Executive Summary

The City of Savage Fire Department completed a Standards of Cover in 2022. The Standards of Cover (SOC) is defined by the Commission on Fire Accreditation International (CFAI) as the "adopted written policies and procedures that determine the distribution, concentration, and reliability of fixed and mobile response forces for fire, emergency medical services (EMS), hazardous materials, and other technical types of responses."

A comprehensive assessment of risks and demand were completed so that the city and department leadership can adopt policies with the utmost confidence to meet expectations and a high degree of transparency with the public.

This executive summary highlights the most substantive recommendations and alternatives for the Department.

Overall, there are six main themes that were utilized to frame opportunities for improvement and a pathway forward that best aligned resource allocation to risks.

Once fully implemented, the citizens and visitors of the greater Savage area would receive improved response capability and maintain or improve response time performance.

Substantive changes would include staffing Station 2, ensuring at least 2 response apparatus per day, provide a 6-minute travel time across the entirety of the jurisdiction, have a medium to long-range plan to staff three resources per day, staff each major fire suppression apparatus with a minimum of 3 personnel, consider Advanced Life Support (ALS) services, and adopting a system of measures.

Top Six Priorities

1. Improving Dispatch and Turnout Times
2. Staffing Station 2
3. Optimizing Staffing and Deployment and reducing overtime costs
4. Introducing Outcome Measures to Performance Management Strategies
5. Adopting a System of Measures for Future Action Planning and Decision Making
6. Considering providing ALS EMS services

Community Demand

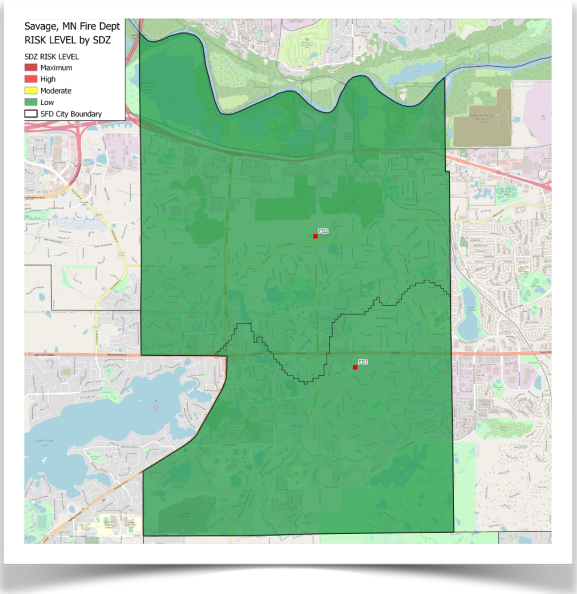
The distribution of calls that the Savage Fire Department responds to, is approximately 49% EMS and 46% Fire related. Specialty responses such as hazardous materials and technical rescue events account for less than 5% of the overall requests for service.

Program and Call Type	Number of Calls	Call Percentage
EMS	465	49.3%
Fire	433	45.9%
Hazmat	37	3.9%
Rescue	8	0.8%
Total	943	100%

However, the EMS value is lower than is expected because the fire department does not respond to all medical calls as an ambulance provider responds to a greater portion of the EMS incidents that occur within the jurisdiction. The department should be prepared to respond to more EMS incidents in the future as changes in the environment occur or expectations for service dictate.

Community Risk Assessment

The risk assessment process utilized both retrospective and prospective lenses to measure community risks. Ultimately, risks were classified as low, moderate, high, and maximum.



Socioeconomic and demographic variables were utilized to compliment retrospective measures of historical demand such as the number of calls and the rate of call concurrency or simultaneity.

Stations 1 and 2 are both calculated to be low-risk stations, meaning that a single resource can work effectively in each station area. Long-term, a 3rd resource may be necessary in the future to ensure system resiliency due to increased call volume or impacts to availability.

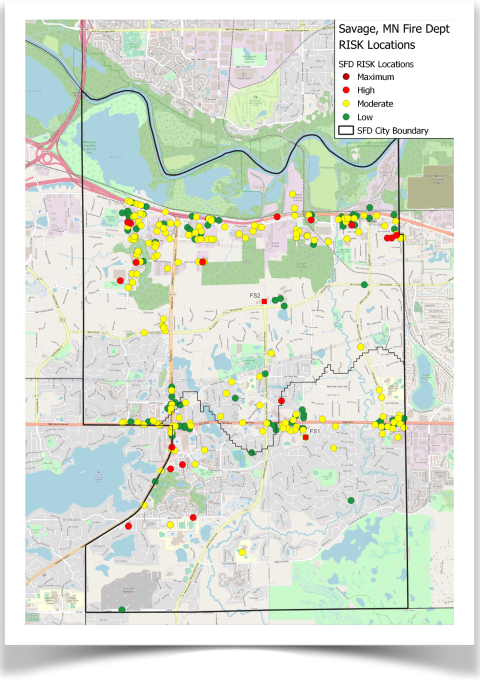
Observations

1. Stations 1 and 2 were calculated to be “low” risk first due response areas
2. Generally, a single appropriately staffed resource can handle both the demand and the risk within the response area

Variables of Risk

All variables measured at the first due station area

- Population density
- Square mileage of each first due station area
- Median age of residents
- Median household income
- Unemployment rate
- Percentage of homes greater than 50 years old
- Number of moderate, high, and maximum-risk structures
- Community demand



Occupancy level data was utilized to measure the relative risk of buildings within each of the first due station areas. Overall, 315 buildings were rated with the majority of stations being moderate and low risk. Station 2 had the greatest amount of occupancy level risk at 227 buildings while Station 1 has 80. This finding continues to support a commensurate risk approach that would staff Station 2.

	Component Risk Scores for Census Variables										2019-2021 Call Data				Final Scoring	
First Due Station	Population Density	Square Miles	Median Age of Residents	Median Household Income	Unemployment Rate	Percentage of Homes > 50 Years Old	Number of Moderate-, High-, and Maximum-Risk Structures	Census Average Value	Census Average Value Risk Score	Total Number of Calls	Average Number of Calls per Period	Demand Risk Score	Call Concurrency Rate	Call Concurrency Rate Risk Score	Final Risk Score	Final Risk Level
1	5	4	4	5	5	3	6	4.57	4	1,676[1]	558.7	2	5.61[1]	2	8.49	Low
2	4	5	5	5	5	4	10	5.43	5	392[1]	130.7	1	3.06[1]	2	8.03	Low

Improving Dispatch and Turnout Times

The Department understands the relative opportunity to improve the citizens' experience by maximizing the efficiency of the dispatch interval and turnout time. Dispatch Time is defined as the time from when the 911 center receives a request for service until the fire department is notified to respond. Turnout Time is defined as the time between the fire department being notified of a call (dispatched) and when they are actually driving to the incident.

The National Fire Protection Association (NFPA) 1710 and 1225, recommend a 64-,and 60-second dispatch time, respectively. The current performance is 4.4-minutes.

Similarly, the NFPA and the Commission on Fire Accreditation International (CFAI), recommend a turnout time of 60-seconds for EMS incidents and between 80-, and 90-seconds for non-EMS incidents, respectively. The Department's current performance is at 3.1 minutes for EMS and 3.8 minutes for fire related incidents, both approximately three times the recommended best practice performance.

It is understood that as the department provides staffed resources, the turnout time will substantively improve due to the process challenges of relying on personnel to respond in to the station when needed.

Recommendations

1. Work with the 911 provider to find incremental improvements in dispatch times, where applicable
2. Better align turnout time performance with best practices

Observation

1. It is understood that as the department provided more staffed resources, the turnout time will substantively improve

2021 90th Percentile Response Time Performance

Program	Dispatch Time (Minutes)	Turnout Time (Minutes)	Travel Time (Minutes)	Response Time (Minutes)	Sample Size[1]
EMS	4.8	3.1	6.6	12.7	350
Fire	3.0	3.8	7.4	11.4	157
Hazmat	2.4	4.6	9.4	12.9	25
Rescue	—	—	—	—	4
Total	**4.4**	**3.3**	**6.9**	**12.3**	**536**

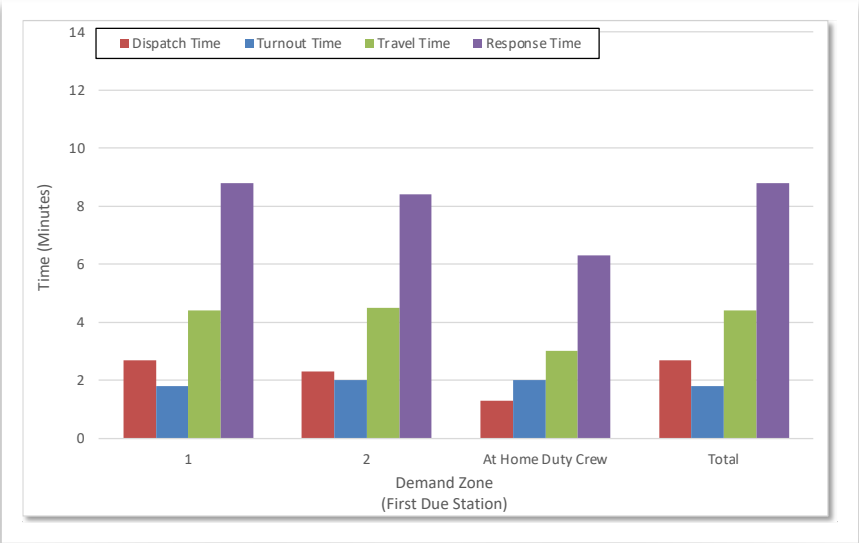
Commensurate Risk and Improving Response Time

Analyses of the two stations areas revealed that each of the station areas have a mix of both urban and rural call densities. In other words, each of the station areas have a relatively uniform blend of demand related risks as defined by concentration.

Therefore, staffing and deploying two units from the two stations would provide a commensurate risk model across all areas of the jurisdiction and maintaining and improving current response time performance. Long-term, the department should utilize the adopted standards and system or measures provided to evaluate when a third resource would be beneficial.

Recommendations

1. Staff Station 2
2. Deploy a minimum of two apparatus (units) each day
3. Consider the introduction of ALS services

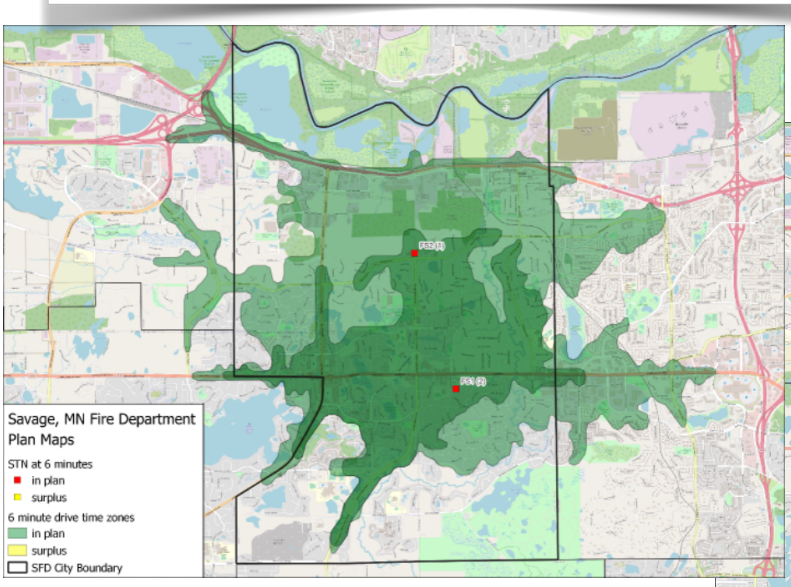


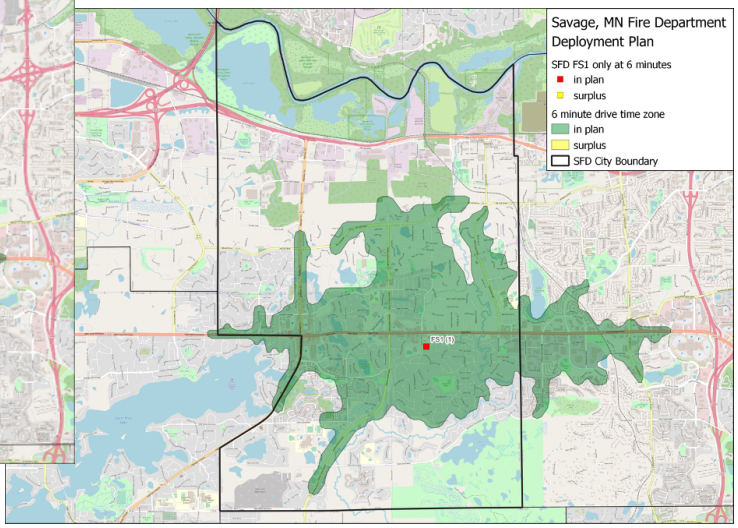
Observations

1. Station 2 is placed in a good location
2. There is limited variation in travel time across the two station areas

The figure on the lower left demonstrates a two station configuration at 6-minutes travel time.

The figure below demonstrates a single station coverage plan at 6-minutes travel time.





Optimized Relief Staffing Multiplier

A Continuous Staffing strategy is utilized when the department hires additional personnel to cover the average leave experienced on shift work. In this manner, the additional personnel are available as “relief” personnel who are utilized to cover vacancies at the straight time rate more frequently and thus reducing the overtime liability.

An optimized staffing analysis was conducted utilizing mathematical formulae to determine the most efficient allocation of personnel to maintain the desired staffing.

Optimal staffing is defined as sufficient staffing to cover all scheduled work hours, shift schedules, and the average employee leave experience. Maintaining the minimum daily staffing of (3), it would require a staffing multiplier of 3.6 to optimally staff the department.

Recommendations

1. Optimized staffing would require a total of 11 shift-assigned FTEs to cover the average employee leave
2. Optimizing staffing will reduce the overtime costs
3. The department should hire 3.6 personnel for each position within the daily minimum staffing
4. Opening Station would require an additional 11 personnel for a total of 22 assigned to shift

In other words, it would take 3.6 Full Time Equivalents (FTEs) for each of the minimum staffed positions for a total of 11 (10.8) personnel assigned to shift. The current allocation is 9 personnel. This equates to a need for an additional 2 personnel department-wide .

Staffing Station 2 would require an additional 11 personnel for a total minimum staffing of 6 per day and a total of 22 personnel assigned to the shift over the three shifts.

Current Staffing and Unit Count	One Station	Two Stations
24hr Seats	3	6
Minimum Per Shift	3	6
Total FTE Required by Multiplier	10.8	21.6
Shift Assigned FTE Strength	9	9
Additional Department Personnel Needed	2	13

System Resiliency and Deployment

Savage currently uses Station 1 as the primary station that responds to the majority of the calls. Therefore, the distinction between the historical performance of Station 1 and Station 2 is not representative of what the true experience would be if both stations were staffed and deployed. As a jurisdiction, there is a 7.2% call concurrency rate. This means that during the period of an active call, there is a 7.2% chance that another incident in station 72 will occur.

The current deployment strategy where Station 1 is the primary station is only capable for covering between approximately 57% and 69% of the incidents with either 6 or 7 minutes, respectively. Best practice would be to achieve 90% of the adopted standard. Staffing and deploying from both stations would provide for 85% to 95% coverage at 6 and 7 minutes, respectively.

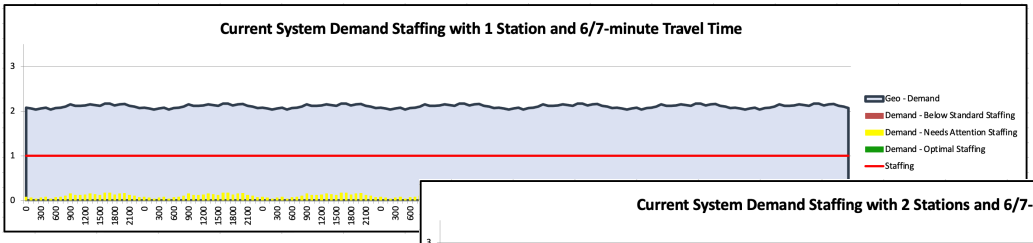
Rank	Station	Drive Time	Station Capture	Total Capture	Percent Capture
1	FS1	6	516	516	56.77%
1	FS1	7	630	630	69.31%

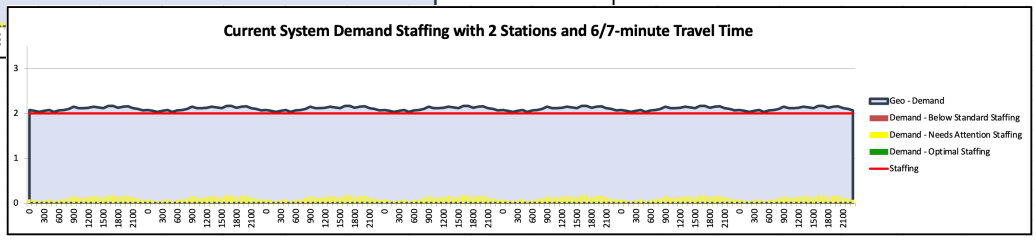
Recommendations

1. It is recommended that the department staff Station 2 24-hours per day
2. It is recommended that all major fire suppression resources are staffed with 3 personnel including a supervisor

The current deployment that primarily relies on a single 24-hour resource from Station 1 is insufficient to support a commensurate risk model. The following figure illustrates the resource constraint of the current system.

When reviewing the figures, the green/yellow/red columns are the hourly demand for services, unadjusted for time on task, from Sunday through Saturday. The blue shaded area represents the unit demands to cover the geographic area with either a 6 or 7-minute travel time. The dark blue line that outlines the shaded area is the required unit deployment. Finally, the red line is the actual unit deployment. Whenever the redline is at or below the blue line, the system is resource constrained.





When the system is resource constrained, the units aren't available to immediately respond, which means that there may be longer response times from call-back personnel, farther away units, and/or mutual and automatic-aid requests.

Within the current system, the combination of the geographic demand to meet a 7-minute response time and the average hourly rate of calls requires a minimum of 2 deployed units each day. The current system has 1, therefore, the optimal resource allocation for the current risks, desired performance, and system design would require 1 additional resource. Therefore, staffing Station 2 is recommended.

Introducing Outcome Measures

In addition to setting goals or benchmarks related to impact or outcome measures, systems typically set goals or benchmarks related to outputs or process measures due to the presumed or evidence-based relationship between the two measures. For example, it is assumed that a faster response time would be beneficial for structure fires.

Outputs or process measures are typically more easily evaluated, as the system exerts direct influence over their outputs and processes, and can oversee related data collection and management. Impact or outcome measures become more difficult to evaluate when data collection and management are outside the purview of the system, and interpretation of data must account for other intervening factors.

Beginning to consider outcome measures allows the agency to desensitize some of the assumed output and process measures. For example, if structure fires are held to the room of origin at the desired percentage of time, then the City and Department may not have to act immediately if the response time increased by 30 seconds over the previous year. It provides greater flexibility for the policy group to attempt to understand which variables are contributing and their root causes.

Fire Suppression		
Measure	**Benchmark Performance**	**Current Performance**
Fire Spread – Degree of Confinement – All Building Fires with Fire Spread		
Fire Confined to Building of Origin	95%	%
Fire Confined to Floor of Origin	75%	%
Fire Confined to Room of Origin	50%	%
Time to Fire Confined (from FD arrival)	10:00	mm:ss
Fire Spread – Degree of Confinement – Residential Structures with Fire Spread		
Fire Confined to Room of Origin		
Fires Controlled by Fire Suppression Systems		
Percentage of Fires Extinguished by Fire Suppression Systems in Protected Buildings	90%	%
Preventable Fire Incidents		
Percentage of Fires Unpreventable	%	%
Building Fires in Commercial Occupancies		
Confined to Room of Origin	%	%
Fire Loss as a Percentage of Total Protected Property Value with Fire Protection System	%	%
Fire Loss as a Percentage of Total Protected Property Value without Fire Protection System	%	%
Property Saved in Buildings with Fires		
Value of Property Saved in Dollars	$	$
Fire Loss as a Percentage of Total Protected Property Value	0.05%	%
Emergency Medical Services		
7. Cardiac Arrest Patient Management		
7.3 Percent of patients (in cardiac arrest before EMS arrival) with a witnessed collapse and found in an initially "shockable" rhythm, with survival to discharge from the acute care hospital	≥ 50%	%
7.4 Percent of overall cardiac arrest patients with survival to discharge from hospital	≥ 10%	%

Nevertheless, systems are encouraged to move beyond goal setting or benchmarking and evaluation related to outputs or process measures, and consider ways that impact or outcome measures can be evaluated.

[1] Washington State Department of Health. (2017, January 18). EMS System Key Performance Indicators / Clinical Measures. State of Washington: Author. (Available: http://ncecc.net/wp-content/uploads/2012/03/WA-State-EMS-KPI-Spreadsheet-Update-20170126.pdf).

Adopting a System of Measures

However, it is still important to measure and manage the efficiencies of a well-run operation using a system of measures as presented in the table below. In this manner, the daily management continues in place, but the strict adherence to system design performance is secondary to the outcome measures. For example, if response time increases and there is no change in outcomes then it would be purely a policy choice to act. Conversely, if the outcomes change, then the Department leadership will turn to the system of measures and attempt to discern which of the variables or combination of variables may be contributing to the change in outcomes.

The summary of measures provided below include all aspects of time, apparatus staffing by type, relative risk ratings, and system resiliency measures such as reliability, call concurrency, workload, and unit hour utilization. For example, reliability should be at least 70% for each station and only if the reliability drops below the 70% threshold before considering a mitigation reaction. Similarly, call concurrency is credible until the call concurrency reaches 70%. In other words, only 30% of the calls are overlapping. Call concurrency is suggested as a per unit threshold unless the majority of calls are multi-unit responses. For example, if there are two units assigned to a station, the station level call concurrency can perform well at 60% or less for single unit responses. Finally, the cross-staffing strategy speaks to an upper threshold of call volume of no more than 1,500 calls per year (4 calls per day) and a call concurrency of 15% or less, units can generally be confidently cross-staffed within the same station.

Type of Measure	Performance Metric	Recommended Performance Urban	Priority	Review Period
Station/Unit Performance	Turnout Time – EMS	≤1.0 Min at 90%	Emergent	Quarterly
	Turnout Time – All Other	≤1.5 Min at 90%	Emergent	Quarterly
	Travel Time	≤7 Min at 90%	Emergent	Quarterly
	Minimum Engine Staffing	≥3 Firefighters	All Responses	Daily
	Minimum QRV/Squad/Ambulance Staffing	≥1 FF/PM ≥1 FF/EMT	All Responses	Daily
System Design and Performance	Dispatch	≤2 Min at 90%	Emergent	Monthly
	Station Risk Rating	Increases in Risk		Annually
	Reliability	≥70%		Quarterly
	Call Concurrency	≤30% Per Unit		Quarterly
	Call Volume	3,000 – Initial 1,000 – Ongoing		Annually
	Unit Hour Utilization	≤0.25 on 24-hour units ≤0.50 on 12-hour units		Quarterly
	Cross-Staffing at Unit Level (each station)	<1,500 annual calls and <15% Call Concurrency		Annually

The system of measures provided are not intended to be overly prescriptive for the Department. The Department should adopt the system performance objectives internally and update as needed.

Considerations for ALS First Response

Clinical research has supported the fact that a well-functioning Basic Life Support (BLS) system can deliver excellent clinical care. However, few systems are willing to entirely void the system from ALS level care.

Therefore, a typical scenario is for the transport agency to provide ALS level of service and the first responder can provide either ALS or BLS. At times, the public-private partnership may function differently by having a robust ALS first response from the fire department and the ambulance provider only provides BLS and the fire department personnel ride in to the hospital when necessary. Finally, there are fire departments that provide all aspects of the EMS service as a government service.

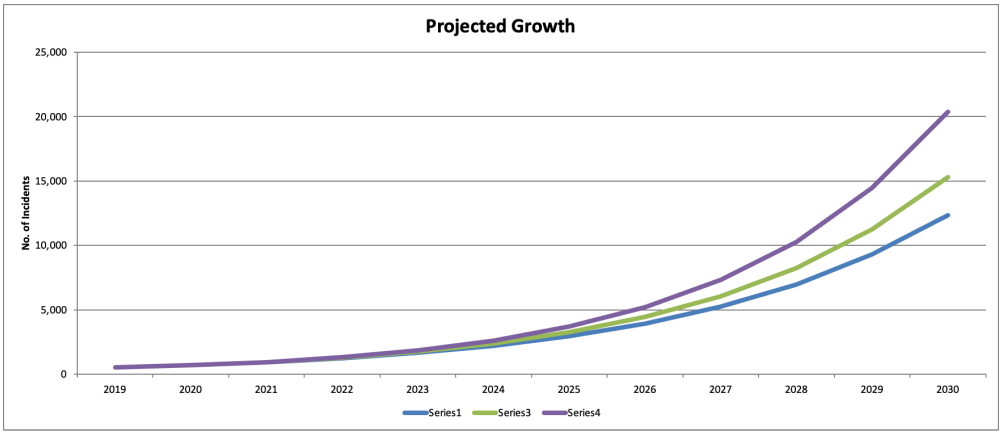
Policy makers have historically had considerable flexibility in the preferred system design.

Recommendations

1. It is recommended that the department consider providing ALS first response services
2. It is recommended that the department consider paramedics in their hiring practices during phased implementation
3. Creating an ALS first response capability will provide for more robust contingency planning

However, there are two influences in the environment today that may provide some guidance for policy discourse. First, is a state issue where there is a legislative effort to provide municipal governments local choice for the provision of emergency medical services. In other words, local policy could decide to provide the services within the local governance structure or continue to outsource through a public-private partnership. Minnesota has a long history of legacy ambulance service areas that are assigned by the state providing little local control.

Second, is the state of the EMS industry across the nation. A series of contributing factors such as inflation and other escalating expenses, outdated and capitated revenue models, supply chain issues, living wages, and staffing shortages have all contributed to an unstable market for private EMS ambulance providers. As sustainability of the EMS systems are challenged, municipal subsidy is typically required. Finally, rather than subsidizing a private provider, many local governments are opting to directly provide the services.



The relative instability seen across the nation, whether it is occurring locally nor or not, may prompt local government to begin contingency planning in the event that there is a market failure that would fall to the municipality to provide the essential services. For these purposes, the recommendation is to begin planning to provide first response ALS services that will not only benefit the community and improve performance, but make the necessary investments to maintain organizational agility if needed.

Considerations for Fire Prevention

Savage Fire Department recently hired a dedicated full-time Fire Marshal. This investment will allow the department to initiate a best practice community risk reduction program. Implementing a community risk reduction program is best accomplished in three phases.

The first phase of implementation is to inventory and asses the community risk. The four steps to inventorying and assessing community risk are:

- Inventorying the community includes identifying all of the structures within the community, fire systems within the structures, and current fire code compliance.
- A risk assessment should be completed while inventorying the community based on life hazards, property loss, and potential impact to the environment and community.
- An analysis of the inventory and analysis should be used to determine impacts and trends.
- Prioritization of the risk based on life hazards, property loss, and impact on the environment and community.

Recommendations

1. Inventory and asses the community risk
2. Identify the most appropriate mitigation strategies
3. Implement necessary policy and procedures

The second phase of community risk implementation is to identify the appropriate mitigating strategies. There are five common mitigation strategies with the first four being proactive and the last option being the responsive safety net:

- Education - Educating a specific target audience can help reduce risk. Some examples include educating seniors on fall prevention or apartment managers common impactful fire code violations.
- Enforcement - Enforcement generally is about gaining compliance with fire code and/or local ordinances. The best practice approach is to start with education for first violations unless their is a egregious life safety risk present.
- Engineering - Engineering controls can include programs like installing fire stops above stoves to control cooking fires or ensuring fire doors close when a fire alarm sounds.
- Economic incentives - These incentives could be both incentives or disincentives. An incentive might be waiving a permit or inspection fee if no code violations are found. A disincentive could be an escalating fee for multiple false fire alarms within a year.
- Emergency response - Emergency response is a post incident mitigation strategy. This is usually costly both in the response and the loss that is created by an incident.

The most effective community risk reduction program focuses on reducing occurrences or decreasing the impact of the risks.

The last phase of the community risk reduction program implementation is to implement the necessary policy and procedures. This phase may include council level policy decisions such as ordinance changes or a fee schedule adoption. Much of this phase will include operational level policy and procedure development and implementation.