Critical Care Organizations: Building and Integrating Academic Programs

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Abstract

Objective—Academic medical centers (AMCs) in North America are expanding their missions from the traditional triad of patient care, research, and education to include the broader issue of healthcare delivery improvement. In recent years, integrated Critical Care Organizations (CCOs) have developed within academic centers to better meet the challenges of this broadening mission. The goal of this article is to provide interested administrators and intensivists with the proper resources, lines of communication, and organizational approach to accomplish integration and CCO formation effectively.

Participants—The Society of Critical Care Medicine convened a taskforce entitled "Academic Leaders in Critical Care Medicine" on February 22, 2016 at the 45th Critical Care Congress using the expertise of successful leaders of advanced governance CCOs in North America to develop a toolkit for advancing CCOs. The Academic CCO Building section workgroup of the taskforce established regular monthly conference calls over the past year to reach consensus on the development of a toolkit utilizing methods proven to advance the development of their own academic CCOs.

Data Sources and Synthesis—Relevant medical literature was reviewed by literature search. Materials from federal agencies and other national organizations were accessed through the internet. Key elements of an academic CCO are outlined. The vital missions of multidisciplinary patient care, safety, and quality are linked to the research, education, and professional development missions that enhance the value of such organizations. Core features, benefits, barriers, and recommendations for integration of academic programs within CCOs are described. Selected readings and resources to successfully implement the recommendations are provided. Communication with medical school and hospital leadership is discussed.

Conclusions—We present the rationale for critical care programs to transition to integrated CCOs within academic medical centers and provide recommendations and resources to facilitate this transition and foster CCO effectiveness and future success.

Keywords

Introduction

Academic medical centers (AMCs) in North America are facing the need to evolve in response to a health care market that demands greater efficiency, lower cost, and more accountability (1). While each AMC will evolve differently depending on local conditions

and preferences, streamlined "corporate-style" structures are poised to replace traditional administrative organizations through greater horizontal and vertical integration (1, 2). As a vital part of clinical operations, Critical Care Medicine (CCM) services are subject to the same market forces and evolutionary demands. Several AMCs have already chosen to integrate these services into larger Critical Care Organizations (CCOs) (3). This integration was most often initiated by hospital administration (3), and resulted in improvement of a variety of metrics including quality of care, patient satisfaction, resource use, support of hospital leadership, and in some cases hospital cost of care (4).

In the first article of this "how-to" series regarding CCO development, Leung et al presented the rationale for integration of the business and operations aspects of Critical Care and provided a roadmap for horizontal and vertical integration (4). The integrated multidisciplinary patient care, safety, and quality programs that are characteristic of CCOs may add value to the care of critically ill patients by focusing on improving outcomes and lowering cost (4,5). While these programs are central to healthcare delivery in the intensive care unit (ICU), the additional academic missions of research, education, and professional development programs may contribute to this value through dissemination of knowledge and support of discovery and innovation. These academic missions, however, are expensive to maintain, often requiring significant subsidization from revenue generated from clinical care (1). Integration of academic programs may lower costs by maximizing resource utilization, improve efficiency by reducing duplication of efforts, and result in better academic products through enhanced collaboration. We now continue the CCO development discussion by presenting concepts of academic program integration within CCOs as well as specific benefits, barriers, and recommendations pertaining to such integration.

Perceptions of Academic Program Integration

Data from a recent survey of 24 CCOs in North America by Leung et al (4) supports integration and CCO development. All CCOs reported improvements in quality of care, patient satisfaction, resource utilization, and support from hospital leadership following integration; and a majority of respondents reported improved hospital cost of care (3, 4). Notably, the impetus to transition to an integrated CCO is not limited to the CCM programs themselves. A recent description of 24 integrated CCOs in North America demonstrated that almost half (46%) of such transitions were initiated by hospital administration (3). This kind of data is lacking for integration of academic programs within CCOs; however, there is empiric data and expert opinion that falls on both sides of the issue (1, 6–8). Perhaps the biggest argument supporting integration is economy of scale. Horizontal integration provides flexibility and reliability benefits resulting from consolidation of resources, and improved accountability for academic endeavors similar to the improved accountability of single governance seen from the business and operations standpoint (3, 4). Additionally, integration often results in placing different disciplines in closer administrative and physical proximity, encouraging communication and academic collaboration in some instances (6). Anecdotal evidence demonstrates improved research and education efforts (8), and this broader collaboration is thought to be key to improving CCM research (9). Finally, proponents point to the potential for integration to control costs through greater efficiency (6).

Arguments opposing integration include the potential loss of individual program autonomy and visibility to the larger CCO. Attempts at integration in the absence of collaboration amongst CCO members may result in failure, with academic program directors possibly feeling that the loss of such autonomy forces them to accept decisions that are not in the best interest of their own program. Integration is complex and requires strong leadership within the institution to convince key stakeholders such as the medical school Dean and department chairs to undergo organizational change. Many department chairs and division chiefs will resist transferring traditional authority and autonomy of clinical and academic programs to the CCO leadership (7), and power struggles are likely to ensue as different departments attempt to lay claim to as much authority within the CCO as possible. Recruitment and retention of faculty may also be affected for those who are more comfortable with the traditional academic structure and have concerns about their own academic advancement within an integrated system (7), though there is some evidence that recruitment and retention are improved through integration (4). The financial benefit of integrating academic programs has limited data and is still unclear (7). Without such clear benefit, traditional academic silos will be more difficult to bridge. Some circumstances even discourage integration, such as a lack of a unified Critical Care specialty board examination, salary disparities between departments that would contribute to a CCO, or the adoption of different residency review committee (RRC) requirements for different CCM training programs (10–14).

All of these perceptions and the weight given to them by AMC and Critical Care leadership will determine whether a given institution is more or less enthusiastic about evolving Critical Care academic programs from their traditional structure. Strong and willing leadership will indeed be required (15); however the possibility of developing more efficient, reliable, and accountable academic programs and the possibility of reducing the number of clinical dollars needed to support these programs will prove compelling. New CCOs may first integrate clinical and business operations in response to current market conditions (4); however the individual divisions and departments contributing to the CCO are likely to also want to support their academic interests at lower cost. Administrative and physical proximity as well as the potential of better productivity through improved collaboration will also encourage academic integration.

Once integrated, the academic programs within the CCO must demonstrate enthusiasm for aligning goals and collaborating with other departments. Failure to do so will undermine the ability of CCOs to affect institutional improvement and improve patient care, resulting in decreased empowerment, effectiveness, and academic prestige. As the concerns of loss of autonomy, influence, and academic advancement are addressed with forethought and care, a stronger and more sustainable CCO will emerge. Integration will not follow a single pathway, but instead be based on local conditions and priorities. While the most common organizational models of current CCOs are free standing Critical Care Departments (38%) and Critical Care Centers (21%) there are a number of other organizational arrangements that represent a wide variety of strengths, responsibilities, collaborations, and reporting relationships that may work better for a given institution (3, 16). Whatever the pathway of integration, we offer the following set of recommendations to help institutions with this important transition.

Initial Steps toward Academic Integration

Integration of academic programs may follow or be concurrent with the integration of business and clinical operations. It is unlikely that academic integration would precede business integration given the economic drivers of the latter (4). While the details of integrating academic programs may vary greatly between institutions, the initial steps of introspection, outreach, collaboration, and communication with medical school and hospital administration should be similar (Table 1).

Even after an integrated CCO has been developed, continued efforts are needed to maintain its efficacy. A CCO is most successful and overall health care delivery improved when its clinical, academic, and financial goals align with those of hospital and academic leadership, when lines of communication are maintained between CCO and institutional leadership, and when opportunities to collaborate with clinical departments outside the CCO are actively pursued. Finally, demonstrating milestones of achievement and relaying those milestones to key stakeholders is an important factor for CCO success, particularly during the initial development phase when momentum for change is fragile (17).

Key Elements of CCOs

The key academic elements of CCOs include patient care and safety, quality, research, education, and professional development. These elements are closely linked to one another and to value-based care (Figure 1). For AMCs that feature most if not all of these elements, the full potential to enhance value-based care cannot be realized without integration of a broad range of missions. Table 2 lists the key elements of academic CCOs, core features specific to each element, and general aims for integration. Common to all of these elements are the need for buy-in from hospital and medical school leadership, fiscal understanding and oversight, close communication between stakeholders, and collaborative efforts both within and outside the CCO.

Patient Care and Safety Program

The provision of safe patient care remains the most important mission of AMCs and is particularly focused on patient outcome and value (4). The association between improved patient outcomes and inter-professional collaboration has been well established (18–20). Patient care and safety programs within CCOs must establish a culture of collaboration for solving complex patient care delivery issues. This culture should include reporting, review, and open discussion of adverse events; patient safety education; and checklist development (21). Educational experiences, including high-fidelity simulation (21), may enhance safety knowledge and behavior of inter-professional healthcare teams.

In addition to interdisciplinary collaboration, CCOs should develop a patient care delivery structure that features an electronic medical record (EMR) system that aids decision making, reduces waste, optimizes security of personal information, and minimizes interoperability problems between different medical information systems. Practitioners must be able to efficiently report adverse events (21) and information should flow seamlessly between hospital departments, communicating with frontline clinicians as well as leadership. While

current generation EMR systems reduce medication errors through improved legibility (22) and improve adoption of proven therapies (23), future EMR generations may reduce delays in care and lower costs through clinical decision support (24–26). CCO leadership must advocate for those EMR features that will improve value. Digital Supplement 1 lists specific benefits, barriers, and recommendations for patient care and safety programs.

Finally, the alignment of patient care and safety program objectives with those of hospital leadership and other clinical departments within the institution is particularly important. Such broad collaboration enhances visibility of the CCO and strengthens its central position within the AMC as a necessary confederate for addressing hospital-based clinical issues. Failure to align goals and collaborate with other departments undermines the ability of CCOs to affect institutional improvement and results in decreased empowerment, effectiveness, and sustainability.

Quality Improvement Program

Quality Improvement (QI) programs are similar to patient safety programs with respect to their direct connection to value (Figure 1). Much has been written on how to create a highly functioning interdisciplinary QI program within an ICU (27–30). Digital Supplement 2 presents specific benefits, barriers, and recommendations for QI programs, particularly with respect to metrics, design and implementation, education, and information technology.

In the setting of an integrated CCO, QI projects must extend across ICUs as well as across professional disciplines and should be based on explicitly defined metrics. These metrics should be linked to specific QI program objectives and expected clinical outcomes based on hospital and CCO goals (5, 31). Information technology (IT) support must be leveraged in order to appropriately measure desired metrics (22). In addition to ICU-specific projects, metrics used for the CCO QI program may involve projects that extend outside the ICU (32). Critical Care QI programs should take the lead in developing both ICU-specific clinical protocols and protocols that partner with other departments to address issues that interface with Critical Care. If available, an integrated QI organization within the AMC may be leveraged to support specific projects, encourage multidisciplinary involvement, and assist with developing QI expertise through formal training programs. Growing partnerships between healthcare systems and industrial and systems engineering will further advance the efficiency and effectiveness of the design, education, and implementation of critical care QI programs in the future (33).

Research Program

Successful CCO research programs must pursue broad intramural and extramural collaboration and consolidation of both academic and administrative resources. The integration plan must seek to remedy barriers to research innovation and progress, including suboptimal collaboration among different healthcare professionals, an overly narrow focus on specific organ system research, and failure to use the expertise and insights of other non-medical disciplines (9). The goal of such an integrated research program is to improve overall research quality, productivity, and funding with relative cost savings resulting from resource consolidation. Specific deliverables include grant funding, promotion and national

visibility of faculty, and development of a research mentor pool to enhance the professional careers of early-career physician-scientists. Digital supplement 3 describes specific benefits, barriers, and recommendations for integrated research programs.

CCOs should strive to have a research program that obtains federal funding for a broad range of research in critical care, including basic science, clinical trials, and healthcare outcomes, to a degree that is commensurate with that of any other major department within its institution. While some CCOs may not be able to maintain basic and clinical research programs, outcomes and healthcare systems research is particularly vital to the function of the CCO as a central part of the quality improvement mission and the structure, process, and outcomes of patient care (9, 27). Institutions wishing to become designated centers for certain clinical populations (e.g. stroke center) may need a particular type of research program as part of the requirements of that designation (34, 35).

Research program priorities should be thematic and align with institutional priorities, ensure protected time for research faculty and trainees, and leverage an electronic data collection system to organize clinical information (36). These priorities should be maintained throughout integration. Well-developed programs should seek to establish a training grant to enhance their CCO. Training opportunities such as NIH funded T32 programs in the United States are important for creating a sustainable physician-scientist workforce in Critical Care and are another way to achieve integration of learners outside of didactic and clinical training. As integration of the research program proceeds, cost savings and improved operations resulting from consolidation of human resources (e.g. coordinators, statisticians, and grant support staff) may be quickly realized, however developing a shared identity as a Critical Care research team may take longer.

Education Program

Critical Care education represents an amalgam of learners from various medical and surgical training specialties as well as nursing, pharmacy, respiratory therapy, and other professional disciplines. As with other aspects of the CCO, the educational program must break down traditional training "silos" and seek to create a shared identity amongst trainees as part of the Critical Care team. This integrated approach helps create a versatile workforce in Critical Care where trainees acquire the strengths and employ the best practices of a wide range of professional backgrounds. It is essential that the multidisciplinary nature of Critical Care be reflected in both clinical and didactic aspects of the CCO's education program. Digital supplement 4 depicts the benefits, barriers, and recommendations for these and other core features.

Integration of CCO education programs center on the establishment of a culture of inter-professional training. Learners trained using an interprofessional education (IPE) approach are more likely to become collaborative and respectful team members who work towards improving patient outcomes (37). Trainees should share clinical rotations and didactic training. The clinical environment must support the notion that the different training backgrounds of Critical Care team members are equally vital to patient care and that differences in expertise should be considered a teaching opportunity. Didactic experiences may be integrated by selecting high yield topics from education consensus statements and

program requirements (10–13, 38) and then leveraging online learning management systems to deliver didactic material in a learner-controlled manner. Subsequent pairing of online content delivery with interactive in-class team experiences such as high-fidelity simulation may help learners to better retain and consolidate Critical Care knowledge (39) while reinforcing the IPE culture.

Professional Development Program

Professional development represents a long term process of academic maturation and is essential to sustaining a pool of local expertise that supports each mission of the CCO. In addition, there is a need to produce CCM leaders with the political and administrative skill sets required to lead CCOs into the future (3). CCO professional development programs must help faculty and CCM trainees identify and pursue a desired career pathway (40), find robust mentorship, and acquire an understanding of a broad range of professional skills that will enhance their leadership abilities.

Many CCM trainees perceive the support to help them achieve their career goals as inadequate (41, 42). CCOs must develop a structured way of helping its members cultivate a career pathway. AMCs have developed tracks for faculty advancement and promotion, and this strategy may also work for training programs (43–45). Additionally, a robust mentorship program using an interprofessional pool of mentors is needed. Such mentorship has been shown to enhance professional success and improve overall career satisfaction (46).

A third important aspect of professional development is helping members establish basic leadership and professional skills and a broad-based fund of knowledge of the other academic missions of the CCO, including teaching, business, work/life balance, and scholarly writing skills that CCM team members require (47, 48). A recent study featuring a seminar-style curriculum established topics needed for broad-based professional development and suggested that this type of curriculum may help develop professional skills that are durable over time (49). Digital supplement 5 shows the benefits, barriers, and specific recommendations for CCO professional development programs. In addition to the set of recommendations for the various key elements above, Digital supplement 6 provides a set of readings and resources that may be helpful to institutions considering this transition.

Conclusion

Integration of Critical Care services into a collaborative, horizontally structured organization is likely to include academic programs as well. These academic programs could possibly benefit from integration in several ways both economically and professionally and contribute to value-based patient care. The recommendations provided for patient safety, quality, research, education, and professional development programs will help to establish effective and sustainable academic CCOs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

APPENDIX

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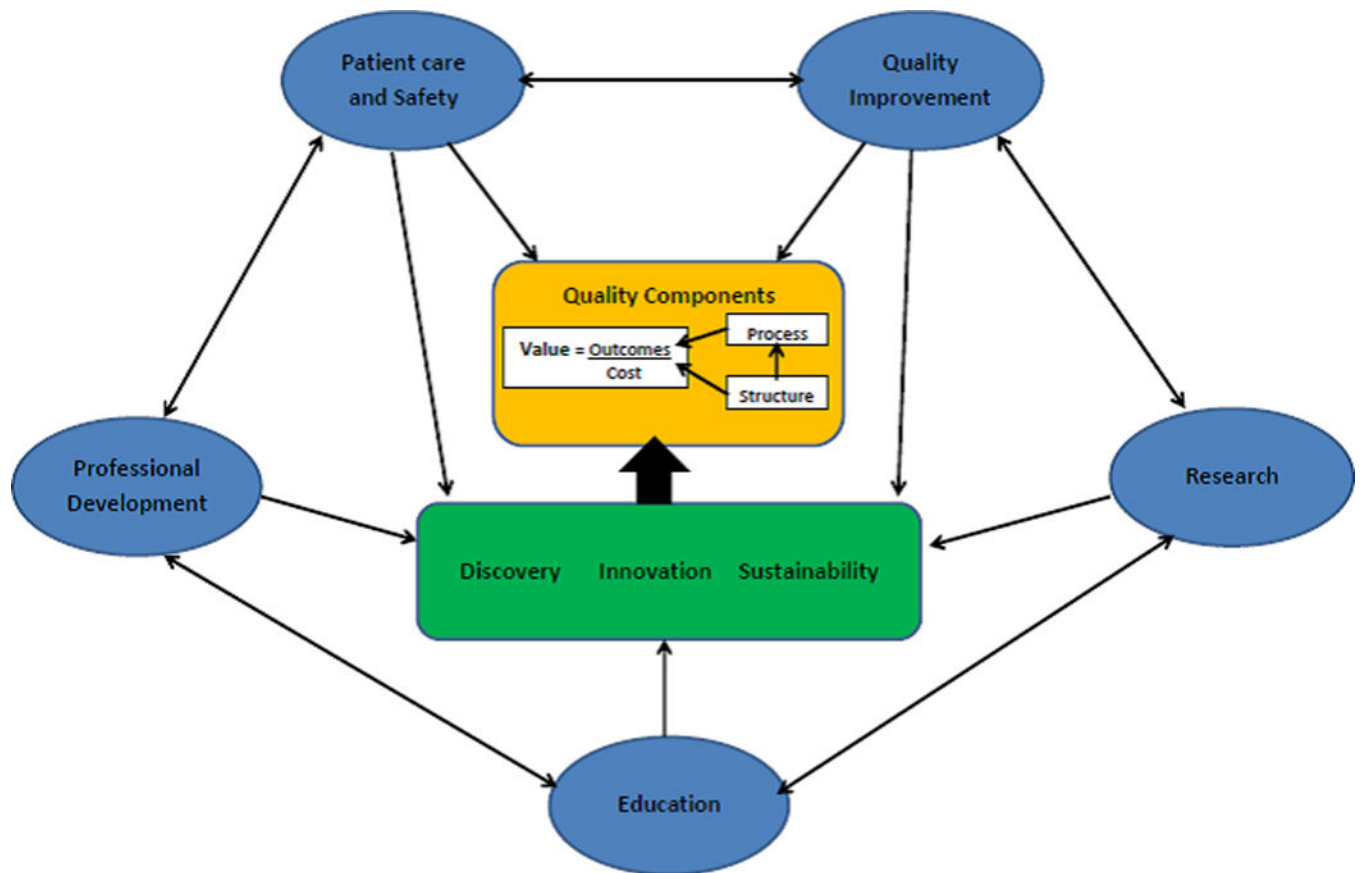
Figure 1. Relationship of Academic CCO Missions to Value-Based Care
Patient Safety and Quality programs directly add to the value of patient care by improving
outcomes and reducing cost. Other academic missions such as research, education, and
professional development also contribute to value through supporting the patient safety and
quality missions as well as contributing to discovery, innovation, and the sustainability of the
CCO. (Adapted with permission from Murphy DJ, Ogbu OC, Coopersmith CM. ICU
director data: using data to assess value, inform local change, and relate to the external
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Table 1

Initial steps of Integration

Steps	Recommendations
Introspection	• Identify all of the academic leaders amongst its contributing (or potentially contributing) departments and divisions. • Each of these leaders should evaluate their own academic programs from both budgetary and productivity standpoints. Performance of SWOT analyses for each program may be particularly helpful.
Outreach	• Each academic program evaluation should be shared amongst the group of academic leaders within the CCO. • Identify potential areas of collaboration. • Perform a local analysis of how integration of various programs may affect cost or productivity.
Collaboration	• A detailed plan of integration should be developed by the group of academic leaders. • The goal of this integration should be to create a shared identity as intensivists. It is important that this collaboration be done in good faith and ultimately create a relationship of trust between the members of the new CCO. • It will not always be possible to integrate all programs completely; however the academic leadership should work to find as many areas to integrate as possible.
Communication	• Identify key stakeholders who are primary decision makers from an approval, organizational, and funding standpoint (e.g. hospital president, Medical School Dean, Chief Medical Officer, Department Chairs, governmental funding agencies). • Stakeholders may be interested in different parts of the academic CCO. Medical school officials may be more interested in research and professional development of faculty, whereas hospital and government officials may be particularly concerned with patient care quality, efficiency, and overall cost. Close communication with this group regarding the plan and progress of integration is essential. • Patient care/quality and academic aspects, financial support structure, organizational leadership, and expectations regarding accountability should be presented together. Create a comprehensive plan and present it all at once. This will allow the group of stakeholders to evaluate the entire integration plan in context.

Table 2

Key Elements of Critical Care Organizations

Element	Core Features	General Goals for Integration
Patient Care and Safety	• Clinical Operations • Education and Event Review • Information Technology and the EMR	• Improve consistency of patient care across multiple ICUs • Facilitate and enhance multi-disciplinary solutions to complex clinical problems • Enhance the capability and synchrony of critical care faculty to provide institutional support during times of surge • Coordinate selection and implementation of innovation and technology applications in patient care
Quality Improvement	• Metrics • Design and Implementation • Education • Information Technology and the EMR	• Align specific metrics of the CCO quality improvement program with the institution program goals • Strengthen multidisciplinary contributions to refine and improve multiple ICU quality improvement programs • Leverage effective patient databases to serve all the institution's ICUs
Research	• Program Development, Leadership, and Administration • Productivity and Funding • Research Education	• Increase the number and quality of studies that will advance knowledge and improve the delivery of value-based Critical Care • Provide opportunities and professional recognition/advancement for staff that contribute to research endeavors • Include scholarly activity and research among topics for regularly scheduled staff conferences and discussions • Support efforts to fund research including efforts by professional societies that represent critical care professionals
Education	• Program Development, Leadership, and Administration • Clinical • Didactic • Innovation and Research	• Create a shared identity amongst Critical Care trainees of all disciplines as integral parts of the CCO team • Enhance Critical Care provider teamwork through interdisciplinary clinical and didactic training opportunities • Create an environment that fosters teaching innovations, discovery, and outreach to learner groups outside the CCO • Optimize educational methods to provide cost savings and potential revenue through collaborative efforts
Professional Development	• Broad-based Training • Development Tracks • Mentorship • Productivity	• Create a sustainable pool of interdisciplinary expertise pertaining to all aspects of Critical Care • Provide a structured pathway for promotion and other means of professional advancement • Identify and develop future leaders of CCOs and of Critical Care in general

Element	Core Features	General Goals for Integration
		• Improve job satisfaction, reduce turnover, and enhance overall academic productivity