Fi signals. For example, during the 2022 school shooting in Uvalde, TX, the administration attempted to send out a lockdown alert, but many teachers and staff did not receive them because of poor Wi-Fi coverage on school grounds.

In Maryland, to help mitigate some of these issues, the State has wisely invested in a statewide land-mobile radio communications system, Maryland FiRST, which provides interoperable communications capabilities for public safety agencies across the state. Several major Maryland universities, including the University System of Maryland, Johns Hopkins University, and Towson University all participate in the Maryland FiRST system. However, for schools that are not yet part of the Maryland FiRST system, including K-12 institutions, the communications issues noted here require additional action on the part of policymakers.

Recommendations

1. **The State of Maryland should not institute a legislatively mandated single product emergency communication program. The burden and cost of setting up a "panic button" or similar statewide emergency notification system outweigh the potential benefits.**

Local governments and school systems are best situated to make decisions about locally used and implemented school-based emergency communications systems that need to integrate into their existing communication and security systems. In a perfect world with unlimited state resources, providing grant funding to allow for local implementation of such a system or funding a pilot school safety program like this, might be advantageous. However, a preponderance of the findings of this study argues strongly against using Maryland state funds on a mandated single-product system.

If there were a school-based communications system that could save lives, relative to other available tools, then it would be advisable to adopt such a system regardless of the cost. The primary interest of every stakeholder involved in this process is to save as many lives as possible. However, our research did not produce evidence that to show that these systems would improve responses to these incidents. Rather, our research indicated that a

combination of other solutions, noted in the recommendations below, have proven to be more effective in mitigating the worst results from these incidents.

Though cost was not a dispositive factor in our recommendations, it is important to note that a combination of the high initial cost for a school-based emergency communications system, and the cost of maintenance would be a significant burden on state finances. The original fiscal note for SB0677 showed an initial cost of $4.5 million with an estimated annual cost of $1 million for maintenance. This estimate likely understated the costs for such a program, because as the Department of Legislative Services noted, there may be a cost to integrate existing 9-1-1 systems into the new program. The results of our study show that not only is there not easily identifiable evidence that the program would be effective, but that that there are school safety communications issues that require immediate attention and would be less costly and easier to resolve.

2. Invest in improved and reliable intercom/public address systems.

While the speed and efficiency of emergency responders are paramount during an active shooter event, the school's administration needs to be able to reliably communicate with the entirety of the school's staff and students, and alert them to the present danger while waiting for emergency responders. Both Sandy Hook and Robb Elementary schools' after-action reports recommend improving the school's intercom system. In Sandy Hook, in 2012, the reviewing committee recommended that a "call button with direct intercom communication to the central administrative office and/or security should be installed at key public contact areas."[5] The reviewing committee also recommended that "[a]ll classrooms [...] be equipped with a communications system to alert administrators in case of emergency. Such communication systems may consist of a push-to-talk button system, an identifiable telephone system, or other means."[6] Similarly, Robb Elementary was using an alert phone app that relied on every teacher having a cell phone, installing the app on their phone, keeping the phone on their person, and keeping the phone turned on at all times.[7] Consequently, there were many points of failure in the system, and a teacher could easily not receive the alert once activated in the app by an administrator. Further, the app was used for all kinds of alerts, so the teachers regularly ignored pings from the app, even if received, to avoid interrupting their lessons.[8] Ultimately, improving a school's internal communication systems may be one of the best ways to save lives during an active shooter event because it will lead to a faster lockdown (i.e., securing and locking building and classroom doors).

3. Invest in BDA (Bi-Directional Amplifiers) to enhance on-site cellular/radio coverage.

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[5] Sandy Hook Elementary, p 50
[6] Sandy Hook Elementary, p 56
[7] Robb Elementary, p 24
[8] Robb Elementary, p 23

One key finding from our research into both past school-related emergencies and through conversations with stakeholders is that there are significant gaps in cellular coverage on school grounds. This is especially true in the most rural parts of the state, where cellular service is less reliable. Each Maryland County has previously noted significant gaps in cellular service. Public safety agencies have also noted in-building gaps in public safety radio communications across the State, including on the Maryland FiRST radio system. This has been a particular problem at school facilities, where the building construction materials reduce signal coverage and these facilities often have basements, internal hallways, stairwells etc. that limit both cellular and public safety radio coverage.

Therefore, our recommendation is that Maryland continue to provide grants and investments to enhance on-site cellular/public safety radio coverage at schools like Bi-Directional Amplifiers (BDAs). BDAs improve service in the hardest to reach areas of buildings. BDAs work by amplifying incoming signals and broadcasting them throughout large buildings. They also amplify and extend the range of outgoing signals from a building, which would be critical for emergency communications during a school-based crisis.

BDAs are not only critical for cellular service, but for reliable radio communications as well. BDAs in many jurisdictions are required for new and existing buildings to maintain minimum two-way radio communication with emergency responders, per Emergency Responder Radio Coverage (ERRC) regulations. Properly designed BDA systems can support both land mobile radio and wireless broadband which can reduce costs vs separately dealing with each.

In addition to improved cellular service, another critical system to have during an active shooter event at a school is reliable Wi-Fi. Wi-fi allows school administrators to use digital services during a response and can also serve as a very important back-up service provider if cellular service is not strong. No after-action report studied found an issue with contacting 9-1-1 using cell phones,[9] however, it is foreseeable that in a low coverage area, Wi-Fi calling and texting may be paramount in staff and students reaching 9-1-1 and maintaining a strong connection. Further, strong Wi-Fi will be foundational in any digital system used to lock-down classrooms or communicate with staff and students. For example, an administrator at Robb Elementary failed to initiate a lockdown on their alert app because there was bad Wi-Fi.[10] Strong Wi-Fi, cellular, and radio signals, combined with a strong intercom system, may better prepare individuals to communicate during a school-based emergency.

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[9] After action reports studied include reports for the active shooter events at Columbine High School (1999), Virginia Tech University (2007), Sandy Hook Elementary School (2012), Marjory Stoneman Douglas High School (2018), and Robb Elementary School (2022).
[10] Robb Elementary, p 44

4. **Invest in interoperability improvements in public safety communications systems, including CAD (Computer-Aided Dispatch)-to-CAD communications.**

The response to a school emergency event needs to be quick, efficient, and coordinated between the responding emergency services. Interoperable communications are critical for first responders and public safety communicators to coordinate response. Maryland has invested in the Maryland FiRST radio system, the statewide public safety radio system, and significant work has been done as part of FCC Region 20 Planning Committee and the MD FiRST operations group to ensure that standardized interoperability frequencies and talk groups are installed in all public safety radios using common naming. However, as noted above, not all public safety agencies may have the equipment to access the system.

The after-action reports reviewed indicate interoperability was one of the most consistent and greatest barriers to responding quickly and cooperatively to an active threat. For example, Virginia Tech identified that "Blacksburg [police] and [Virginia Tech campus police] had no common radio channel between the two departments" limiting their ability to communicate and coordinate with each other in 2007.[11] Similarly, 11 years later in 2018, during the Marjory Stoneman Douglas High School shooting, the after action report identified that "the City of Parkland's decision to contract with two different agencies for its police and fire/EMS services caused issues in the following domains: 1) communications interoperability and 2) 9-1-1 call routing."[12] Ultimately, police and fire had to communicate via word-of-mouth during the Parkland response.[13] Even more recently in 2022, the Robb Elementary emergency responders could not communicate with each other across the building and consequently could not coordinate a response on the classroom containing the shooter.[14] The delay was significant. Ultimately, the failure to establish interoperable communication systems results in a delayed response to neutralizing the threat and providing medical care to those who are injured.

CAD to CAD
Study participants identified CAD to CAD communications as a major area for improvement in interoperable communications. CAD to CAD integration is a method of sharing 9-1-1 caller and response information seamlessly between public safety agencies. This allows public safety communicators to view in real-time updates from 9-1-1 specialists as well as information relayed by first response units. Active assailant and other major incidents at schools will inevitably result in multiple public safety agencies responding to the location. In Maryland, dispatch for public safety agencies may not be integrated into one single Center. For example, a school located in a municipality may have Maryland State Police, county law enforcement (Sheriff or county police departments), and municipal law enforcement responding, and may have three different dispatch entities relaying information. Those

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[11] Virginia Tech, p 17
[12] Marjory Stoneman Douglas High, p 215
[13] Marjory Stoneman Douglas High, p 217
[14] Robb Elementary - Texas University Assessment, p 3-9

dispatch centers may be different than the Public Safety Answering Point (PSAP) where the 9-1-1 call is received, adding a fourth element to the response. Currently, for any public safety agencies without CAD to CAD integration, public safety communicators must verbally relay information between dispatch centers and the PSAP, resulting in delays as well as potential misunderstandings or relaying of incorrect information.

Some PSAPs in Maryland have established an automated transfer of 9-1-1 calls to another PSAP should the lines to the original center become overwhelmed and clogged. For example, the Eastern Shore counties have established a daisy chain of PSAPs to ensure 9-1-1 calls are answered, even if they are routed to another county. However, without CAD to CAD integration, the information from the 9-1-1 caller still needs to be relayed to the original PSAP verbally, which takes valuable time and resources from an already overwhelmed PSAP. By investing in CAD to CAD integration, PSAPs would be able to provide additional 9-1-1 caller information into the open incident electronically without needing to verbally relay the information to the PSAP or other dispatch centers.

Conclusion

Maryland legislators are right to be concerned about emergency communications during school-based emergencies. A wide array of stakeholders have worked to address gaps in public safety communications and have advanced planning and tactical response coordination with local first responders. Our review of the most high-profile nationwide school shooting incidents during the last two decades indicates that there continue to be gaps in interoperable and reliable communications. However, given the high cost of establishing a new single statewide panic button system, and, most importantly, a lack of compelling evidence of its potential efficacy, lead us to recommend a different course of action.

As such, our expert stakeholders, including school safety and security officials, local emergency managers, and first responders unanimously agreed that the state would better use its resources improving critical aspects of our current communications infrastructure. Questions about this project can be directed to MCSS, admin.mcss@maryland.gov.