Trained Paramedics Provide Ongoing Support to Frequent 911 Callers, Reducing Use of Ambulance and Emergency Department Services

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Snapshot

Summary
The Area Metropolitan Ambulance Authority (more commonly known as MedStar), an emergency medical service provider serving the Fort Worth, TX, area, uses mobile health care paramedics to provide in-home and telephone-based support to patients who frequently call 911 and to other patient populations who are at risk for potentially preventable admissions or readmissions. Working as part of MedStar's Mobile Integrated Healthcare Practice, these paramedics conduct an in-depth medical assessment, develop a customized care plan based on that assessment, and periodically visit or telephone the patient and family to support them in following the plan. Support generally continues until they can manage on their own. Four additional similar programs serve individuals with congestive heart failure, patients who can be managed transitionally at home versus an overnight observational admission in the hospital, in-home hospice patients who are at risk for hospice revocation, and as a support for home health agencies to prevent unnecessary visits to the emergency department. These programs have significantly reduced the number of 911 calls, the number of potentially preventable emergency department visits and hospital admissions, the number of overnight observational admissions, and the number of hospice admissions.
revocations, leading to declines in emergency medical services and emergency department charges and costs, and freeing up capacity in area emergency departments.

**Evidence Rating** *(What is this?)*
Moderate: The evidence consists of pre- and post-implementation comparisons of 911 calls from program participants, along with estimates of the cost savings generated and emergency department capacity freed up as a result of the reduction in calls.

**Developing Organizations**
Area Metropolitan Ambulance Authority, d/b/a MedStar Mobile Healthcare
Fort Worth, TX

**Use By Other Organizations**
As of December 2015, approximately 171 other EMS programs from across the U.S. and five international communities have visited MedStar in the past 60 months to learn more about these programs.

**Date First Implemented**
2009

**Problem Addressed**
Inappropriate calls to emergency medical service (EMS) providers and unnecessary use of the emergency department (ED) occur frequently. Typically, a handful of “super users” accounts for a disproportionate share of the problem. These individuals generally lack health insurance and a medical home and face multiple barriers to care, causing them to repeatedly turn to EMS providers and local EDs with problems that could have been prevented or do not require immediate care by EMS or ED staff. Other patient populations responsible for inappropriate calls to the ED include those with non-urgent (also known as low-acuity) problems, those with chronic conditions (such as congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and diabetes) that can be managed in an outpatient setting, those who are admitted on an “observational” basis but
whose needs are social or environmental rather than medical, and those with terminal illness who may prefer to die at home. These inappropriate calls result in higher costs and the diversion of valuable resources away from true emergencies.

- **High utilization, dominated by a few (often uninsured) users:** A few super users often account for a disproportionate share of 911 calls and ED visits. In 2009, MedStar found that 21 patients had been transported to local EDs a total of 800 times over a 12-month period, generating more than $950,000 in ambulance charges and even larger ED expenses. Most of these individuals did not have health insurance and relied on EMS and local EDs for health services. Other cities have found similar problems. For example, the Tucson Fire Department identified 50 individuals who accounted for more than 300 nonemergency 911 calls over a 12-month period.¹

- **Calls often for non-urgent needs or for needs that the ED is not equipped to handle:** Various studies have found that between 11 and 52 percent of 911 calls come from individuals who do not face serious health problems.² Many ED visits by super users and other patients are for conditions that should be treated in a primary care setting, including acute upper respiratory infections, viral infections, otitis media, and acute pharyngitis. Still other patients may routinely call 911 and visit the ED with exacerbations of chronic conditions (such as CHF) that could be avoided with adequate ongoing care, or with psychosocial problems that cannot be effectively treated in the ED, such as alcohol or drug dependency and depression. In some cases, patients are observationally admitted for reasons that may be social or environmental in nature. In other cases, patients at the end of life may be taken to the ED (resulting in a revocation of their hospice status) when they would have preferred in-home, less aggressive measures.

- **High costs, diverted resources, little lasting value for callers:** Handling nonemergency calls raises the costs of providing EMS and ED services and diverts scarce resources away from true emergencies, leading to longer response times. In addition, although those who respond to these cases can resolve the immediate problem(s), they lack the resources and knowledge to educate the individual about appropriate self-management and the many community-based resources (e.g., home health care, behavioral health services, public...
health clinics, substance abuse services) that could better address their needs in the future.

Patient Population
The program serves people who frequently call 911 in situations not considered to be an emergency, patients who call 911 with low-acuity medical complaints, patients at risk for potentially preventable admissions or readmissions, and patients at risk for hospice status revocation.

Description of the Innovative Activity
MedStar uses registered nurses (RNs) in its 911 center to work with 911 callers who call with very low acuity calls to find more appropriate resources than an ambulance response to an ED. In addition, mobile health care paramedics provide in-home and telephone-based support to patients who (a) frequently call 911 or call 911 for low-acuity medical complaints, (b) are at risk for CHF, COPD and diabetes-related readmission, (c) can be referred to monitored home care as opposed to observational admission, or (d) are at risk for hospice status revocation. The paramedics conduct an in-depth medical assessment, develop a customized care plan based on that assessment, and periodically visit or telephone the patient and family to support them in following the plan. Support generally continues until they can manage on their own. Key program elements are described below:

- **Identification of eligible individuals:** MedStar identifies eligible individuals in various ways, including a pre-defined 911 call intake protocol, internal analysis (a monthly report lists those with 10 or more 911 calls in the past month) and referrals from ED case workers at local hospitals, other first-responder agencies, and MedStar employees working in the field. Currently, the high-user program serves those who have called 911 at least 15 times in the past 90 days or who meet other criteria used by hospitals to identify and refer frequent ED users. (Those close to this threshold may be tagged as someone to monitor for enrollment at a later date.) For the CHF program, staff at local cardiac intensive care units (ICUs) identify and refer patients who are at risk for bounce-back to the ED within 30 days.
or who could benefit from ongoing support; these patients need not meet the 15-call threshold. In June 2012, MedStar added a 911 Nurse Triage program to the Patient Navigation program, using an RN in the communication center to receive low-acuity 911 calls and help navigate callers safely to a patient-centered medical home.

- **Brief enrollment visit**: Anyone deemed eligible for the program receives a telephone call or visit from a mobile health care paramedic, either at home or in the hospital. The paramedic explains the benefits of the program to the patient and his or her family members and other caregivers. Those interested sign a consent form authorizing the sharing of relevant information with appropriate parties.

- **Indepth medical assessment**: The mobile health care paramedic conducts a 1.5- to 2-hour in-home visit with the patient, family members, and caregivers. The visit includes a full medical assessment, including checking vital signs, blood glucose levels, oxygen saturation levels, and other key indicators (refer to Figure 1). During the visit, the paramedic reviews the following:
  - Current medication use, making note of any potential problems (e.g., taking two or more medications for the same condition, potential drug–drug interactions) to be discussed with the prescribing physician(s).
  - Any chronic conditions the patient may have, focusing on appropriate self-management of those conditions and related comorbidities.

Figure 1. Woman receiving care in her home. Image courtesy of Bob Strickland Photography. Used with permission.
• Existing support and resources available to the patient and family, including financial resources, insurance coverage, and access to nonemergency medical care (including primary care and home health care), mental health services, transportation, and other relevant social services.

• Assessment of the patient's ability to manage his or her own health care. Patients are given the EuroQol (EQ-5D) Health Assessment Questionnaire to rate current health status and ability to manage his or her health care needs. This same assessment is given to the patient at the end of enrollment to see how the assessment has changed.

• **Individualized care plan based on assessment:** The mobile health care paramedic who conducted the review works with the patient and family to develop an individualized care plan that outlines their needs and responsibilities related to managing the patient's health and health care on an ongoing basis. As part of this process, the mobile health care paramedic may talk with other providers who serve the patient (as identified in the assessment), including primary care clinicians and mental health care providers. The resulting plan includes concrete steps to be taken by the paramedic to help in accessing needed resources, such as securing insurance coverage or other financial resources and linking the patient and family to county hospital-affiliated clinics and other local agencies and resources that serve low-income and uninsured individuals (e.g., transportation, home health care, hospice, Meals on Wheels). The plan also includes mutually agreed on goals for the patient and family to manage the patient's health, such as checking his or her blood pressure or blood glucose levels, eating an appropriate diet, exercising more regularly, taking medications appropriately, and scheduling and attending needed appointments. The patient and family members receive a copy of the care plan, and the plan is also entered into the patient's electronic medical record (EMR) where it can be accessed by mobile health care paramedics and other authorized providers as appropriate.

• **Ongoing support via home visits and telephone calls:** Based on the needs identified in the care plan, a mobile health care paramedic conducts periodic 30- to 60-minute home visits with patients, with the frequency of visits determined by need. (The same paramedic may not
conducted each visit, but all have access to the patient's information, and most know all patients enrolled.) Visits initially occur two or three times a week, with the frequency tapering off to one or two visits a week over time. The mobile health care paramedic may make telephone calls instead of in-person visits if the patient is making adequate progress. Visits provide an opportunity to ensure that the patient and family are following the plan. As appropriate, the paramedic will intervene, providing referrals and support in accessing needed services. For many patients, visits also provide an opportunity for much needed social interaction. All mobile health care paramedic contacts with patients are entered into the patient's EMR, including current vital signs, medications, and other relevant information. Patients are also given a 10-digit telephone number to call to request a mobile health care paramedic home or telephone visit as an alternative to calling 911.

- **Special protocols for patients with CHF, COPD, or Diabetes:**
  Mobile health care paramedics who work with CHF, COPD, and diabetic patients are able to take point-of-care blood values (e.g., blood urea nitrogen [BUN], potassium levels, blood glucose levels) at the patient's side and use standing order protocols to adjust doses of diuretic medications based on a patient's weight gain and other indicators (refer to Figure 2). The paramedic, in consultation with the patient's primary care physician and EMS medical director, can also use intravenous diuretic therapy or breathing treatments in
the home with a 3- to 5-hour reassessment home visit and an appointment with the primary care physician within 1 day.

- **Multiple paths for leaving the program:** At some point, patients receiving services (designated “active” patients) formally leave the program. This process can occur in several ways, as outlined below:

- **“Graduating” from the program:** Most patients successfully graduate, which occurs when both the patient and the mobile health care paramedic believe that the patient can effectively manage his or her own health and health care without proactive support. Part of that assessment is the use of the EuroQol (EQ-5D) Assessment of Health Status. Graduation typically occurs in about 30 to 60 days, with the shortest time being 2 weeks and the longest time being 6 to 8 months. Graduates can call a special 24-hour nonemergency number that will trigger a paramedic or ambulance visit within an hour to check on their well-being and an intervention as necessary. Before graduating, some individuals may be placed on “watch” status, which means they are almost ready to graduate, but their 911 use remains elevated or has recently increased, suggesting they still need some support.

- **Designation as a system abuser:** Those who do not change their habits and continue to call 911 repeatedly may be transitioned into another program. These individuals are either designated as “pending system abusers,” meaning they do not have any medical issues that require ongoing care, or as “system abusers,” meaning they have ongoing medical issues. If an abuser calls 911, the mobile health care paramedic responds to the call (in addition to the regular response team) to conduct a full medical evaluation and then works with the medical director to determine the right course of action. System abusers are assigned to a designated home hospital; whenever they call 911, the ambulance takes them to that facility so they can be monitored by providers familiar with their condition.

- **Regular case discussions with hospital caseworkers:** Once or twice a month, MedStar’s Mobile Healthcare Program coordinator meets with hospital, ED, and cardiac ICU caseworkers to discuss patients enrolled in the program. The caseworkers provide information on recent ED visits or hospitalizations, including diagnoses, treatments...
and tests performed, medications prescribed, and discharge and followup instructions. This information, which is entered into the EMR, helps the mobile health care paramedics determine the appropriate level of ongoing support and identify those who may be abusing the system by seeking care (e.g., medications) at multiple facilities. The Mobile Healthcare Program coordinator also shares relevant information with hospital-based caseworkers about recent contacts that the mobile health care paramedics have had with patients.

**Ongoing monitoring via electronic database:** The coordinator regularly reviews an electronic database to check on the progress of individual patients and update classifications as appropriate. This information is regularly shared with the associate medical director.

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**Context of the Innovation**

The Area Metropolitan Ambulance Authority, also known as MedStar, operates as the sole provider of emergency and nonemergency ambulance service for 15 cities in north Texas, including Fort Worth. More than 936,000 people live in this area, making roughly 125,000 calls to 911 a year that are handled by a fleet of 56 MedStar ambulances. The impetus for this program came from MedStar's medical director, who in preparing for another busy summer season in 2009, began thinking about how the organization could better serve 911 callers who repeatedly use the system for non-urgent situations.

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**Results**

These programs have cancantly reduced the number of 911 calls and redirected some low-acuity calls to other, more appropriate dispositions, leading to declines in EMS and ED charges and costs, and freeing up capacity in area EDs.

**Significant decline in ambulance and ED use:** Information provided in January 2016 indicates that for the 911 Nurse Triage Program between June 1 and December 31, 2015, 1,022 patients who called 911 with low-acuity medical conditions were successfully referred to dispositions other than an ambulance to the ED. Between the formal launch in July 2009 and December 2015, 911 calls from the program's 302 enrollees with 2 years of utilization data fell by 65.9 percent for the 12 months following graduation from the programs.
Patients enrolled in the high utilizer program also experienced a 58.1 percent reduction in ED visits and in-patient admissions fell 45.3 percent in the enrolled population.

- **Corresponding declines in EMS and ED charges and costs:** The decline in calls has led to a corresponding drop in MedStar's payments for ambulance services and overall health care system expenditures, with the program leading to savings of $1.4 million in ambulance and ED expenditures ($1,256 per patient). Data on 302 patients with 12-month pre-enrollment and post-graduation data available revealed that annualized EMS transport charges for these patients fell by more than $4.9 million, representing $16,063 annual savings per patient enrolled.

- **Freed-up ED capacity:** MedStar estimates that the decline in the number of patients being transported by ambulance has freed up more than 14,000 bed hours at area EDs, allowing these capacity-constrained facilities to better serve those facing real emergencies.

- **Avoidance of CHF readmissions:** Under the new CHF enrollment protocol launched in June 2012, 119 patients at risk for CHF-related readmissions have been enrolled in the program. For these 119 patients, the readmission rate fell from an anticipated 100 percent (all patients were referred due to the anticipation of a 30-day readmission) to 27.7 percent.

- **Positive results from the hospice program:** One hundred and eighty-one patients who the hospice agency believed were at high risk for a voluntary disenrollment have been enrolled in the hospice program. Of these, only 28 have voluntarily disenrolled from the hospice program. Further, there were 83 911 EMS calls in this cohort and only 49 resulted in a transport to the ED. In 7 of the 911 cases, the patient was directly admitted from the field to a hospice bed in the hospital, so no revocation of hospice status occurred because of the ED visit.

**Evidence Rating (What is this?)**

Moderate: The evidence consists of pre- and post-implementation comparisons of 911 calls from program participants, along with estimates of the cost savings generated and emergency department capacity freed up as a result of the reduction in calls.

**Planning and Development Process**
Key steps included the following:

• **Quick analysis to document the problem:** To test his theory, the then associate medical director ran a quick analysis and found that 21 patients accounted for more than 800 calls in 2008, with the vast majority being for primary care and other non-urgent needs.

• **Pilot test with a subset of patients:** MedStar reviewed information on the 21 identified individuals and enrolled 9 of them in a 60-day pilot test of the program. These individuals had a long history with and were very familiar to MedStar staff. During the trial, two paramedics on “light duty” (owing to their recovering from an injury) who had experience in primary care served as the mobile health care paramedics. The test proved quite successful, leading to a 77-percent reduction in monthly 911 calls.

• **Funding plan to support rollout:** Because home visits and other services provided as part of the program are not eligible for reimbursement by third-party payers, MedStar lacked a funding source to cover the costs of shifting paramedic time from their traditional duties to program activities. To address this issue, MedStar leaders decided to “marry” the Mobile Healthcare Program to a new critical care transport program, a service not previously offered by MedStar that involves transporting critically ill patients from facilities that cannot adequately care for them (usually in outlying areas) to those that can (often tertiary facilities in urban areas).

• **Paramedic training:** The Mobile Healthcare Paramedics complete a specialized 80-hour classroom and 80 hours of field training. The program focuses on the core concepts of patient navigation, motivational interviewing techniques, and the resources available in the community to help patients better manage their health care. (Updated December 2013.)

• **Partnerships with community-based organizations:** MedStar leaders forged partnerships with community-based organizations serving the same population, including hospitals, EDs, the county health department, the local Medicaid office, mental health organizations, home health and hospice agencies, and Meals on Wheels. They first met with organizational leaders to explain the program and gain their buy-in, and then discussed how the mobile
health care paramedics could coordinate with them on an ongoing basis, including how each party should make referrals to the other.

- **Expansion to patients with CHF and other chronic conditions:** In September 2010, the program expanded to serve CHF patients. The CHF program continues to evolve, as MedStar leaders have worked with local cardiologists to develop the aforementioned standing order protocols that allow mobile health care paramedics to adjust medication doses. Now that the CHF model has been “perfected,” MedStar leaders have partnered with local stakeholders to use the same basic approach to support those with other conditions that frequently lead to EMS and ED use, such as chronic obstructive pulmonary disease, and diabetes.

- **Hospice partnership:** MedStar has formalized the successful program to help ensure that hospice patients stay in hospice without voluntary disenrollment or involuntary program revocation by the hospice agency. One hundred and eighty-one patients identified by the hospice agency as at-risk for voluntary disenrollment or revocation have been enrolled in the program with only 28 (15.5 percent) actually disenrolling from hospice.

- **Program with home health patients:** In partnership with a local home health agency, MedStar is conducting a program in which mobile health care paramedics support patients and families receiving in-home care by providing back-up services to the home health agency for night and weekend coverage. Additionally, new home health enrollees who the agency feels might be at risk for calling 911 and being readmitted to the hospital are identified in MedStar's 911 computer-aided dispatch system. If the patient calls 911, the ambulance and mobile health care paramedic respond to the scene, and the home health agency is immediately notified of the response. Once on scene, the mobile health care paramedic works with the home health agency to determine the most appropriate outcome for the patient. Eight hundred and eighty patients have been enrolled in MedStar's home health partnership. This population generated 655 911 calls since 2014. When a MedStar MHP is on scene on the 911 call, a patient is transported to the ED only 59.8 percent of the time. Additionally, the home health agency requested a MedStar MHP visit for one of their patients 213 times, and only 17 of these patients (18 percent) were taken to the ED.
**Resources Used and Skills Needed**

- **Staffing:** The program has 5.5 full-time equivalents allocated to it. Managers and directors (e.g., medical directors, operations managers) participate in program-related duties as part of their regular job responsibilities. One mobile health care paramedic is on duty at all times (7 days a week, 24 hours a day), with one additional mobile health care paramedic working 10 hours each weekday to assist with home visits (updated December 2013). Mobile health care paramedics, however, do not spend all of their shift time on the Mobile Integrated Healthcare Program, as some time goes to critical care transports and other duties.

- **Costs:** The program required an upfront outlay of roughly $46,000 to buy and equip a response vehicle for the mobile health care paramedics. This vehicle houses specialized equipment and computer technology, including monitors. Other upfront costs included the time spent by paramedics in training, while ongoing costs include uniforms and supplies for the paramedics. Ongoing costs are $560,000 annually.

**Funding Sources**

The program was initially funded internally by MedStar, but the agency has recently engaged in fee-for-service agreements with a local accountable care organization for the Observation Admission Avoidance Program, a hospice agency for the Hospice Revocation program, and with three local hospitals for the 911 Nurse Triage program. MedStar has initiated expanded enrollment of Medicaid and unfunded patients in partnership with two local hospitals under an 1115a Waiver Delivery System Reform Incentive Payment program with the local regional health care plan to expand the program resources to enroll 5,500 additional patients over 3 years. That funding amount is $3.5 million over 3 years. In addition, the home health partnership is funded by the home health agency at a fee per patient contact (updated December 2013).

The 911 Nurse Triage program is being jointly funded by MedStar and three area hospital systems, with the hospital systems sharing equally in the cost of the nurse and MedStar providing the technology and infrastructure.

**Tools and Resources**
More information on the program can be found at www.medstar911.org/community-health-program.

**Sustaining This Innovation**

- **Continue investing in partnerships:** Ongoing communication based on transparency, honesty, and respect is critical to keeping partners together. In particular, the various organizations must honor their commitments to each other. MedStar has forged good relationships with virtually all key stakeholders, including four competing hospitals that have a tense relationship with each other, but freely share data and collaborate with MedStar.

- **Approach payers about funding support:** Third-party payers may be interested in supporting the program once they understand how it can benefit them. To that end, MedStar leaders plan to meet with representatives of the three largest payers in the area to find out what aspects of the program would be most meaningful and beneficial to them (e.g., its ability to reduce EMS transports, ED visits, and hospitalizations). MedStar will then hire an independent party to evaluate and document the program’s impact on these metrics, later sharing that analysis with the payers as part of a conversation about reimbursement.

- **Prepare for reimbursement changes:** As accountable care organizations, pay-for-performance systems, and other new payment and care delivery programs become a reality, health systems and other large provider organizations will increasingly take responsibility for covering EMS transport services (rather than traditional insurers). Consequently, those adopting this program should consider partnering with organizations that plan to participate in these new initiatives.

**Use By Other Organizations**

As of December 2015, approximately 171 other EMS programs from across the U.S. and five international communities have visited MedStar in the past 60 months to learn more about these programs.

**Contact the Innovator**

**Matt Zavadsky**
Director of Public Affairs
Area Metropolitan Ambulance Authority
Innovator Disclosures

Mr. Zavadsky reported receiving travel expenses for various national conferences where he spoke on patient navigation programs relevant to the work described in the profile; in addition, information on funders is available in the Funding Sources section.

Recognition

In September 2013, EMS World and the National Association of Emergency Medical Technicians (NAEMT) named MedStar the Paid EMS Service of the Year. This award recognizes outstanding performance by a paid EMS service. More information on this honor is available at: http://emsworld.epubxp.com/i/160224/87.

In March 2013, MedStar was awarded an EMS-10 Innovator award by the Journal of Emergency Medical Services. These awards recognize individuals (and for the first time with this award organizations) who have contributed to EMS in an exceptional and innovative way. More information on this award is available at: http://www.jems.com/EMS10.

References/Related Articles


Mitchell M. In Fort Worth, MedStar's Community Health Program cutting costs, improving patients' well-being. Fort Worth Star-Telegram. July 9, 2011.


Footnotes
1. Referred services and alpha trucks: Norma Battaglia leads Tucson Fire Department toward response efficiency. JEMS. 2009 Apr;34 (4):4-5.
This is very interesting. As the inventor making possible the Automatic External Defibrillator (AED) I was asked to look into some of these methods and have over the last few years. I just returned from East Midlands in the UK where they are saving $11 million annually using Decision Support Software (DSS). This is classically the way risk is lowered in such a program. It references over one million words of clinically referenced data and does this in a few minutes. I would suggest this is far less risky when doing assessments. We are combining this concept with EMS telemedicine. And, we have a new technology design guide to aid in configuring such a program with these technologies. It's focus is Community Paramedicine.
Partnerships

BY BRITTANEY BETHEA ON MON, 2014-08-18 04:06

I was hoping to gather specific information regarding the public health sector and role played in the delivery of this innovation. The profile briefly mentions MedStar leaders forged partnerships with organizations that included the county health department and the local Medicaid office; could you elaborate more about what the health department's and the Medicaid office's role in the delivery of this program looked like?

REPLY

Reply to "Partnerships"

BY MATT ZAVADSKY ON WED, 2014-08-20 10:26

Hi Brittaney: Thanks for the comment and reaching out off-line as well. The Tarrant County Hospital District provides indigent care clinics in our community and we have several funded projects with them for the "EMS Loyalty Program" members, as well as our CHF patients. The State Medicaid Office has an 1115A waiver project and we participate in program funding through the Medicaid waiver and the TCHD/John Peter Smith Health Network.

REPLY

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Last updated indicates the date the most recent changes to the profile were posted to the Innovations Exchange.

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Date verified by innovator indicates the most recent date the innovator provided feedback during the annual review process. The innovator is invited to review, update, and verify the profile annually.

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