People call 9-1-1 during a medical crisis with the expectation that professional help will arrive within minutes. During an acute medical or traumatic emergency, patients don’t plan on receiving interventions for other health problems. Messages about chronic disease, falls in the elderly and other public health problems are usually delivered through public education campaigns and scheduled visits with one's personal physician.

However, simultaneously addressing medical emergencies and chronic medical problems is both feasible and attainable. King County (Wash.) EMS is currently implementing a program that links EMS more closely with the broader mission of public health.

Through the SPHERE (Supporting Public Health with Emergency Responders) initiative, information provided to EMS administrative offices by EMS personnel following an incident in which a health problem is identified flows back to doctors and patients. SPHERE essentially closes the medical care feedback loop and enhances the potential for improved patient and community health.

EMS providers routinely collect vital sign information on millions of patients each year as part of their basic patient evaluation. Traditionally, these data are archived and...
not used in the service of public health. However, SPHERE emphasizes the use of these data in an effort to positively affect community health, as shown in Figure 1 (opposite).

What makes the process seamless is that EMS personnel continue to transmit their incident data to the EMS administrative agency with little or no changes to their routine. New system developments within the EMS administrative agency then propel the wheels of SPHERE into action.

Program basics
To illustrate one possible way to implement SPHERE, we’ll use the example of hypertension. As mentioned, EMS personnel will respond to calls and complete their incident reports as they normally do. Administrative personnel could monitor the incident report database to identify every patient with a blood pressure of 160/100 or higher. These patients will receive a letter from the EMS agency’s medical director telling the patients that their blood pressure was abnormally elevated during a recent EMS visit. The medical director can further advise these patients to follow up with their regular physician and/or have their blood pressure rechecked at a local fire department or EMS agency. If a patient is homebound, an EMT could plan to recheck the patient’s blood pressure during a pre-arranged home visit. This example places the burden of follow-up on the EMS agency, rather than the individual provider on scene.

It could be argued that hypertension, if identified, should be discussed immediately. By waiting until after the incident to contact the patients, some cases might slip through the cracks. For example, if correct contact information isn’t recorded on the incident report form, it might not be possible to reach a patient for follow-up. Thus, some would argue that the on-scene EMS crew is in an ideal position to deliver medical information to a patient who might otherwise not hear it.
Although delivering news to patients about high blood pressure during the EMS response to a call has advantages, there are also significant disadvantages. The EMT or paramedic could leave appropriate information with the patient, but this places the burden of counseling on EMS providers, and this is not their highest priority during the call.

The provider is there to tend to the immediate problem and not to focus on secondary or incidental matters. In most cases, a medical emergency is not the ideal time for a “teachable moment.” Further, a patient who is struggling with pain or anxiety might not be capable of handling information unrelated to their current condition.

Instead, follow-up information about a patient’s blood pressure might best be delivered in writing a week or two after the EMS visit. Imagine the response of a patient who calls 9-1-1 for abdominal pain and one week later receives a letter from the EMS medical director informing them of possible high blood pressure. We suspect such a patient would be very grateful. We tested this approach during a small pilot study conducted in one fire district in King County.

Pilot study
Although the SPHERE model can be applied to a variety of different chronic diseases or medical risk factors, the pilot project in King County focused on hypertension. It’s critical for patients with newly discovered hypertension to seek the care of a doctor and begin treatment. Similarly, patients whose conditions are not well controlled must have their treatment adjusted, or they will be at greater risk for heart attacks and strokes.

The Federal Way Fire Department (population 83,590) was extremely supportive and enthusiastic about participating in a pilot project. With the help of Chief Al Church and Federal Way EMS personnel, we identified 200 patients at risk of undiagnosed or undertreated hypertension (defined as systolic >160 mmHg and/or diastolic >100 mmHg) from the medical incident report forms.

We mailed a personal letter to these patients indicating that their blood pressure was elevated during a recent EMS visit. The letter stressed the importance of blood pressure monitoring and encouraged patients to seek professional care and/or come to a local fire station for an additional blood pressure check. For patients choosing to go to a fire station, EMTs took patients’ blood pressures and talked to them about hypertension control.

We called each of the 200 patients within one month after mailing the letter to confirm if they had received the letter and to assess the letter’s impact on their intentions and behaviors. In 40 cases, the contact information on the medical incident report form was incorrect, leaving us with about 160 patients for whom we had correct contact information.
Of these 160 patients, 75 were successfully reached by phone in the month after the letter was sent. These 75 patients were mostly female (65%) and elderly (68 years of age or older).

Of the 75 interviewees, 85% remembered the letter, and of those, 85% were currently under the care of an MD for high blood pressure. Many of those patients reported they had seen their doctor after receiving the letter.

Of the patients who reported no history of hypertension, three stopped by at a fire station for an additional blood pressure check and several more indicated they intended to do so in the near future. Many patients were thankful for the information they received from the EMS division, including four patients who called within a day to express their gratitude.

National potential
The pilot study demonstrated that EMS data can be used to identify patients who may be undiagnosed as having hypertension and a much larger group of patients with undertreated hypertension. Larger, more systematic studies need to be conducted to provide better data on accuracy in identification of patients with new or undercontrolled hypertension as well as on the effectiveness of various intervention strategies with this population.

In addition to hypertension, numerous other medical conditions can be targeted with SPHERE, including diabetes and falls in the elderly. A brief look at King County's medical incident report form data from 2004 demonstrates the enormous potential of SPHERE for hypertension, diabetes and fall prevention in a service area with a population of 870,000. BLS providers responded to medical emergencies approximately 127,000 times in 2004. This represents approximately 15% of the population. Almost 21% of the records showed evidence of hypertension. BLS responded to more than 1,800 calls for insulin reaction. Further, approximately 7,000 calls were made to 9-1-1 as a result of a fall in patients age 60 or older.

The SPHERE model can be applied to EMS systems throughout the nation. Although different organizations might have their EMS database in diverse stages of development, the potential to use EMS data for improving public health exists in virtually every community. We must stress that there are numerous ways to achieve public health interventions under the SPHERE umbrella. Whether interventions are delivered by EMS personnel during a call, by administrative staff after a call or by a combination of methods, the opportunity to link EMS to public health can and should be realized.

Mickey Eisenberg, MD, PhD, is a professor of medicine at the University of Washington and medical program director for King County EMS. He is an active researcher in prehospital resuscitation.

Gayle Garson, EdD, MS, is a program manager at King County EMS.