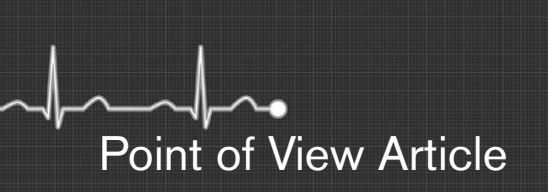

Critical Care Medicine in the United States: Addressing the Intensivist Shortage and Image of the Specialty*

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Intensivists are increasingly needed to care for the critically ill and manage ICUs as ICU beds, utilization, acuity of illness, complexity of care and costs continue to rise. However, there is a nationwide shortage of intensivists that has occurred despite years of well publicized warnings of an impending workforce crisis from specialty societies and the federal government. The magnitude of the intensivist shortfall, however, is difficult to determine because there are many perspectives of optimal ICU administration, patient coverage and intensivist availability and a lack of national data on intensivist practices. Nevertheless, the intensivist shortfall is quite real as evidenced by the alternative solutions that hospitals are deploying to provide care for their critically ill patients. In the midst of these manpower struggles, the critical care environment is dynamically changing and becoming more stressful. Severe hospital bed availability and fiscal constraints are forcing ICUs to alter their approaches to triage, throughput and unit staffing. National and local organizations are mandating that hospitals comply with resource intensive and arguably unproven initiatives to monitor and improve patient safety and quality, and informatics systems. Lastly, there is an ongoing sense of professional dissatisfaction among intensivists and a lack of public awareness that critical care medicine is even a distinct specialty. This article offers proposals to increase the adult intensivist workforce through expansion and enhancements of internal medicine based critical care training programs, incentives for recent graduates to enter the critical care medicine field, suggestions for improvements in the critical care profession and workplace to encourage senior intensivists to remain in the field, proactive marketing of critical care, and expanded engagement by the critical care societies in the challenges facing intensivists. (*Crit Care Med* 2013; 41:2754–2761)

Key Words: critical care; intensive care unit; intensivist; medicine; physician; professional societies; shortfall; specialty education; staffing; workforce

The need for comprehensive and cutting-edge critical care medicine (CCM) continues to grow in the midst of a nationwide shortage of critical care physicians and ongoing increases in the number of critically ill patients and ICU beds and costs (1, 2). The intensivist shortage has occurred despite decade-long warnings of a workforce crisis from specialty societies and the federal government (3–10). Frustratingly, recommendations drafted to increase the number of intensivists, enhance the CCM field for new physicians and improve its cohesiveness, and engage and educate hospital administrators and the public to the benefits of CCM (11–16) were not implemented. In this article, we offer proposals to increase the adult intensivist workforce through expansion and enhancements of internal medicine based critical care training programs, incentives for recent CCM graduates to stay in the ICU, improvements

***See also p. 2827 and 2828.**

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in the CCM profession, workplace, and utilization of ICU beds, proactive marketing of critical care, and enhanced engagement by the CCM organizations in the challenges facing intensivists.

CRITICAL CARE LANDSCAPE AND ICU GOVERNANCE

Critical care is a major piece of the U.S. healthcare landscape. There are approximately 6,500 ICUs with 94,000 ICU beds in nearly 5,000 U.S. acute care hospitals (1, 2). The average ICU occupancy rates nationally range from 65% to 72% (1) with higher occupancy rates in larger hospitals (1, 17). Between 4 and 6 million patients are admitted to ICUs annually (18). More than half of these patients are older than 65 years and have multiple comorbidities. Additionally, ICU patients in general continue to have high acuity of illness and complexity of care (3, 4, 7, 19). ICU beds account for almost 15% of hospital beds while ICU costs represent 13% of hospital expenditures and approximately 1% (0.66%, $82B) of the U.S. gross domestic product (1). Roughly 60% of ICU beds are in general ICUs (mixed medical-surgical or medical-surgical-coronary) in nonteaching, community hospitals (1, 19); the remainder are primarily in the PICUs and neonatal ICUs (18%), coronary care units (13%), surgical and surgical subspecialty ICUs (8%), and burn ICUs (1%) of large academic medical centers (1, 19).

ICUs are well-defined areas with specialty staff and equipment that deliver advanced care to critically ill patients (4, 18). From their inception, ICUs have been organizationally situated under the hospital's nursing leadership and governance typical of an inpatient ward. In contrast, ICU physician administration, staffing, and patient care responsibilities are still in transition after over four decades of CCM practice. Few academic or community hospitals, even those with multiple ICUs, have enterprise-wide intensivist directed CCM management. Most ICUs reside in clinical departments working within parallel "silos" without uniformity of purpose especially in the large academic centers. Furthermore, fewer than half of all ICUs have a full-time medical director (18, 20) and less than one third of ICUs have intensivists at all. Hospitals, large or small, academic or community, continue to search for the optimal balance between intensivist and admitting physician involvement (open vs closed vs hybrid; low vs high intensity) in the triage and care of their ICU patients (11, 12, 14, 18, 19, 21). Similarly hospitals are navigating between daytime versus 24/7 shift work ICU coverage, hospital-based or third-party contracted intensivists, and full-time or part-time intensivist leadership (7, 15).

Nevertheless, changes are happening in this unsettled critical care environment that requires a unified intensivist response. ICUs are now mandated by national and state patient safety and quality improvement organizations and accrediting agencies to comply with a host of CCM safety and quality of care measures, some of questionable benefit (7). Insurers and regulators will no longer overlook failures to comply with basic infection prevention and patient care protocols; and infractions will be met with financial penalties (19, 22). Similarly, ICUs are being forced to optimize their approach to triage and throughput (23) and adjust ICU staffing to new care models (24, 25) in the setting of limited bed availability and intensivist manpower. Lastly, obsolete and dysfunctional ICU plants and technologies must be renovated or replaced (26).

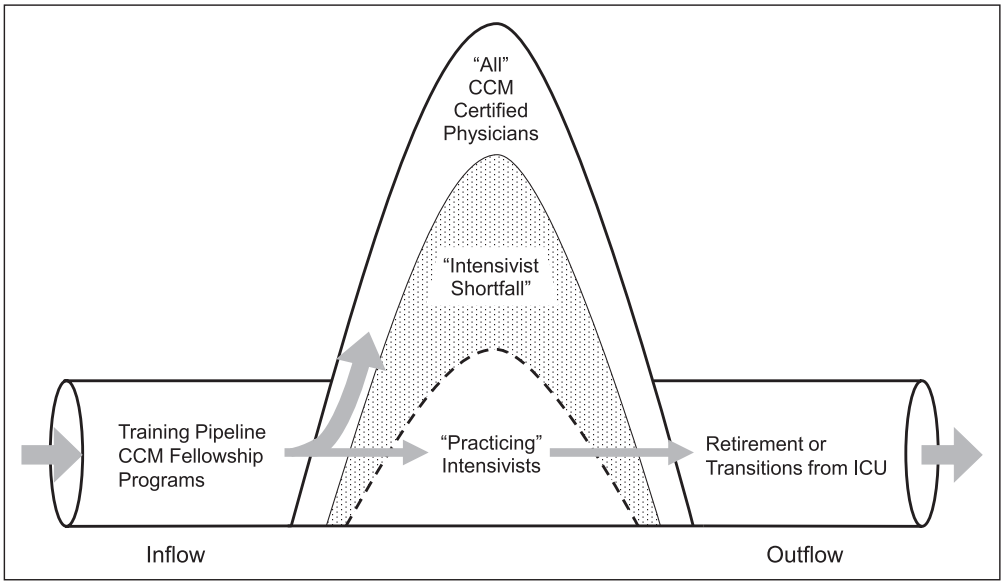

Figure 1. Critical care medicine (CCM) fellowship programs (internal medicine, surgery, anesthesiology, and neurology) train adult intensivists (Table 1). There are approximately 12,000 adult CCM-certified physicians. However, the number of certified CCM physicians and recent fellowship graduates who spend the predominant portion of their practice in critical care is not known (3, 4). Thus, the actual magnitude of the intensivist shortfall cannot be determined. Hospitals address the absence of intensivists with alternative ICU workforces (nurse practitioners and physician assistants, hospitalists, and other clinicians), telemedicine, and regionalization. An indeterminate number of senior intensivists leave the field each year either in retirement (early or appropriate) or through transitions to nonintensive care clinical roles or administrative positions.

CCM PHYSICIAN WORKFORCE AND PROFESSIONAL REPRESENTATION

In 2011, 11,806 U.S. physicians with adult CCM board certification were listed by the American Board of Medical Subspecialties (ABMS) (27). The majority (8,369, 71%) of these intensivists are internists (trained in pulmonary/critical care or medical critical care), followed by surgeons (2,048, 17%) and anesthesiologists (1,389, 12%) (27). There are also a limited number of emergency medicine (EM) physicians trained in critical care with CCM certification (28).

Although the number of CCM-certified clinicians appears large, there are major differences in the quantity of time and proportion of actual

ICU practice by these physicians; many spending limited time in the ICU. Thus, the paradox of a multitude of CCM-certified doctors and an intensivist shortfall in the ICU (**Fig. 1**). Internists trained exclusively in critical care (without pulmonary or nonpulmonary subspecialty training) spend greater than 46% of patient care hours in the ICU (3); in contrast, the remaining certified intensivists spend less time in the ICU because of their other clinical responsibilities outside the ICU. For example, pulmonary/critical care clinicians have to balance inpatient and outpatient pulmonary care along with critical care and sleep medicine. Similarly, CCM-certified surgeons and anesthesiologists divide their time between operating rooms, postanesthesia care units, outpatient clinics, and surgical ICUs of large academic medical centers (9, 10). Dual-trained EM-CCM physicians (28) split their time between the emergency department and the ICU. Furthermore, many accomplished intensivists who may have practiced well into their later years are leaving CCM in mid-career, retiring early or switching into non-ICU patient care, hospital administration, quality control, or private industry (3–8).

CCM FELLOWSHIP TRAINING AND CERTIFICATION

Four separate adult CCM training pathways (internal medicine [IM], EM, anesthesiology, and surgery) are approved by the Accreditation Council for Graduate Medical Education (ACGME). There is also a non-ACGME-accredited CCM pathway for neurocritical care. The largest number of adult CCM training programs are in the combined 3-year pulmonary and critical care medicine (PCCM) programs followed by surgery, anesthesiology, neurocritical care, and IM (29) (**Table 1**). The lack of a single unified training and certification pathway in CCM, the norm in other specialties (i.e., cardiology or thoracic surgery) and originally envisioned by the founders of the specialty (30), has led to intensivists with very different clinical experiences (7, 31), core competencies (32), employment opportunities, and compensation packages.

Based upon the current ICU practice patterns of CCM-certified clinicians (3, 4, 9, 10, 28), we feel that intensivists trained exclusively in medical critical care are best suited to fulfill the role of alleviating the intensivist shortfall in the community hospitals because this group has no competing non-ICU-based clinical obligations. However, the number of medical critical care fellowship programs remains the fewest of all the CCM training programs (Table 1). Beyond the funding issues (33), we want to highlight two particularly burdensome barriers to the expansion or creation of these programs. The first is the requirement that at least three of five ACGME-accredited IM subspecialty fellowship training programs be located at the primary clinical site (34). This rule limits the placement of medical CCM fellowships in community hospitals that do not have IM subspecialty fellowships but would otherwise be well suited to maintain a CCM training program based on patient load and faculty. The second is the exclusion of non-American Board of Internal Medicine (ABIM)-certified intensivists as key clinical faculty (34) even though they are already valuable educators and role models who provide the multidisciplinary CCM exposure so needed by medical CCM fellows (31, 35–37).

CCM PHYSICIAN SHORTAGES

Detailed analyses from the CCM societies (3, 5–7), clinicians (8), and the federal government (4) predicted the current shortage of intensivists. However, the magnitude of the intensivist shortfall is difficult to ascertain because there are not only many perspectives of "optimal" ICU administration, patient coverage and intensivist availability, but there is also a lack of national data on the ICU work patterns of CCM-certified clinicians (7, 14, 16) (Fig. 1). Concomitantly, only a minority of corrective solutions put forth by the CCM societies (3, 5–7), incentives introduced by private industry (http://leapfroggroup.org), and proposed federal legislation (38, 39) were enacted or particularly useful (25) (**Fig. 2**). Additionally, the intensivist shortfall must be viewed within the greater contexts of a nationwide physician shortage (40, 41) and

TABLE 1. Adult Critical Care Medicine Fellowship Programs: Estimates of 2012 Graduates

			Graduating Fellows
Types of Training Programs	Years of Training	Number of Programs (%)	Number (%)
Pulmonary/critical care	3	137 (38)	455 (50)
Internal medicine-critical care	1 or 2	34 (10)	120[a] (13)
Surgery-critical care	1	102 (28)	180[b] (20)
Anesthesiology-critical care	1	48 (13)	100[b] (12)
Neurology-critical care	2	40 (11)	45[c] (5)
Total		361	900

[a]Internal medicine-critical care fellows over 2 yr (2010–2012) totaled approximately 200 (Yr 1–120 and Yr 2–80). We estimated 40 of the graduating fellows from 2-yr CCM programs were completing 1 yr of CCM fellowship after 2-yr pulmonary or nonpulmonary subspecialty fellowships. This value (40) was added to the 80 graduates of the 2-yr fellowship to obtain 120 graduating fellows.

[b]An indeterminate number of nonsurgeons and nonanesthesiologists (e.g., emergency medicine) train in these programs.

[c]Neurocritical care fellows over 2 yr (2010–2012) include 90 positions; our estimate for 2012 was 45 graduates.

Data from http://www.acgme.org/acgmeweb/Portals/0/PFAssets/PublicationsBooks/2011-2012_ACGME_DATABOOK_DOCUMENT_Final.pdf and http://www.ucns.org.

Figure 2. Historical timeline since 2000 of various initiatives by the federal government, critical care medicine (CCM) societies (Society of Critical Care Medicine, American College of Chest Physicians and American Thoracic Society), a consensus conferences and corporate America to address the CCM workforce shortfall and enhance the CCM specialty. The Patient-Focused Critical Care Enhancement Act was brought to both Houses of Congress in 2007 and 2009 and was not passed at either session. HRSA = Health Resources and Services Administration.

the as yet unknown implications of the federal and state-based implementations of the arcane Affordable Care Act (22) on CCM as millions of uninsured are potentially added to the insurance rolls.

The absence of a nationally coordinated CCM strategy that officially addresses the intensivist shortfall has led primary medical specialties and subspecialties and various CCM societies to implement or propose their own initiatives. EM trainees are now permitted to train in medical critical care programs (42); recently surgical and anesthesia programs have similarly begun offering formal EM-CCM tracks (**Table 2**). Neurologists have established their own 2-year neurocritical care training track (43) and the Society of Hospital Medicine and Society of Critical Care Medicine (SCCM) have recently proposed a 1-year expedited training pathway for "experienced" hospitalists to achieve CCM certification through the ABIM (44). Cardiologists, acute care surgeons, and cardiothoracic surgeons are also formulating strategies to implement critical care training pathways within their respective disciplines (45–48).

HOSPITAL APPROACHES TO ICU COVERAGE

Hospitals are on the "front line" as they navigate ICU coverage in the setting of the intensivist shortfall. Teaching hospitals, traditionally dependent on resident coverage of their ICUs, are further limited by the mandatory compliance with ACGME duty hour restrictions (49, 50). In lieu of intensivists, hospitals, especially in the community, have historically granted ICU privileges to staff physicians even without CCM certification. Hospitals are now providing hands-on ICU care through their hospitalists, nurse practitioners (NPs), and physician assistants (PAs) who already play an expansive role in non-ICU inpatient care (24, 51–53). Hospitals are also contracting with telemedicine vendors to provide critical care from remote locations (54–56), regionalizing CCM services through affiliation agreements with major medical centers (57, 58) and obtaining grant support from the Centers for Medicare and Medicaid Services to fund non-intensivist CCM workforce and informatics programs (59).

These intensivist "alternatives" are all quite challenging and costly to introduce and ultimately depend on the presence of intensivists for successful implementation (51). NPs, PAs, and hospitalists have minimal, if any, formal acute care or CCM training; therefore intensivists must be involved in their education and possibly their ongoing supervision (51). Additionally, hospitals may not receive a good return on their NP and PA CCM investments as retention of these advanced practitioners has been problematic (51). Telemedicine, an evolving venture, still requires intensivists to operate the eICU bunkers and supervise the contracted hospitals' local bedside staff members who have nominal CCM expertise (55, 56). Regionalization requires sophisticated triage and interhospital transport systems in combination with appropriate intensivist staffing and ICU resources at the destination hospitals (57, 58). Hospitals will struggle to address these elusive issues on their own unless the CCM societies offer updated or new national guidelines for ICU triage (60), tiered care (7, 25), CCM practitioner workload (61, 62), telemedicine, and regionalization.

CHALLENGES WITHIN AND OUTSIDE THE ICU

The ICU is a highly stressful milieu (61–64) especially in regard to family interactions and end-of-life discussions, daily facets of CCM practice. These experiences are exacerbated by the dynamic political nature of the ICU that includes occasional conflicts in triage and management decisions with non-CCM clinicians. Concomitantly, hospitals have also delegated new and time-consuming responsibilities, to CCM teams, often without increasing their resources (65). These include managing critical care "without walls," providing 24/7 rapid response and palliative care services, training new NPs and PAs, administering advanced cardiac life support courses, supervising step-down, intermediate, and ventilator-dependent units, and participating in regional collaborative projects.

COMPENSATION AND REIMBURSEMENT FOR CRITICAL CARE

The mismatch between a heavy work schedule, quality of lifestyle, and compensation renders the CCM field unattractive to trainees and practicing intensivists (63, 64, 66, 67). Reimbursement for professional services for hospital-based intensivists

TABLE 2. Proposals to Address the Intensivist Shortfall and Image of the CCM Specialty

CCM database
• Create one national CCM fellow database that tracks fellows into the ICU workplace
Expand the pipeline and enhance the training of medical intensivists
• Lift restrictive Accreditation Council on Graduate Medical Education mandates on IM-based CCM programs
• Community hospitals should financially support hospitalists with CCM interests to train in existing CCM programs and assure them intensivist jobs after training
• Publicize the "CCM only" track within Pulmonary/Critical Care programs
• Broaden perioperative critical care training of IM-based CCM fellows
• Create an inpatient-dedicated track in 3-yr IM residency programs with extensive ICU exposure and procedural experiences to prepare these IM trainees for CCM fellowships
Shifting CCM-certified physicians in the ICU
• Government to incentivize recent CCM graduates to work in underserved ICU areas
• Hospitals to incentivize CCM-certified specialists to increase their time in ICU
Enhance the CCM specialty
• Improve professional environment
• Proactively refine and market the CCM-intensivist brand
• Early exposure of medical students to CCM
Better utilization of ICU beds
• Public and physician education on appropriate use of ICU beds, advanced care directives, and shifting goals of care from cure to comfort when further aggressive ICU care is futile

CCM = critical care medicine, IM = internal medicine.

may include various combinations of salary support from hospital administration, hospital departments, and physician billing. Intensivists employed through contracted groups are commonly paid directly from the employer. Regardless of the payment model, compensation usually includes a mix of base and incentive or productivity pay. However, restrictive CCM coding rules (68) and a possible lack of hospital or group awareness of the many nuances of CCM billing (i.e., competitive billing between intensivists and NPs or PAs or duplicative uses of CCM billing codes per day) may limit CCM physician reimbursement and hurt staffing and retention. Significant discrepancies in pay (69) between CCM training backgrounds (anesthesiologist vs internist) and ICU types (surgical ICU vs medical ICU) also interferes with recruitment of intensivists to the lower paying ICUs.

PROPOSALS TO ADDRESS THE INTENSIVIST SHORTFALL AND CCM SPECIALTY

We present the following proposals as potential and actionable solutions to the intensivist "supply" and specialty image problems that we have outlined (Table 2).

CCM Database

In order to determine what the newly graduating CCM fellows are doing posttraining, we need to develop one longitudinal universal database that captures trainee information from CCM fellowship programs, hospitals, and ACGME postgraduate data (29). This dataset must include the number and background training of graduating fellows, the percentage that actually enters the CCM workforce, and the types of ICUs and hospitals they choose to work in (8). Data on ICU coverage systems, personnel, and shortages should also be collected through the well-established American Hospital Association annual survey that has already begun engaging in CCM data acquisition (70).

Expand the Pipeline and Enhance the Training of Medical Intensivists

We advocate five approaches to enlarging the pipeline of trainees focusing on medical critical care programs. First, the ACGME restrictions on subspecialty fellowships and key faculty should be relaxed to permit the expansion of existing programs and the creation of new programs; concomitantly, any additional CCM training spots must be funded. Second, community hospitals should encourage and financially support their hospitalists with already demonstrated CCM interests to train in existing CCM fellowship programs (71, 72) and assure them intensivist jobs thereafter. Third, the rarely used, but ACGME approved, "CCM only" track within current pulmonary/critical care programs (42) should be publicized and marketed to medical residents or prospective PCCM

fellows who wish to pursue CCM, but not pulmonary medicine. Fourth, we recommend a broadening of the perioperative critical care training of IM-based CCM fellows in order to assure their competency in caring for the complex surgical patients seen in community-based medical-surgical ICUs (29). Finally, we suggest creation of an "inpatient-dedicated" track in 3-year IM residency programs to attract those trainees who are interested in becoming intensivists. This pathway would focus on inpatient care of both medical and surgical patients and include extensive and diverse ICU exposure and procedural experiences to optimally prepare these trainees for CCM fellowships and careers as medical-surgical intensivists.

Shifting CCM-Certified Physicians to the ICU

Beyond the time-consuming pipeline expansion, federal and local governments can more quickly increase the number of recent CCM graduates working in underserved CCM areas through financial incentives and immigration code adjustments (7) (Fig. 1). Hospitals can augment their ICU physician staffing by financially motivating their own CCM-certified clinicians to shift a portion of their practices from non-ICU care to the ICU (Fig. 1). An opportunity to achieve this goal may be available through the recent rise in the hospital-based (73) acquisition of medical practices, especially pulmonary/critical care physician groups that have the largest number of CCM-certified clinicians. Although this approach may stress the pulmonary workforce, the transition of PCCM practitioners to full-time CCM, especially now with the availability of ICU shift work, may extend the work life of those clinicians dissatisfied with working in both the outpatient and inpatient environments (74).

Enhance the CCM Specialty

The suggestions to increase and maintain the intensivist workforce will only be effective if the work balance, lifestyle, work satisfaction, and compensation deficiencies endemic in the CCM field are corrected (6, 7, 62–64, 66, 67). Ultimately, the CCM specialty intensivist "brand" (75) must be refined and aggressively marketed to medical students, resident trainees, hospital administrators, and the general public. The combination of substantial improvements in the specialty branding and early, well-planned exposure to critical care may encourage medical students (76) and trainees (63, 77) to enter the field.

BETTER UTILIZATION OF ICU BEDS

Although we have focused upon increasing the supply of intensivists, it is equally important to recognize that the intensivist shortfall will persist unless the United States comprehensively addresses the ongoing increases in ICU bed numbers (1) that are already out of proportion to other advanced countries (78) and the inappropriate use of ICU beds at the end of life (79). This will require tremendous political will and public and physician education on the appropriate use of ICU beds, advanced care directives (80), and knowing when to shift goals from aggressive ICU care to palliation (81).

MOVING FORWARD

We strongly urge that the Critical Care Societies Collaborative (SCCM, American College of Chest Physicians, American Thoracic Society, and the American Association of Critical Care Nurses) be funded and politically enabled to address all aspects of the critical care physician workforce shortage. Concomitantly, a full-time CCM physician representative should be appointed to the Residency Review Committee of the ACGME to provide additional input and balance to the updating of critical care training requirements. An alliance between fellowship program directors and the ICU directors of community hospitals should also be formed to assess if the needs of their ICUs are being actually met by fellowship programs. This group would augment the efforts of the already existing Association of Pulmonary and Critical Care Medicine Program Directors (http://apccmpd.org).

At times, however, difficult long-term problems cannot be solved within the current organizational constructs (7); thus a new national CCM physician society primarily focused on advancing intensivist training, leadership, and advocacy may need to be created. Already, in New York City where the authors practice, a local CCM network (http://www.gnyha.org) was developed over the last decade that combines academic and community hospitals and intensivists to address the issues we highlight herein (82).

CONCLUSIONS

The United States needs a cohesive CCM specialty that is attractive to physicians and recognized for its value to hospitals and the public. We hope that our proposals will be successful in uplifting our profession. In the end, this is not really about CCM itself, but the delivery of excellent care for the critically ill patients in all of our hospitals.

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