

Characterization of Ohio EMS and Dispatch Systems

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Significance

Ohio has a population of over 11 million people, making it the seventh largest state by population in the nation. There is wide variation between urban, suburban, and rural populations; each with unique emergency care priorities. Ohio is also one of a small handful of home rule states in which historically many municipalities have assumed responsibility for the public safety needs of their citizens including dispatching their own emergency responses regardless of call volume. The number of 911 calls made annually in Ohio is not known, however, there are over 240 million emergency medical service (EMS) calls annually in the US, one-third of these from wireless providers and an increasing number from voice over internet providers. As call volumes and types increase, dispatch centers and providers are faced with more and more challenges. The dispatch centers must consider public safety with increasing number of emergency response vehicles on the road, manage resource allocation (getting the right equipment and personnel to the right place at the right time) in an environment of increasing need and decreasing funds, as well as adapt to the rapidly developing discipline of communications technology.

Dispatch is the public's point of first contact with the 911 emergency care system. The primary safety answering point (PSAP) represents the first opportunity to improve care and thereby outcomes for Ohio citizens. Dispatch agencies have the potential to decrease response times, advance appropriate transport of trauma, stroke, and cardiac patients, and enhance patient care by lay person instruction while awaiting medical personnel arrival. These activities can be enhanced by having separate call takers and dispatchers in which one interacts with the caller while the other listens in and facilitates dispatch and communicating with the responding units. Dispatch centers also have the ability to communicate directly with the public and alert citizens of potential dangers in their communities while providing instructions on actions to take. Finally, by the very nature of these agencies, dispatch centers are also an integral element to any disaster response system.

The literature regarding dispatch systems is relatively new and limited. For significant advancement in this field, it is necessary to understand current practice in order to begin applying evidence-based standards.

Purpose

The goal of this project was to conduct a broad functional assessment of the public 911 dispatch entities in the state of Ohio which may drive future research.

Methods

A survey was created and administered to individual municipalities providing 911 EMS response and the dispatch centers for these calls. Municipality contacts were obtained from the www.ohio.gov website EMS agency listing.

The survey collected information regarding the communities served by the agencies, the EMS agency organization and practices, and the dispatch agency organization and practices. This included who handles incoming 911 calls and who performs the actual dispatch. There were also questions regarding dispatcher training, certification, and oversight along with the provision of pre-arrival instruction, and reverse 911 dispatch.

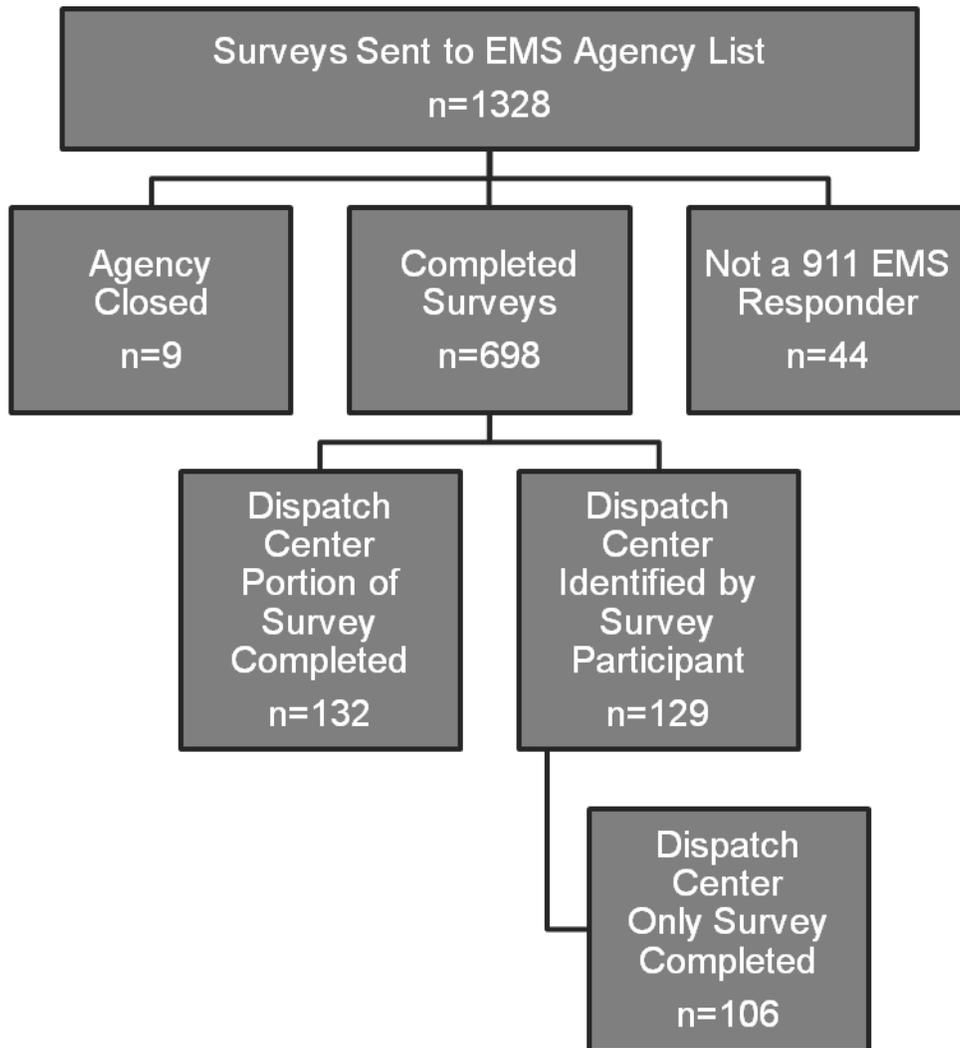
The approach to data collection was multi-tiered. An initial survey was sent to the primary contact at the agency per the EMS agency listing. Contacts were able to complete the survey on a website or return a hard copy of the questions. An additional survey was mailed to non-responders. Surveys that were returned undeliverable were researched online to determine if an alternative address was available and resent. Surveys that were returned with new mailing addresses were sent to the updated mailing address. EMS agencies who did not respond to the survey after two mailings were attempted to be contacted by telephone. The dispatch centers identified by EMS respondents were contacted by phone to complete the dispatch portion of the survey if the dispatch center had not previously completed the survey. All surveys returned by mail and completed over the phone were entered into the website by the study staff.

Data were collected using the Survey Monkey website. Data were reviewed by zip code and agency name to remove duplicate responses and analyzed using Microsoft Excel and Stata. The data are presented as proportions.

Results

The EMS agency listing was downloaded from the www.ohio.gov website on September 6, 2013 and included 1328 agencies. Surveys were not deliverable to 19 agencies. Nine agencies were determined to be closed or merged into another private company. Forty-four agencies were determined not to be a 911 EMS responder. There were 698 responses from 911 EMS responders analyzed. This represents 53% (698/1328) of the agencies listed on Ohio Department of Public Safety website. These responses included data for 132 dispatch agencies. Additionally, a total of 129 dispatch agencies were identified by the 911 EMS responders and data were collected from 82% (106/129) of these agencies. In total, 238 dispatch centers participated in the survey.

Figure 1. Diagram of Survey Method.



Responders to 911 EMS Calls

Data from 698 responders to 911 EMS calls were analyzed.

Table 1. Characteristics of Communities Served by Responders to 911 EMS Calls.

	N	Percent
Community Setting (n=683)		
Rural	400	58.6%
Suburban	202	29.6%
Urban	53	7.8%
Mixed	24	3.5%
Other	4	0.6%
Municipality Organization (n=689)		
Township	246	35.7%
City	165	23.9%
Village	88	12.8%
District (including several other entities)	79	11.5%
Multiple Municipalities	72	10.4%
County	15	2.2%
Not a municipality	14	2.0%
Other	10	1.5%
Community Leadership (n=693)		
Board of Trustees	396	57.1%
Mayor	379	54.7%
Council	360	51.9%
Manager	112	16.2%
Commission	34	4.9%
Other	20	2.9%

Table 2. Providing EMS Response in Community.

	N	Percent
Agencies Responding to Calls (n=690)		
Local Fire Department	542	78.6%
Local EMS Service (separate from fire)	127	18.4%
Private Ambulance	56	8.1%
Other Municipal EMS Service	15	2.2%
Other Municipal Fire Department	9	1.3%

Table 3. Annual EMS Call Volumes.

	N	Percent
Calls per Year (n=691)		
More than 25,000	6	0.9%
10,001 - 25,000	11	1.6%
5,001 - 10,000	31	4.5%
2,501 - 5000	74	10.7%
1,001 - 2,000	144	20.9%
501 - 1000	131	19.0%
251 - 500	147	21.3%
Less than 250	147	21.3%

Table 4. EMS Agency Staffing and Training.

	N	Percent
EMS Agency Staffing (n=692)		
Paid Full Time	365	52.7%
Paid Part Time	338	48.8%
All Volunteer	192	27.7%
Part Volunteer	154	22.3%
Paid On-Call	10	1.4%
Paid Per Call	6	0.9%
Other	6	0.9%
Stationing of Staff (n=690)		
Cross Trained Dual Response in Fire and EMS	536	77.7%
Separate EMS and Fire Not Stationed Together	71	10.3%
Separate EMS and Fire Stationed Together	41	5.9%
EMS Staffed Only	22	3.2%
Other	20	2.9%
EMS Training Level (n=693)		
Paramedics (EMT-P)	602	86.9%
Advanced EMTs (EMT-I)	291	42.0%
EMTs (EMT-B)	414	59.7%
Emergency Medical Responders (First Responders)	139	20.1%

Table 5. Responding to EMS Calls.

	N	Percent
Response to 911 EMS Calls (n=691)		
Ambulance to All 911 EMS Calls	627	90.7%
Ambulance to Some 911 EMS Calls	18	2.6%
Fire Truck to All 911 EMS Calls	44	6.4%
Fire Truck to some 911 EMS Calls	231	33.4%
Alternative Vehicle to Some 911 EMS Calls	41	5.9%
Tiered Response to 911 EMS Calls (n=669)		
No	472	70.6%
Yes	122	18.2%
Don't Know	75	11.2%
Run with Lights and Sirens (n=691)		
All Calls	439	63.5%
Some Calls	252	36.5%
Never	0	0%

Table 6. Transporting Patients.

	N	Percent
Agency Providing Transport of 911 EMS Patients (n=691)		
Our Agency	596	87.4%
Contract Ambulance Provider	69	10.1%
Other	54	7.9%
Can Transport to Alternative Destinations such as Doctor's Office or Urgent Care (n=684)		
No	549	80.3%
Yes	68	9.9%
Don't Know	67	9.8%
Can Transport to Free-Standing Emergency Departments (n=683)		
No	130	19.0%
Yes	272	39.8%
Does Not Apply	243	35.6%
Don't Know	38	5.6%

Table 7. The Initial EMS 911 Call.

	N	Percent
Agency who Receives the Initial EMS 911 Call (n=691)		
Sheriff's Office	306	44.3%
Regional Dispatch Center	187	27.1%
Our Local Police Department	141	20.4%
Our Local Fire Department	39	5.6%
Our EMS Department	18	2.6%
Other Police Department	31	4.5%
Other Fire Department	11	1.6%
State Highway Patrol	4	0.6%
Other	4	0.6%
Agency who Dispatches EMS 911 Response (n=677)		
Our Agency Provides Our Own Dispatch	130	19.2%
A Separate Agency Provides Dispatch	547	80.8%

Dispatchers of 911 EMS Calls

Data from 238 dispatchers of 911 EMS calls were analyzed.

Table 8. Dispatch Center Services.

	N	Percent
Number of Jurisdictions Center Provides EMS Dispatch* (n=224)		
0	4	1.8%
1	96	42.9%
2 – 5	62	27.7%
6 – 10	28	12.5%
11 – 15	24	10.7%
16 – 20	5	2.2%
21 – 30	3	1.3%
30 – 45	2	0.9%
Services Dispatched by Center (n=228)		
EMS	217	95.2%
Fire	201	88.2%
Local Police	166	72.8%
Sheriff	68	29.8%
Local Government Services	19	8.3%
Private Ambulance	10	4.4%
State Highway Patrol	7	3.1%
Other	3	1.3%
Dispatcher Assignments (n=222)		
Dispatchers Are Separated By Service	43	19.4%
Dispatchers Are Not Separated By Service	159	71.6%
Only EMS Is Dispatched	20	9.0%
Use Separate Call Taker & Dispatcher (n=222)		
Yes	14	6.3%
Sometimes	40	18.0%
No	168	75.7%
Certification Required In Order to Be Hired as Dispatcher ** (n=217)		
Yes	188	86.6%
No	29	13.4%

* Data for number of jurisdictions covered should be used cautiously as some responders seem to have reported 1 jurisdiction when referring to 1 specific area that may utilize a number of EMS agencies.

** For some agencies, certification is part of the orientation process after hiring.

Table 9. Dispatch Coverage.

	N	Percent
Maximum Number of Call Takers/Dispatchers Per Shift (n=214)		
1	39	18.2%
2	79	36.9%
3	46	21.5%
4	21	9.8%
5	10	4.7%
6 – 10	13	6.1%
11 – 15	3	1.4%
16 – 20	1	0.5%
21 – 25	2	0.9%
Minimum Number of Call Takers/Dispatchers Per Shift (n=213)		
1	106	49.8%
2	64	30.0%
3	23	10.8%
4	8	3.8%
5	3	1.4%
6 – 10	4	1.9%
11 – 15	2	0.9%
16 – 20	2	0.9%
21 – 25	1	0.5%

Table 10. Dispatch Process.

	N	Percent
Use Computer Assisted Dispatch (n=225)		
Yes	190	84.4%
No	35	15.6%
Give Pre-arrival Instructions (n=224)		
For All Calls	62	27.7%
For Some Calls	102	45.5%
No	60	26.8%

Table 11. 911 Calls from Cell Phones.

	N	Percent
Dispatch Center Receives 911 Calls from Cell Phones (n=226)		
Yes	168	74.3%
No	58	25.7%
If No, Agency that Receives 911 Calls from Cell Phones (n=56)		
Central Emergency Dispatch	30	53.6%
Sheriff	15	26.8%
Fire Department	4	7.1%
State Highway Patrol	2	3.6%
Police Department	2	3.6%
Other	3	5.4%

Table 12. Call Recording.

	N	Percent
Call Recording (n=223)		
All Calls Are Recorded	215	96.4%
Some Calls Are Recorded	3	1.3%
No Calls Are Recorded	5	2.2%
Storage of Recorded Calls (n=223)		
Indefinitely	31	13.9%
11 – 15 Years	1	0.4%
6 – 10 Years	11	4.9%
4 – 5 Years	4	1.8%
3 Years	7	3.1%
2 Years	23	10.3%
1 Year	21	9.4%
6 Months	17	7.6%
3 Months	16	7.2%
2 Months	2	0.9%
1 Month	18	8.1%
< 1 Week	3	1.3%
Don't Know	39	17.5%

Table 13. Quality Assurance.

	N	Percent
Audits of Calls (n=186)		
Software Automatically Audits All Calls	5	2.7%
Audit All Calls	10	5.4%
Audit A Random Sample of Calls	86	46.2%
Audit Some Calls Based on Chief Complaint	28	15.1%
No Audit Process	57	30.6%
Physician Involvement or Oversight (n=216)		
Yes	61	28.2%
No	155	71.8%

Table 14. Community Emergency Preparedness and Communications.

	N	Percent
Dispatch Center is Part of Local Emergency Operations Plan (n=208)		
Yes	192	92.3%
No	16	7.7%
Dispatch Center Uses Reverse 911 (n=212)		
Yes	116	54.7%
No	96	45.3%
Dispatch Center Implementation of Next Generation 911, Including Texting (n=196)		
Ready to Go	51	26.0%
In Planning Stage	98	50.0%
Not Planning to Implement	47	24.0%

Discussion

As the data demonstrate, there is large variation across the state of Ohio in the organization of local government, as well as in emergency response and dispatch operations. As expected, the communities served are mostly rural and suburban in character. Furthermore, the communities are organized with a variety of municipality and leadership structures. Although not investigated here, the financial resources in these communities to support EMS and dispatch services is likely also to vary widely.

Fire departments provide the majority of providers responding to 911 EMS calls. The majority of agencies respond to less than 1000 EMS calls per year. The low volumes of EMS calls in some area may provide rationale for the EMS staffing which often incorporates volunteer EMS providers. The providers are cross trained in EMS and fire response at most of the agencies participating in this study and have staff with paramedic level EMS training.

The data indicate that a tiered response is not used by most agencies but there is variation in running to calls with lights and sirens on. Additionally, as medical care changes, agencies will need to evaluate if changing transport practices to include alternative medical facilities or levels of EMS care is appropriate for patients as well as feasible.

Currently, Sheriff's Offices and Regional Dispatch Centers are most likely to receive the initial EMS 911 call. These central agencies must then dispatch to the EMS responders. The dispatch centers often serve as a clearing house for a number of local services, including EMS, fire, and law enforcement. Since many dispatch centers are staffed with only 1 or 2 individuals on a shift, this likely limits the ability to offer separate call takers and dispatchers and possibly pre-arrival instructions and reverse 911 as well. In addition, changes to the dispatcher staffing and processes is likely to be an expensive proposition for some communities given the low volume of EMS 911 calls. Furthermore, the data indicate dispatchers do not have to be certified in order to be hired for the role, but anecdotal discussions have indicated that certification is often included in the initial orientation process.

Despite the fact that this is the caller's first point of contact with the emergency health care system, there is limited application of physician involvement in most dispatch systems. Many agencies also fail to provide any pre-arrival instructions. Although essentially all systems record calls and keep the recordings for a lengthy period, audits are not routinely performed at 30% of the dispatch agencies surveyed, so compliance with dispatch protocols and pre-arrival instructions may be difficult to confirm even in systems that claim to use them.

Most dispatch centers are integrated into the local emergency response plan and utilize computer assisted dispatch. Only 55% of dispatch agencies use reverse 911. This may reflect another local entity responsible for the reverse 911 system or a lack of this communication tool in the community. Most agencies are in the planning stages or ready to go with Next Generation 911, however legislation or direction from the state agencies is needed for wider implementation.

Conclusion

This study characterized the EMS and dispatch systems present in Ohio. The results are limited based on the participation of the EMS and dispatch agencies. As the data indicate, there is tremendous diversity in the structure, organization, and integration of these systems among communities. With this variation, there is ample room for change, standardization, and improvement. These changes may include further integration of services and potentially developing dispatch centers that routinely pair call takers and dispatchers as well as dispense pre-arrival instruction. Further implementation of processes which include regular audits of dispatched calls and increased physician involvement may contribute to improvement of patient outcomes which was not investigated in the scope of this study. Furthermore, changes such as reducing the number of dispatch centers may decrease overall costs to the citizens if unnecessary duplication of services can be eliminated and personnel are used efficiently.

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