

August 22, 2025

To: De'Carlton Seewood, City Manager
From: Brian Schaeffer, Fire Chief
John Ambra, Deputy Fire Chief
RE: Four-Person Staffing Plan

Introduction & Background

Over the last several months we have evaluated our deployment model against current science and our own CFAI Standards of Cover (SOC). As Columbia continues to grow past our 128,555 residents and 67 square miles, we face struggles maintaining service levels with the current deployment of 10 stations with 13 front-line companies on duty daily. Our SOC sets specific performance benchmarks for both the first-due unit and the Effective Response Force (ERF) across fire suppression and EMS (e.g., first-due travel $\leq 4:00$ and ERF travel $\leq 6:00$ for moderate-risk fires; $\leq 8:00$ for first-due and $\leq 14:00$ for ERF at high-risk).

Today, most of our stations are single-company houses staffed with three personnel, while a minority host multiple companies (Stations 1, 2, 7). In practical terms, distance (drive time) between single-company houses forces three-person crews to wait on reinforcements for critical, simultaneous tasks—particularly rescues in an immediately dangerous life and health atmosphere (IDLH) and high-acuity medical care—pushing us against (or past) benchmark travel times for assembling an ERF and limiting our ability to work fast and effectively enough to mitigate the risk.

Recommendation

Approve a phased-in, four-person staffing plan citywide. This memo summarizes the deployment science—across Fire/Rescue and EMS—that shows adding the fourth firefighter improves speed, safety, and clinical outcomes. It aligns our resources with our CFAI SOC benchmarks and the risk we protect today, and those we expect to see in the future using Darkhorse deployment software.

What the fireground science says (key deltas with 4-person companies)

Independent time–motion studies repeatedly show that adding the fourth firefighter produces faster task completion and safer sequences, which compounds into better outcomes:

Selected performance improvements:

Critical Task	3-Person Crew	4-Person Crew	Improvement
Initial water on fire	Baseline	11% faster	+11%
Continuous water supply	Baseline	74% faster	+74%
Victim removal time	Baseline	27% faster	+27%

These operational gains are directionally consistent with peer-reviewed work on crew size, productivity, and health/safety: four-person companies complete more simultaneous tasks, limit high-risk solo work, and reduce fatigue exposure (Hirsch & Martell, 1996; Maher, Bateman, & Randall, 2019; Moore-Merrell, Kerber, Horn, & Smith, 2021). In Columbia, where our stations are greater distances from each other, unit hour utilization is high, and the system is complicated by increasing concurrent incidents, four-person staffing offers a significant improvement for victim survival and firefighter safety.

Why four-person companies matter just as much for EMS

High-acuity medical incidents (cardiac arrest, stroke, STEMI, major trauma) require **simultaneous** interventions: early defibrillation and high-quality compressions; parallel stroke assessment and pre-notification; concurrent 12-lead acquisition, IV/IO, meds, and cath-lab/stroke/trauma activation; rapid hemorrhage control and packaging. A three-person crew often sequences these steps **serially**; a four-person crew can run them **in parallel**—with one provider dedicated to airway/ventilation, one for compressions, one to manage vasculature access and select medications, and one to manage the situation including documentation. Below are exemplar clinical domains where the science links faster, coordinated execution to measurably better outcomes. Four-person staffing is the on-scene enabler.

Out-of-Hospital Cardiac Arrest (OHCA)

- **High-quality, team-based CPR saves lives.** AHA guidelines emphasize team-based resuscitation with minimal interruptions and high chest compression fraction (CCF>80%). (Panchal et al., 2020; AHA CPR Quality)
- **More hands → higher compression fraction → higher survival.** In a large ROC study, every 10% rise in CCF increased odds of survival (adjusted OR≈1.11). (Christenson et al., 2009).
- **“Pit-crew” implementation improved survival and neurological outcomes**
A systemwide bundle focused on choreographed roles (i.e., enough rescuers for parallel tasks) produced higher survival with favorable neurologic outcome. (Hopkins et al., 2016).

Operational implication: With four people, we can sustain compressor rotation, dedicate a provider to basic and advanced airway/ventilation, defibrillation delivery, and medication/IO tasks without pausing compressions—something we struggle with currently based on a three-person company plan, especially during long resuscitations or complex resuscitations (e.g. pediatric, electrocutions, refractory or sustained VF/VT).

STEMI (heart attack)

- **Prehospital 12-lead & hospital pre-activation reduce mortality and D2B.** A 15-study systematic review (n=29,365) found lower short-term mortality (OR 0.72) and ~26-minute faster door-to-balloon with prehospital 12-lead + notification. (Nakashima et al., 2022).

- Contemporary statewide and international data echo these benefits with prehospital activation strategies. (Savage et al., 2023; Hashiba et al., 2022). [PMC+1](#)

Operational implication: A four-person company can acquire/transmit the ECG, give aspirin/nitro per protocol, establish IV access, manage symptoms, and complete early notification **simultaneously**, shaving minutes off first-medical-contact-to-balloon.

Stroke

- EMS prenotification speeds imaging and thrombolysis; more eligible patients get tPA.** National registry analysis: prenotification cut door-to-imaging and door-to-needle times and increased timely tPA treatment. (Lin et al., 2012). [PubMed](#)

Operational implication: With four personnel, one provider performs the stroke scale and completes neurological exam, one gets glucose/vitals/IV, one handles documentation and prenotification, and one coordinates the patient movement with EMS partners—again, all in parallel and without avoidable delays.

Major Trauma

- Shorter on-scene time and rapid control/packaging are linked to improved outcomes** in many trauma cohorts; appropriate personnel can facilitate hemorrhage control, airway management, spinal precautions, and rapid movement concurrently. (Brown et al., 2016; Siripakarn et al., 2023).

EMS—putting it together (how the 4th provider changes the first 10 minutes)

Condition	Prehospital actions tied to outcomes	What the science shows	Why a 4-person crew helps
Cardiac arrest	High CCF, rapid defib, minimal pauses	Higher CCF → higher survival; pit-crew programs improved neuro-intact survival (Christenson 2009; Hopkins 2016; AHA 2020).	Compressor rotation, dedicated airway, real-time defib/meds, and command—all at once.
STEMI	12-lead ECG Interpretation, IV/Med + cath-lab pre-activation	Lower short-term mortality; -26 min D2B (Nakashima 2022).	ECG, IV/meds, transmission, and prenotification proceed in parallel
Stroke	EMS prenotification; rapid glucose/scale	Faster door-to-CT and door-to-needle; more timely tPA (Lin 2012).	Two assess/treat; one packages; one notifies/coordinates—no waiting.
Trauma	Hemorrhage control, airway, rapid extrication	Shorter scene times & faster control linked with better outcomes in many settings (Brown 2016; Siripakarn 2023).	Extra hands to control bleeding, package, and move immediately

Columbia's deployment reality

Our SOC assumes **specific** task and travel-time benchmarks that require multiple, coordinated companies—e.g., moderate-risk ERF in ≤6:00 travel with at least 16 personnel; high-risk fire ERF in ≤14:00 with 24 personnel capable of attack, search, ventilation, water supply, lobby/evacuation, and firefighter rescue (RIC). In EMS, high-risk incidents similarly require multi-company ERF's to assemble enough firefighters to provide the highly complex care and patient movement needed to treat critical patients.

Because the **vast majority** of our stations are single-company houses (typically three personnel), drive time between first-due and second-due companies frequently delays when simultaneous tasks can start—on both the fireground (e.g., water supply/search/RIC) and the medical scene (e.g., compressor rotation + airway + IV/meds + prenotification). Each minute of “serial” work costs outcome in time-sensitive conditions. Adding the **fourth** firefighter at the tip of the spear turns serial into parallel, letting the first-due company **begin** the ERF's work while reinforcements are still en route.

Fiscal and risk stewardship

Four-person staffing is not just a fireground luxury; it is a **performance and quality** necessity. It aligns with national resuscitation and time-critical care standards; it supports our SOC benchmarks; and it ensures that our residents—including our most vulnerable cardiac, stroke, and sepsis patients—receive the best chance at survival and recovery from the moment we are notified and arrive.

Conclusion

I recommend adopting four-person staffing for ladder and engine/quint companies citywide. The deployment science is consistent: adding the fourth provider meaningfully improves task speed and quality in both Fire/Rescue and EMS incidents; it reduces risk to the public and to our crews; and it helps Columbia meet the standards we acknowledged in Accreditation and promised to the community. The impact on the system is expected to improve compliance with our deployment benchmarks and goals for ERF and first arriving approximately 20% (see image). While the data may paint a clear picture of the future, the more profound argument for the investment is the lives saved and overall safer conditions we will create for the City of Columbia and our visitors.

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