Surge Medical Response Capability:
What is it? How do we get it? How do we know when we have it?

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The nation's track record in planning for, funding and achieving even minimally adequate disaster surge response capabilities within the medical community is woefully deficient. This paper offers eight transformational requirements the country should embrace in order to develop essential capabilities. By embracing these requirements, public leaders and the medical community can together begin to forge a new science of medical surge. That new science of surge must be focused relentlessly on one question: what works?

For as long as there have been hospitals, there has been a need to plan for a surge in patient volumes. Whether caused by flu season, a natural disaster or a terrorist attack, there is frequently a mismatch between demand and resource supply. Daily surge capacity has been dwindling as emergency department volumes increase and, the facilities to handle the patients, at best, is stable. By any measure – ambulance diversion, wait times, or patient boarding – crowding of emergency departments is worse than ever and there are significant delays in patients receiving timely service when urgent or emergency care is required.[1] Hospitals and health care systems have squeezed out all of their excess capacity for the purposes of efficiency and reduction of overhead. The way health care is financed has catalyzed these efficiencies so that cost-shifting to compensate for overhead to address non-income producing services is virtually eliminated.

Hospitals manage "daily surge" in several ways, the predominant one is shared by every other industry with ebbs and flows in demand – increased wait times for service. A relatively steady state is therefore created, with predictable consequences. What is yet unmanaged is the unpredictable surge of patients that arises from infrequent, geographically scattered events, known as "disasters with medical consequences." The issues dealing with large-scale catastrophic events are what seem unmanageable. Are the daily skills and accidents of the management of daily surge scalable for natural disasters or intentional catastrophic events? Clearly, the answer is "no." This is not to say that the same capabilities needed to address daily surge are not applicable to disasters – they are. But it is the set of additional requirements to manage this rare circumstance that groups of experts gather and produce recommendations for catastrophic events. Due to the rarity of the events and the lack of a mechanism to gather data in real-time, this expertise is usually based on experience rather than the more normal evidenced-based approaches to medical decision making.

The difficulty of designing a national strategy for medical surge capacity in disasters, much less the operational and tactical planning, is in evidence by the failure to produce such a strategy irrespective of the numbers of papers in the literature on the subject over this decade. Responsibility for developing such a strategy has been shunted off to states, the private sector, hospitals, think tanks and professional associations. But it is difficult to ignore that one of the reasons for the formation of a Federal government in the first place was to provide for the

common defense. Medical response is an essential element of the common defense, and is therefore a responsibility of the Federal government that must not be abrogated. Like the super majority of our critical infrastructures and key resources (CI/KR), the nation's medical infrastructure is not owned or controlled by the government. Like much of the U.S. homeland security enterprise, the Federal government has responsibility but no control. Therefore, the way the Federal government has asserted itself to achieve the goal of a common defense is through planning, controlling funding, setting standards, and collaborating with private CI/KR owners on common goals, like continuity of operations (COOP) assurance.

Medical response should be no different, and the government has acknowledged this through its efforts to date. The lead Federal agencies for this effort have been the Department of Health and Human Services (HHS), the Department of Homeland Security (DHS), and to a lesser extent, the Department of Defense (DoD) and the Veterans Administration (VA). The latter two are different in that their facilities are controlled by the Federal government and they have distinct populations to serve. But they are also part of the nation's distributed health infrastructure, and their facilities are as likely to be involved in any large-scale disaster. HHS and DHS have had a somewhat different approach to the health critical infrastructure. For DHS, the focus has been on hardening and protecting and brick-and-mortar infrastructure and with COOP issues. HHS has tended to think more in terms of systems, including people and consumable resources like medicines and supplies, and is much more apt to talk about surge capability in terms of "public health." Both agencies work together through the DHS health Sector Coordinating Council and Government Coordinating Council, for which HHS is the "lead sector-specific agency."

Still, the issues around medical surge capacity cannot be managed by the Federal government in a vacuum. The Federal government is wholly dependent on the commitment and investment of the owners and deliverers of health care in the private sector and state and local governments. There is virtually no hope of achieving the necessary level of commitment, much less investment, without the process of planning, standards setting, and taxpayer investments to fulfill the requirements that emerge. The responsibility therefore falls to the taxpayers to provide for the common defense, with the Federal government as its agent.

Requirement #1: HHS must take responsibility for seeking out all owners of the health care infrastructure necessary for catastrophic incident response, assessing the need for investment and achieving on-going funding outside of periodic grant programs.

Refocusing the Core Terminology of Surge Capacity

The fact that there is not a common nomenclature and definition is vexing and indicative of a lack of planning. Kelen and McCarthy have pointed out that it is not excess capacity we seek, but rather a capability termed "surge response capability," as a function of available resources and resource demand.[2] The most attractive feature of this nomenclature is that no one, including the government or the private medical sector, can afford to pay for unused capacity, but nearly everyone should agree that the nation should possess the capability to respond to a surge in health care demand in the wake of a disaster.

Any doubt about the political will to have this capability is belied by the criticism over the alleged slowness and incompleteness of the medical response to Hurricane Katrina, in spite of the heroic work done by thousands of volunteers and private sector contributors in caring for

people whose tenuous infrastructure was wiped out. America usually gets what it pays for, and so for it hasn't paid for medical surge response capability. However, it is a better argument than advocating for "capacity" that will either go unused or be sucked up by everyday surge and overcrowding. From here on, "surge medical response capability" it is. (Even the acronym "SMRC" has a confident ring to it.)

There is considerable attention being paid to definitions around *levels* of surge capability. Some experts advocate the terms "daily surge" and "disaster surge."[3] Others use the capacity levels "conventional," "contingency," and "crisis" as subsets of overall surge capacity.[4] These definitions have operational significance and must be linked to planning and exercises in order to be meaningful. At some point, decisions will be made about definitions and operational triggers based on the merits, and the usage of the terms will be driven from the top down. Management of a disaster is no time for democracy. If you want to fly a commercial airliner anywhere in the world, you communicate with air traffic control in English. Medical personnel who want or need to participate in the management of a disaster without running into one another had better agree to use a common language. HHS needs to settle on a set of names and definitions and require it for every official document generated for medical surge response capability.

Conformity of nomenclature and terminology is not a foreign concept. If seasoned experts can agree on one issue, it is that the nomenclature of the National Incident Management System (NIMS) be adhered to for the sake of communications with a unified incident command. The December 2008 version of NIMS, written in readable English, explains the principles and language of disaster management.[5] Training courses are available on-line[6] and should be expanded to include training specifically for medical personnel. The Hospital Incident Command System (HICS) developed by the California Emergency Medical Services Authority provides NIMS-compliant incident command guidelines for hospitals,[7] but training and exercising must be expanded. Heath care professionals must understand the interdependencies that exist between medical response and other emergency support functions (e.g. mass care, housing, security, communications) in the National Response Framework.[8]

Requirement #2: HHS must prescribe common nomenclature and definitions for surge medical response capability and use those terms in its publications and the appropriate annexes to NIMS.

Requirement #3: DHS and HHS must create NIMS training specific for physicians, nurses and other hospital personnel and administration to support their integration into a unified incident command structure.

Planning and Exercises

Whether it is performance on the battlefield or in a disaster, "planning and preparation equals performance." The Department of Homeland Security, as part of its national preparedness program, uses 15 planning scenarios. Although even high-level, interagency strategic plans have yet to be released by DHS, certain of the scenarios have been studied to the point where estimates of population risk and exposure have been quantified. While the details of the canonical scenarios on which they are based is classified, the "population risk assessments" performed by DHS drive the requirements for countermeasure acquisition, procurement and stockpiling. Those numbers are not classified and provide a scale of what health care systems

should be thinking about when trying to understand their requirement for surge medical response capabilities.

To use the biological event scenarios as an example, a release of *Bacillus anthracis* spores using conventional agricultural technology in a densely populated city with 8 million people may result in exposure of over 2 million, approximately a quarter million of whom would contract pulmonary anthrax without post-exposure prophylaxis. For the *Yersinia pestis* scenario, it's a million people ill with pneumonic plague. For Botulinum toxin, the range is many thousands.

We have more direct experience with explosive devices on which to base planning scenarios. The March 11 bombings in Madrid sent 312 people to hospitals with the entire range of blast injuries.[9] The destination hospitals followed the usual historical pattern, in that people were taken to the closest hospital, not the "closest appropriate hospital" touted in trauma triage schemes.

All of this points out the importance of scenario-based planning and gaming out the requirements. Is a community hospital that is not a trauma center ready to take care of a large share of 312 people with diffuse orthopedic injuries, many of whom would have severe blood loss, be deafened and blinded, or have over-pressure injuries to the lung? A community or a particular hospital may make the decision NOT to prepare, but that decision should be a conscious one, made in concert with emergency planners and political leadership. As the Madrid and London experiences taught us, if your hospital is closest, the patients are coming whether you want them or not.

The Agency for Healthcare research and Quality has published a Hospital Surge Model that helps health care professionals and administrators use population risk scenarios to estimate the personnel and equipment requirements for two biological scenarios, as well as several chemical releases and radio-nuclear attacks.[10] The use of the model remains dependent on understanding the nature of the agent and the likely proportions of the local population that would be affected, which is not something usually known to hospital planners. Although it is a very useful planning tool to make requirements more granular, the Hospital Surge Model should be linked to other models developed by the Federal government to characterize biological events and validated for smaller population centers.

All personnel involved in medical response to disasters must have planning and exercising built into their job descriptions, and hospitals must do it as part of regular operations. As Burstein said, it is a myth that health professionals are smart enough to hear it once and be able to perform.[11] He also takes the position that it is indeed possible to achieve the necessary degree of preparedness. That is not easily accomplished, however, given the very few tools we have to accomplish training and exercising for these scenarios. The value of an annual or bi-annual tabletop exercise is questionable. Work is being done, however, by the national laboratories and some elements within DHS to create Web-based computer gaming for training and exercising. The health care community needs to be able to tailor such tools to their particular plans, assuming that such plans exist.

Every health care institution that expects to be a player in the surge medical response capability should have a designated Chief Preparedness Officer (CPO) who is not just the most junior administrator who drew the short straw to add to his or her "other duties as assigned." This

person should be driver of the planning, training, equipping and exercising that is necessary to deliver in times of emergency. The CPO should be the point of contact with law enforcement, emergency management, public health, and any other entity with a responsibility under the emergency response plan. The CPO should be fully funded and for large institutions be a full-time job.

Requirement #4: DHS must issue federal interagency strategic plans for those planning scenarios with high-volume medical consequences, specifically anthrax, plague, food-borne illness, explosive devices, and earthquakes.

Requirement #5: DHS and HHS must develop and distribute a template for operational planning for health care facilities around the scenarios with high-volume medical consequences, specifically anthrax, plague, food-borne illness, explosive devices, and earthquakes.

Requirement #6: DHS and HHS should fund a Web-based solution to training and exercising for health care professionals to acquire and maintain proficiency in implementation of surge medical response.

Standards

Just as there is no agreement on definitions and nomenclature, there is no standard for what constitutes an adequate state of preparedness in the health care sector. Even if standards did exist, compliance with the standards may be very difficult given the absence of or the distributed nature of the necessary capacity data, no mandated reporting requirements of capacity, and few real-time resource tracking tools. Health care system preparedness standards would also need to be individualized to different types of medical facilities, recognizing differences in the size and density of a hospital's catchment area, space capacity, and the differences in the threats to their locales (e.g. terrorist risk levels, geological faults, hurricane risks).

At a conference on "the science of surge" sponsored by the journal *Academic Emergency Medicine*, participants could reach consensus only on research and enabling tools that were lacking and certain quantitative metrics[12]. The participants did express concern for a one-size-fits-all approach to standards and metrics and noted that a surge capacity metric may have to be imposed on the system by a professional or governmental authority. The American College of Emergency Physicians has made a worthy attempt at defining best practices for hospital preparedness by producing an operational document with critical emergency department capabilities.[13] Yet, any specific best practices to ensure a surge capability are lacking.

Just because standards and metrics are elusive does not suggest that they are impossible to identify and achieve. Other CI/KR sectors are much further along in defining standards for certain capabilities, such as pipeline restoration, continuity of operations in the financial sector, and chemical security, the latter in order to comply with a recent set of federal regulations. The health care industry, physicians in particular, have traditionally been hesitant to embrace standards set by external bodies. One should not confuse the "standard of medical care," which is determined locally, with standards and metrics for system preparedness, which should be derived through an iterative, evidence-based process.

The disadvantages of a centralized set of standards and metrics can be mitigated. Rather than apply the same quantifiable standards to every health care entity, preparedness standards can be derived using modeling for determining the requirements for quantifiable metrics, making the standard, in fact, a mathematical function rather than a linear relationship based on any single attribute. Both DHS and HHS support robust modeling entities that are used to predict various planning elements, including disease prevalence, effects of terrorist attacks on the infrastructure and the necessary resource requirements to mitigate those conditions. Any preparedness standard that is promulgated can include a template model for communities to use in determining their surge requirements and therefore the appropriate standard. Specific requirements must be based on the best possible evidence, as intuitive thinking from everyday experience often leads to mistaken assumptions.[14]

There are distinct advantages to having standards to which the health care sector should aspire. First and foremost, achieving appropriate standards increases the chances of actually being prepared when the time comes. There are system advantages as well. Planning aimed at achieving standards will drive more concrete requirements, which in turn leads to more exacting and efficient use of funding. Health care systems can better compete with other sectors for homeland security grant funding when specific requirements are known. The HHS Hospital Preparedness Program would finally have targets to meet, rather than the more random spending that has occurred thus far. The Metropolitan Medical Response System, funded by DHS, would also have specific community-specific benchmarks to achieve in cross-sector collaboration. It also enables a much easier sell to congressional appropriators who need assurance that the taxpayers' expenditures are achieving results.

Finally, there is public law that can indirectly confer liability protection to entities that meet certain standards. Title IX of the "9/11 Act" of 2007 provides for a mechanism for standards setting, certification and accreditation for private sector critical infrastructure owners.[15] Once there is a DHS-recognized standard developed for the industry, plaintiffs would bear the burden to show that the standard itself is inadequate, and if unable to do so, the defense simply needs to show that it met industry standards, evidenced in the certification or accreditation. Although this has not yet been applied to capabilities standards or to health care systems, the provision exists and should be employed. This would be very important for institutions that would incur liability for an inability to provide care for vast numbers of patients in a disaster, even if they had made significant provision for surge management. Congress has thereby determined that the doctrine of reasonableness applies to infrastructure owners who may not be able to fulfill their normal duties in the face of unreasonable demand. It is through the standards process that the owners access that protection.

Requirement #7: DHS and HHS, as the sector-specific lead agency for the Health Care Sector, must implement a process to achieve voluntary preparedness standards for health care institutions in accordance with Title IX of the 9/11 Act (2007).

Costs and payment

Improving the status quo in medical preparedness, including provision for reasonable surge medical response capability will require significant investment. Who is responsible for that investment? As discussed above, creating this capability is providing for the common defense, an inherent responsibility of the Federal government. What would constitute a sufficient incentive

to the owners of the health care critical infrastructure to invest in preparedness? Clearly, the owners will perform a cost/benefit analysis to drive those investment decisions, and absent real, sizable incentives, the tendency to roll the dice that "it won't happen here" or "we'll just make do" will overwhelm the desire to be prepared.

Using the number of 4,900 hospitals with emergency services, what level of grant funding would be necessary to achieve a state of medical readiness for all the possible scenarios? Even if the average initial investment is a modest $1 million, it would exceed the entire homeland security grant funding (approximately $4 billion) and the HHS Hospital Preparedness Program (about $400 million). Clearly, the Federal government cannot grant its way to success.

Since this is an inherent responsibility of the Federal government, funding the requirements that arise from scenario-based planning and the setting of standards must have a source outside of the grant programs. The Federal government could simply say that meeting standards is a requirement and attempt to pass on the added costs to the customers of the health care system. However, with its other hand, the Federal government has squeezed the opportunity to cost shift out of its reimbursement policies. According to the GAO report, approximately 40% of the 119 million annual emergency department visits (in 2006) were paid for by federally-supported programs. Hence, the Federal government owns the responsibility for deciding that is or is not going to fund medical preparedness, including surge medical response capabilities. Abrogating that responsibility and dumping it onto providers who cannot cost-shift is not an option.

Pushing the responsibility down to taxpayers at the community level is another option, but in the end, the taxpayers in the highest risk urban areas will bear the brunt of the cost, which leads back to the argument about the common defense. Moreover, mounting a defense against the consequences of terrorist attacks is the responsibility of the entire nation, not only those in communities at highest risk. No community is immune, no matter how removed or bucolic, as the citizens of Shanksville, PA, would attest.

If the Federal government is to fund the investments in surge medical response, how can it ensure that its investments are well-spent and will, in fact, result in a better state of preparedness? The answer to this lies in the specificity of the requirements that come out of the planning process or that are necessary to meet national standards. But if grants are not the answer, then where will the money come from?

In 2006, the Center for Medicare and Medicaid Services was posed the following question by DHS: Would CMS consider certification and accreditation of a hospital to standards of preparedness as an indicator of quality of care? If so, CMS could enhance those institutions' reimbursement formulas by an amount necessary to incentivize such an investment. CMS has not answered the question, presumably because of the multiple policy implications of its answer. For example:

- Is additional investment necessary to raise the level of hospital preparedness? If so, where would the money come from under the current mandate to cut costs?
- Is it the Federal government's responsibility, or the providers?
- Would Medicare or Medicaid beneficiaries directly benefit from a hospital's improved state of readiness? Put another way, could there be hospitals providing better service to

CMS beneficiaries at a less prepared hospital than they receive at one that meets standards for surge medical response?

In any case, some existing mechanism for ongoing investment must be found to accomplish this goal. It can't be cost-shifted onto the customers of the system, grants will not be adequate unless billions more are appropriated, and local governments may not be able to afford to supplement their heath care institutions to that degree to counter what, in the case of terrorism, is an attack on our nation.

Requirement #8: The Secretaries of HHS and DHS must issue a requirement for the Federal government to invest in achieving an adequate standard of surge medical response capability, and the Administration must propose the necessary funding mechanisms as part of the President's next budget.

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