SURGICAL CRITICAL CARE

ENTRUSTABLE PROFESSIONAL ACTIVITES

(SCC EPA)

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EVALUATION AND MANAGEMENT OF PATIENT WITH HEMORRHAGE

EVALUATION AND MANAGEMENT OF PATIENT AT THE END OF LIFE AND PROVISION OF PALLIATIVE CARE

EVALUATION AND MANAGEMENT OF PATIENT WITH SHOCK OR CARDIOVASCULAR FAILURE

EVALUATION AND MANAGEMENT OF PATIENT WITH HEPATIC DYSFUNCTION AND LIVER FAILURE

EVALUATION & MANAGEMENT OF A PATIENT WITH SEPSIS

EVALUATION AND MANAGEMENT OF PATIENT WITH RESPIRATORY FAILURE

EVALUATION AND MANAGEMENT OF NEUROLOGIC DYSFUNCTION/DELIRIUM/ENCEPHALOPATHY OR BRAIN INJURY

EVALUATION AND MANAGEMENT OF THE PATIENT WITH RENAL FAILURE

EVALUATION & MANAGEMENT OF NUTRITIONAL NEEDS OF THE CRITICALLY ILL PATIENT

EVALUATION AND MANAGEMENT OF THE CRITICALLY ILL CHILD

EVALUATION AND MANAGEMENT OF THE CRITICALLY ILL OLDER PATIENT

EVALUATION AND MANAGEMENT OF THE PATIENT WITH THERMAL INJURY

EVALUATION AND MANAGEMENT OF THE PATIENT REQUIRING ECLS

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Evaluation & Management of a Patient with Hemorrhage

Description of the Activity	Hemorrhage is a common problem encountered in critical care units. All surgical intensivists should be able to assess sources and severity of hemorrhage, resuscitate to optimize physiology, and identify interventions/involve consultants to control the source of hemorrhage as the condition warrants.
Functions	❖ Resuscitation ➢ Perform a comprehensive assessment to determine the severity of hemorrhagic shock and triage acuity. ➢ Use evidence-based resuscitation strategies, including the application of principles of balanced resuscitation. ➢ Identify the cause of hemorrhage, and initiate definitive management for hemorrhage control. ➢ Prioritize and interpret laboratory and imaging studies. ➢ Identify and mitigate coagulopathy. ➢ Uses hemostatic adjuncts. ➢ Reverse anticoagulation when applicable and indicated. ➢ Obtain vascular access. ➢ Use evidence-based principles for hemostatic control. ➢ Evaluate volume status. ❖ Ongoing Management ➢ Transition to goal-directed resuscitation. ➢ Identify and respond to the consequences of hemorrhagic shock. ➢ Identify and manage complications of transfusion. ➢ Identify and manage coagulopathy and reversal of anticoagulation. ➢ Optimize vascular access specificity. ➢ Adapt treatment plans based on the source of hemorrhage and underlying conditions. ➢ Incorporate potential resource use and limitations into resuscitation strategies. ➢ Consult with interventional services based on the identified source of hemorrhage when indicated. ➢ Determine the endpoints of resuscitation. ❖ Transition Of Care ➢ Communicate a diagnostic treatment plan to patients/caregivers. ➢ Lead an interdisciplinary team to ensure streamlined care and communication to patients/caregivers to include decision-making that addresses and considers patients' goals of care. ➢ Customize difficult news to patients/caregivers, setting realistic recovery expectations and facilitating goals-of-care discussions.

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	➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of subspecialty palliative care and ethics teams as needed. ➢ Identify when disease has become acutely life-limiting with no further disease-directed treatments, and lead the team in helping transition patients/caregivers to end-of-life care, prioritizing comfort and symptom-directed therapy as indicated. ➢ Recognize the need for and determine the timing of reinitiation of therapeutic anticoagulation when necessary. ➢ Systematically de-escalate care, and recognize when a patient no longer requires intensive care unit–level care. ➢ Lead the team in reflection on difficult patient care experiences, and employ coping strategies that maximize provider well-being and the health of the team.
Scope	❖ In scope ➢ Coagulopathy ➢ Gastrointestinal hemorrhage ➢ Hemorrhage in patients on anticoagulant or antiplatelet therapy ➢ Massive transfusion (ratios, products), including complications ➢ Obstetric hemorrhage ➢ Occult sources of hemorrhage ➢ Traumatic hemorrhage ➢ Use of diagnostic modalities for source determination and therapeutic intervention ➢ Use of laboratory testing to evaluate coagulopathy

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Evaluation & Management of a Patient with Hemorrhage

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Identifies the presence of hemorrhage and shock using objective clinical data with direction • Identifies basic physiologic changes in a bleeding patient • Develops a narrow differential and requires assistance to select diagnostic tools to evaluate the source of the hemorrhage • Prioritizes source control with assistance • Demonstrates understanding of the role of MTP and avoids crystalloid resuscitation when prompted • Demonstrates incomplete understanding of implementing blood product transfusion • Displays limited ability to interpret lab studies (eg, coagulation studies, viscoelastic testing) to direct blood product administration • Engages a consulting team with supervision • Identifies the urgency of consultation when communicating with a supervisor • Demonstrates limited ability to use POCUS and other technology to identify the source of hemorrhage and assess adequacy of resuscitation • Identifies indications for and complications of common ICU procedures, requiring	• Describes the impact of achieving hemostasis and source control • Initiates management for complications of hemorrhagic shock with ongoing assistance (eg, ACS, AKI, ARDS) • Identifies risk factors for and describes symptoms of transfusion-related complications (eg, transfusion reaction, TACO, TRALI) but requires ongoing assistance to manage them • Requires prompting for de-escalation of vascular access or removal of nonsterile lines • Demonstrates understanding of the relationship between the patient's baseline comorbidities and the development of hemorrhage and need for disease-specific treatment after resuscitation • Identifies initial endpoints of resuscitation • Passively participates in interdisciplinary communication, coordination of care, and conflict resolution • Acknowledges the need for reversal of anticoagulants but needs guidance to identify reversal agents	• Acknowledges basic risks and benefits of reinitiation of anticoagulation in a posthemorrhage setting • Demonstrates understanding that hemorrhagic shock can become acutely life-limiting • With assistance, identifies areas for improvement of resuscitation during debriefing • Respectfully communicates a report of events upon transfer but may omit essential information or require guidance to summarize priorities and active issues

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Level	Resuscitation	Ongoing Management	Transition of Care
	instruction to perform them (eg, arterial/central venous catheterization) • Demonstrates limited communication with other team members, including nursing staff, regarding the resuscitation plan		
2 **Direct Supervision** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Anticipates and prepares for physiologic derangements related to hemorrhage and shock with assistance • Describes likely physiologic derangements of the early stages of bleeding and hemorrhagic shock • Analyzes baseline comorbidities to streamline the differential; requires oversight of during the diagnostic workup • Prioritizes source control • Initiates MTP and prioritizes actions to control bleeding with assistance • Demonstrates understanding of priorities in ordering and administering specific blood products but requires guidance in complex patient • Interprets lab studies to direct blood product administration with supervision • Recognizes the need and urgency for consultation but needs prompting on optimal timing	• With prompting, recognizes the importance of source control for hemostasis and prioritizes interventions accordingly • Identifies organ-specific consequences of hemorrhagic shock for early intervention with supervision (eg, ACS, AKI, ARDS). • Verifies and treats transfusion-related complications with supervision (eg, TACO, TRALI, transfusion reaction) • Replaces emergent nonsterile lines but requires prompting to de-escalate vascular access • Incorporates baseline comorbidities into hemorrhage management and, with support, initiates disease-specific treatment • Uses endpoints of resuscitation to guide efforts but needs assistance in selection of patient-specific markers when considering comorbidities (eg, ESRD, cirrhosis) • Actively participates in interdisciplinary communication, coordination of care, and conflict resolution	• Weighs the risks and benefits of resumption of anticoagulation in a posthemorrhage setting with counsel from the attending • With guidance, identifies when hemorrhagic shock has become acutely life-limiting and additional interventions are unlikely to be beneficial • Initiates reflection on resuscitation efforts but seeks feedback to recognize opportunities for improvement • Respectfully communicates a report of events but needs assistance to anticipate barriers to transitioning the level of care

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Level	Resuscitation	Ongoing Management	Transition of Care
	• Identifies the acuity of a patient and formulates an initial plan while communicating with the supervisor • Requires supervision to use POCUS and other technology to identify the source of hemorrhage and assess adequacy of resuscitation • Performs ICU procedures for a straightforward patient but requires supervision for a complex patient • Communicates with other team members, including nursing staff, regarding the resuscitation plan but may require some prompting	• Reverses anticoagulants when indicated	
3 **<u>Indirect Supervision</u>** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in	• Independently identifies the presence of all stages of hemorrhage and shock and prepares for physiologic derangements • Identifies physiologic derangements of hemorrhagic shock and measures to mitigate them (eg, warming, correction of acidosis) • Rapidly narrows the hemorrhage differential and initiates an efficient diagnostic workup but may require assistance for a complex or multifocal source • Identifies the source of hemorrhage and prioritizes source control when multiple sources are present	• Independently recognizes the importance of source control for hemostasis and prioritizes interventions accordingly • Anticipates and intervenes early on the organ-specific consequences of hemorrhagic shock (eg, ACS, AKI, ARDS) • Discerns, differentiates, and treats transfusion-related complications but may need assistance with a complex presentation (eg, transfusion reaction, TACO, TRALI) • Promptly de-escalates vascular access when clinically indicated	• Reinitiates anticoagulation in a posthemorrhage setting after weighing risks and benefits and addressing nuances of comorbidities • Identifies when hemorrhagic shock has become acutely life-limiting but needs reassurance in a difficult scenario • Reflects on resuscitation efforts, identifying opportunities for future improvement • Critically reviews self and team decision-making after resuscitation to identify opportunities for improvement, including a situation appropriate for multidisciplinary review (eg, blood bank committee, ICU PI committee)

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Level	Resuscitation	Ongoing Management	Transition of Care
straightforward circumstances but may require input to manage the most complicated ICU patients.	• Initiates MTP and prioritizes hemorrhage control but may require oversight if resuscitation efforts become acutely life-limiting • Demonstrates understanding of priorities in ordering and administering specific blood products and use of MTP • Interprets lab studies to direct blood product administration in a straightforward patient (eg, without preexisting comorbidity) • Anticipates and engages consulting teams; may require intermittent assistance in a patient with complex or multifocal hemorrhage • Uses POCUS and other technology to identify the source of hemorrhage and adequacy of resuscitation with intermittent guidance • Performs independently and supervises others in routine vascular access and placement of invasive monitoring devices • Communicates with other team members, including nursing staff, regarding the resuscitation plan and solicits input and suggestions	• Incorporates baseline comorbidities into hemorrhage management and initiates disease-specific treatments • Incorporates knowledge of comorbidities and uses patient-specific markers as endpoints of resuscitation (eg, ESRD, cirrhosis) • Actively solicits interdisciplinary communication, coordination of care, and conflict resolution • Weighs the risks and benefits of anticoagulation reversal in a patient	• Respectfully communicates nuanced details of a patient's critical care course upon transfer and facilitates seamless transition of care
4 **Practice Ready** Independently manages complex critical illnesses and leads a critical care team	• Identifies physiologic derangements of hemorrhagic shock and measures to mitigate them (eg, warming, correction of acidosis) in a complex patient	• Incorporates resource use into a management plan with timely cessation of MTP to limit waste	• Evaluates risks and benefits and uses evidence-based guidelines to determine the timing for (re)initiating anticoagulation

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Level	Resuscitation	Ongoing Management	Transition of Care
Framework: Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Demonstrates understanding of priorities in ordering and administering specific blood products and use of MTP and initiates triage measures in a complex situation • Independently interprets lab studies to direct blood product administration in a complex patient (eg, underlying cirrhosis) • Triages and leads resuscitation efforts in coordination with consultants for source control • Uses advanced tools within POCUS to identify the source of hemorrhage and adequacy of resuscitation • Independently obtains difficult and emergent vascular access, facilitating advanced hemostasis adjuncts when indicated, and minimizes resultant complications • Sets the behavioral tone in a challenging situation, leading resuscitation with clear communication, constructive feedback, and conflict resolution • Communicates with other team members, including nursing staff, regarding the resuscitation plan, even in a complex and stressful situation	• Minimizes or mitigates consequences of severe shock in respect to baseline comorbidities and current physiology (eg, avoids nephrotoxic agents) • Delineates, anticipates, and manages complications of transfusion (eg, TACO, TRALI, transfusion reaction) • Critically evaluates ongoing resuscitation with timely de-escalation • Supervises interdisciplinary communication, coordination of care, and conflict resolution	• Leads the team in identifying when hemorrhage has become acutely life-limiting without further disease-directed treatments • Directs multidisciplinary debriefing after a complex case of hemorrhage, aiding resolution of interpersonal or emotional conflict and offering resources for coping • Critically reviews self and team decision-making after resuscitation to identify opportunities for improvement and a situation appropriate for multidisciplinary review (eg, blood bank committee, ICU PI) • Oversees seamless transition of care

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Evaluation & Management of a Patient at the End of Life and Provision of Palliative Care

Description of the Activity	All surgical intensivists should be able to identify patients who can benefit from the inclusion of palliative care principles in the overall care plan. Surgical intensivists should identify the goals of patient care in a shared decision-making model. When applicable, the intensivist should address pain, anxiety, and discomfort in a patient-centered manner. The intensivist should recognize the physiologic changes associated with the end of life. While surgical intensivists should provide primary palliative care, they should also recognize the need to involve specialized care teams, such as palliative medicine, the hospital ethics committee, and hospice care.
Functions	❖ Resuscitation ➢ Screen all patients for the need for palliative care, identifying those who would benefit from it. ➢ Share appropriate patient-centered clinical information with families. ➢ Provide culturally sensitive emotional support to patients and families. ➢ Identify patient surrogates based on local guidelines and regulations. ➢ Demonstrate understanding of and implement advance care planning, and address and implement code status (including perioperative). ➢ Coordinate conversations with the interprofessional team. ❖ Ongoing Management ➢ Describe surgical and nonsurgical management options to patients/caregivers, and outline the expected outcomes from these options. ➢ Identify interventions that will not alter overall patient-centered outcomes, and coordinate with other consultants and stakeholders. ➢ Counsel patients, and make recommendations that are consistent with outlined goals. ➢ Optimize symptom management, such as pain medications and anxiolytic strategies to address unmet needs or updated goals. ➢ Actively screen for and address physical and psychological stressors, and engage allied professionals for social and spiritual support as indicated. ➢ Evaluate the need for specialty palliative care consultation. ➢ Deliver clinical updates to patients/caregivers in a compassionate and patient-centered manner, considering medical literacy. ➢ Respect the autonomy of patients/caregivers to make decisions that are consistent with their cultural and personal practices. ➢ Recognize ethical conflict, and consult hospital support teams such as ethics or legal counsel or the patient relations team. ➢ Recognize medical futility, nonsurvivability, and acutely life-limiting conditions, and distinguish between them. ❖ Transition of Care ➢ Recognize limitations in knowledge about prognosis, engage consultants in the determination of prognosis, and demonstrate understanding of local laws and regulations surrounding end-of-life care. ➢ Delineate goals of care and plans for long-term care facilities or home-based care (home hospice). ➢ Recognize the need for long-term symptom management strategies. ➢ Recognize the anticipated level of future dependence and care requirements in the best- and worst-case scenarios. ➢ Recognize and plan for ongoing feeding, respiratory access, and durable medical equipment.

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	➢ Make recommendations that are aligned with achievable goals, delineate unachievable goals when appropriate, and coordinate recommendations with stakeholders on the treatment team. ➢ Integrate patient values and wishes in the recommended care plan.
Scope	❖ In scope ➢ Critical illness, with particular attention to patients with: ▪ Advanced liver and renal disease ▪ Advanced surgical malignancies ▪ Hemorrhage ▪ Older adult trauma and surgical disease ▪ Sepsis ▪ Severe burns ▪ Severe polytrauma ▪ Severe surgical comorbidities ▪ Spinal cord injury ▪ Stroke and hemorrhagic brain conditions ▪ Traumatic and anoxic brain injury ▪ Vascular disease

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Evaluation & Management of a Patient at the End of Life & Provision of Palliative Care

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Recognizes acute life-limiting disease but requires coaching to deliver difficult news to a patient/caregiver(s) • Demonstrates limited consideration of advance directives when providing life-support or procedures (eg, intubation, CPR, tracheostomy, feeding tube placement) • Displays limited ability to differentiate between beneficial and nonbeneficial treatments (eg, in a patient with nonsurvivable brain injury) • Recognizes challenging family/caregiver dynamics but struggles to manage them • Requires active prompting to recognize and acknowledge cultural factors or personal beliefs • Informs caregiver(s) of acute deterioration in the patient's condition but has difficulty delivering difficult news or addressing overall goals of care • Recognizes challenging dynamics or conflict in the care team but struggles to manage it	• Requires coaching to understand negative prognostic factors and their impact on long-term outcomes • Places orders for medications to manage symptoms (eg, pain, nausea) • With guidance, updates the patient care plan based on palliative or hospice service recommendations, including code status orders and symptom management medications • Needs supervision to recognize disease-specific treatments and the need for goal concordance • Demonstrates limited recognition of interventions that are not consistent with goals of care • Communicates with the primary team about life-limiting illness when prompted • Acknowledges principles of medical ethics	• Prepares discharge from the ICU in coordination with case management or the primary team without anticipating palliative care needs • Adheres to established code status and comfort care measures when applicable • Maintains respectful communication but displays limited ability to respond to emotion in difficult conversations; may be personally adversely affected by difficult discussions or untoward outcomes but is without a plan or strategy for self-care • Documents code status and includes relevant information from consultants and caregivers into a note about goals of care (eg, palliative care recommendations) • Requires assistance to communicate the long-term prognosis of life-limiting illness and expected quality of life to a patient/caregiver(s)
2 **Direct Supervision** Initiates straightforward management for many	• Delivers difficult news and transitions into a goals-of-care discussion with assistance	• Demonstrates understanding of negative prognostic factors and their impact on the long-term prognosis of a straightforward patient	• Recognizes discharge readiness but needs guidance in coordinating care to meet discharge goals for a complex patient

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Level	Resuscitation	Ongoing Management	Transition of Care
critical illnesses but requires active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Seeks assistance in interpreting advance directives within institutional policies beyond the code status documented in the medical record • Recognizes that some treatments may be nonbeneficial (eg, patient with nonsurvivable brain injury) and requires some assistance to guide care • Maintains composure during challenging patient/caregiver reactions or dynamics but needs assistance to navigate the situation • Recognizes and acknowledges patient/caregiver cultural factors or personal beliefs but requires assistance to incorporate these into patient care • With assistance, adjusts goals of care in response to changes in a patient's condition in concordance with patient/caregiver preferences • Recognizes challenging dynamics or conflict in the care team and manages it with assistance	• Evaluates symptoms and places orders to alleviate them (eg, pain, air hunger, thirst) but seeks assistance in escalating treatment • Updates the patient care plan based on palliative or hospice recommendations • Describes disease-specific treatments to achieve goal-concordant care in a straightforward patient • Recognizes interventions that are outside the stated goals of care in a straightforward patient • Communicates with the primary team about life-limiting illness but requires assistance to navigate conflicting views • With assistance, applies principles of medical ethics to the care of a patient	• Seeks assistance in determining goal-concordant procedures (eg, tracheostomy, feeding tube) in the context of goals of care and achieving goal-concordant transitions of care • Identifies difficult emotions or other personal distress and seeks assistance in processing or responding to these emotions or initiating self-care • Documents some elements of illness severity and current code status but omits information during goals-of-care discussions or does not incorporate shared decision-making • Independently provides basic communication about the long-term prognosis of life-limiting illness and expected quality of life to a patient/caregiver(s)
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations	• Delivers difficult news and transitions into a goals-of-care discussion and shared decision-making, taking into account specialist input on prognosis • Independently interprets advance directives within institutional policies	• Discusses negative prognostic factors and their impact on the long-term prognosis for a complex patient • Evaluates and places orders to alleviate symptoms, including pain, air hunger,	• Coordinates care when planning discharge to achieve safe disposition • Recognizes conflict in achievable goals and prognosis while advocating for patient autonomy, delivery of

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Level	Resuscitation	Ongoing Management	Transition of Care
Framework: Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	beyond the code status documented in the medical record • Requires intermittent supervision to guide the delivery of care away from nonbeneficial treatment (eg, nonsurvivable brain injury) • Recognizes and acknowledges patient/caregiver cultural factors or personal beliefs and incorporates them into patient care • Maintains composure during challenging caregiver reactions and dynamics; considers team safety/activates relevant protocols; employs de-escalation strategies • Independently adjusts goals of care in response to change in a patient's condition in concordance with patient/caregiver priorities • Recognizes and manages challenging dynamics and conflict in the care team	and thirst, escalating treatment when required • Updates the patient care plan based on shared decision-making and prioritizes symptom control to meet patient needs • Articulates options for disease-specific treatments but requires some assistance in a complex case to achieve goal-concordant care • Recognizes interventions that do not align with established goals of care for a complex patient but requires assistance when conflict arises • Communicates with the primary care team about life-limiting illness but seeks guidance to navigate conflicting views about a complex patient • Independently applies principles of medical ethics to the care of a patient	compassionate care, and avoidance of non–goal-concordant treatments • Identifies emotions and other distress related to delivery of difficult news to patients/caregiver(s) or debriefing with team members; initiates measures of care for self or others • Documents in a manner that reflects care provided in relation to severity of life-limiting illness and goals of care but without detailing complex discussions, including nuances in shared decision-making or advance directives • Demonstrates understanding of negative prognostic factors in the long-term prognosis of life-limiting illness and communicates them with families with minimal prompting
4 **Practice Ready** Independently manages complex critical illnesses and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge	• Integrates prognostic information and uses skillful communication while delivering difficult news, recognizing specific patient/caregiver needs • Independently interprets and applies advance directives and related documentation, incorporating institutional policies	• Leads discussions about negative prognostic factors and their impact on long-term prognosis in complex patients • Anticipates and manages negative effects of care within the context of stated goals of care	• Anticipates discharge needs while targeting the best possible goal-concordance and optimizing transition of care • Manages conflict in achievable goals and prognosis while advocating for patient autonomy, delivery of

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Evaluation & Management of a Patient at the End of Life & Provision of Palliative Care

Level	Resuscitation	Ongoing Management	Transition of Care
Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Leads the team in avoiding nonbeneficial treatments (eg, in a patient with nonsurvivable brain injury) • Proactively recognizes and acknowledges patient/caregiver cultural factors or personal beliefs and incorporates them into patient care • Maintains composure during challenging caregiver reactions or dynamics, maintains team safety, and applies advanced de-escalation techniques tailored for the specific situation (eg, mirroring, labeling, summative reflection) • Initiates discussion and adjusts goals of care in response to change in a patient's condition in concordance with patient/caregiver priorities • Leads the care team in managing challenging dynamics and conflict within the team	• Independently coordinates disease-specific treatments while balancing side effects and alternatives and applies a goal-concordant care plan • Independently manages conflict in goals of care by communicating with a patient/caregiver(s) about achievable medical goals and the patient's values and substituted wishes • Independently communicates complex patient scenarios of life-limiting illness with the primary team and manages conflict between consultant teams • Leads the care team in application of principles of medical ethics	compassionate care, and avoidance of non–goal-concordant treatments • Identifies and responds to emotions or other types of distress in a supportive manner during delivery of difficult news to a patient/caregiver(s) or in debriefing with team members; anticipates and prioritizes patient, caregiver, and care team needs • Comprehensively documents the status of life-limiting illness (eg, condition), current goals of care, advance directives, and the process of shared decision-making in a manner that facilitates coordination with primary and consultant teams • Recognizes and communicates the long-term prognosis of patient with an acute life-limiting illness in the context of the patient's projected level of dependence, prolonged postdischarge needs, and expected quality of life

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Evaluation & Management of a Patient with Cardiovascular Failure

Description of the Activity	Cardiac emergencies and urgencies and acute decompensation of chronic cardiac conditions are commonly encountered by surgical intensivists. Intensivists should be able to identify and manage these commonly encountered cardiac conditions. Critical care physicians should consider which interventions are necessary for management, perform diagnostic procedures, and coordinate care with specialist consultants.
Functions	❖ Resuscitation ➢ Use evidence-based medicine to formulate an efficient, systematic method to evaluate and manage patients with cardiovascular disease in the intensive care unit (ICU). ➢ Expeditiously identify the signs and symptoms of impending cardiovascular emergencies and urgencies. Use available physiologic, radiologic, and laboratory data to recognize the primary dysfunction and provide evidence-based resuscitation and initial management. ➢ Diagnose and provide initial management of acute coronary syndrome and decompensated heart failure. ➢ Anticipate, diagnose, and initiate treatment of common postoperative complications after cardiac or thoracic surgeries. ➢ Interpret data from various invasive and noninvasive cardiovascular monitoring modalities to guide management. ➢ Demonstrate proficiency in performing resuscitative and diagnostic bedside procedures. ➢ Demonstrate thorough knowledge of advanced cardiac life support (ACLS) algorithms and medications, and lead a team in the event of a cardiac arrest. ➢ Recognize electrocardiogram (ECG) patterns of common atrial and ventricular arrhythmias, heart blocks, and ECG changes associated with electrolyte abnormalities. ➢ Demonstrate knowledge of antiarrhythmic drugs as well as their indications, contraindications, management, and adverse side effects. ➢ Identify the indications for initiating mechanical support for cardiac emergencies while being cognizant of individual and system limitations. ❖ Ongoing Management ➢ Incorporate current guidelines in the recognition and management of common and complex cardiothoracic conditions. ➢ Identify the pathophysiology, management, and sequelae of acute coronary syndromes. ➢ Diagnose and treat acute myocardial infarction (MI) and consult appropriate services when needed. ➢ Anticipate, diagnose, and provide stabilizing measures and initial management of post-MI complications. ➢ Use evidence-based data to manage acute decompensated heart failure. ➢ Understand the differences in pathophysiology and treatment of left versus right heart failure and systolic versus diastolic heart failure. ➢ Recognize the pharmacokinetics and pharmacodynamics of vasoactive agents. ➢ Identify the indications for circulatory assist devices. ➢ Manage patients with complex cardiac disease in the setting of other organ dysfunction. ➢ Show advanced skills and knowledge of point-of-care ultrasound (POCUS) to evaluate cardiac function and dysfunction.

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Evaluation & Management of a Patient with Cardiovascular Failure

	❖ Transition of Care ➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of subspeciality palliative care and ethics as needed. ➢ Customize difficult news to patients/caregivers, setting realistic recovery expectations and facilitating goals-of-care discussions. ➢ Throughout the care continuum, particularly when there are unanticipated changes in the course of a patient's treatment, provide and lead the team in primary palliative care in communication, symptom management, and goal concordance. ➢ Systematically de-escalate care and recognize when patients no longer require ICU-level care. ➢ Select transfer destinations and communicate with consultants and teams, as well as patients and caregivers. ➢ Identify patients who will require evaluation for transplantation. ➢ Lead an interdisciplinary team to ensure streamlined care and communication to patients/caregivers to include decision-making that addresses and considers patients' goals of care.
Scope	❖ In scope ➢ Acute coronary syndrome ➢ Acute decompensated heart failure ➢ Arrhythmias ➢ Cardiogenic shock ➢ Continuous hemodynamic monitoring ➢ Endpoints of resuscitation ➢ Mechanical support ➢ POCUS ➢ Tamponade ➢ Vasopressor/inotropic support

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Evaluation & Management of a Patient with Cardiovascular Failure

Level	Resuscitation	Ongoing Management	Transition of Care
1 **<u>Limited Participation</u>** Demonstrates limited critical care knowledge and skills **<u>Framework:</u>** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Identifies a patient presenting in shock and orders initial diagnostic studies to aid with shock differentiation • Participates in ACLS resuscitation • Recognizes a patient presenting with acute coronary syndrome or decompensated heart failure who requires a higher level of care • Recognizes common arrhythmias via ECG and the indications for intervention • Demonstrates limited ability to identify a patient at high risk for needing mechanical support devices • Demonstrates limited knowledge of evidence-based guidelines for initiation of vasopressors/inotropic agents • Demonstrates limited knowledge of monitoring techniques; needs guidance to interpret data • Demonstrates limited understanding of the differences and treatments for right- vs left-sided heart failure • Identifies indications for and complications of common ICU procedures and requires instruction to perform them (eg, arterial/central venous catheterization) • Demonstrates limited ability to perform and interpret POCUS	• Demonstrates knowledge of the different treatment modalities for arrhythmia management; requires assistance to modify management • Demonstrates limited understanding of the indications for transcutaneous and transvenous pacing • Recognizes the most common postacute coronary syndrome complications; requires coaching in a more complex patient • Needs ongoing direction to manage and modify the treatment plan for a patient after cardiovascular collapse and for interpretation of assessments • Demonstrates understanding of inotropic and vasopressor options for management but requires coaching to modify management in response to changes in a patient's condition • Demonstrates a rudimentary understanding of medical management and mechanical circulatory support in a patient with acute decompensated heart failure • With active supervision, manages the perioperative care of a cardiac surgery patient	• Recognizes the need for a goals-of-care discussion with a patient/caregiver(s) but requires active, ongoing supervision during the discussion • Recognizes the utility of consulting the palliative care team, if available • Requires prompting to remove central venous and arterial access when it is no longer indicated • Identifies a patient who no longer requires critical care; requires some assistance to coordinate transfer and provide a thorough handoff to the accepting team

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Evaluation & Management of a Patient with Cardiovascular Failure

Level	Resuscitation	Ongoing Management	Transition of Care
		• Demonstrates limited ability to perform and interpret POCUS to guide ongoing management	
2 **<u>Direct Supervision</u>** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Demonstrates knowledge of the pathophysiology of various forms of shock and interprets basic diagnostic studies to aid with shock differentiation, needing active direction to initiate management • With direct supervision, leads ACLS resuscitation and initiates postresuscitation management • With direct supervision, initiates management of a patient with acute coronary syndrome and heart failure and knows when to consult other specialists • Identifies and initiates management for common arrhythmias • With active guidance, identifies a patient at high risk of needing mechanical support devices • Demonstrates basic knowledge of evidence-based guidelines for initiation of vasopressors/inotropic agents • Demonstrates knowledge of monitoring techniques and selects appropriate monitoring modalities in a straightforward patient; may need guidance to interpret data • Demonstrates understanding of the differences and treatments for right- vs	• Manages ongoing arrhythmias in a straightforward patient with limited supervision; requires direct supervision for a more complex patient • Demonstrates understanding of the indications for transcutaneous and transvenous pacing • With prompting, recognizes and manages postacute coronary syndrome complications in a straightforward patient • With ongoing guidance, manages a patient after cardiovascular collapse with serial assessments and indicated modification of the treatment plan • Adjusts vasopressors/inotropic support according to changes in a patient's clinical status under direct supervision • With direct supervision, initiates medical management in a straightforward patient; needs direction to identify the need for mechanical circulatory support in a complex patient with acute decompensated heart failure • With assistance, manages the perioperative care of an uncomplicated cardiac surgery patient	• Initiates and maintains communication with a patient/caregiver(s) • Identifies a patient with acutely life-limiting cardiovascular disease; needs assistance to coordinate between the patient/caregiver(s) and the palliative care team • Recognizes when to remove central venous and arterial access because it is no longer indicated • Independently identifies a patient who no longer requires critical care; coordinates transfer and provides a thorough handoff to the accepting team

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Evaluation & Management of a Patient with Cardiovascular Failure

Level	Resuscitation	Ongoing Management	Transition of Care
	left-sided heart failure but is not yet able to diagnose or treat it independently • Performs bedside procedures in a straightforward patient; needs assistance with a complicated patient • Performs POCUS and uses data to change the treatment plan with guidance	• Performs and interprets POCUS to guide ongoing management with active direction	
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **Framework:** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	• Identifies a patient at risk of impending cardiovascular collapse; interprets diagnostic studies to differentiate shock; optimizes management to prevent acute deterioration • Leads ACLS resuscitation and initiates postresuscitation management • With minimal prompting, initiates management of acute coronary syndrome, heart failure and cardiogenic shock in a complicated patient • Recognizes and initiates management of arrhythmias but needs assistance for a complicated/refractory situation • Identifies a patient in need of mechanical-assist devices; needs limited guidance to stabilize the patient, mobilize resources, and consult the appropriate specialists • Applies evidence-based guidelines to the management of a patient with cardiovascular failure	• Manages ongoing arrhythmias in straightforward and complex patients with limited supervision • Initiates transcutaneous and transvenous pacing when indicated • Identifies and manages postacute coronary syndrome sequelae in a straightforward patient; requires some direction to manage a complicated patient • Manages a patient after cardiovascular collapse with serial assessments and modification of the treatment plan in a straightforward patient • Manages vasopressor/inotropic support with intermittent assistance • Identifies and manages a straightforward patient in need of mechanical circulatory support with acute decompensated heart failure • Directs the management of a straightforward perioperative cardiac	• Independently conducts a multidisciplinary goals-of-care discussion for a patient with a life-limiting condition • Identifies a patient who needs transplantation; needs guidance coordinating transfer/consultation • Formulates a post-ICU discharge plan that includes transition of care services, patient/caregiver needs, and the receiving treatment team

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Evaluation & Management of a Patient with Cardiovascular Failure

Level	Resuscitation	Ongoing Management	Transition of Care
	• Demonstrates knowledge of advanced monitoring techniques; independently selects appropriate monitoring modalities for a complicated patient (PC3 L3) • Diagnoses and treats right- vs left-sided heart failure in a straightforward patient (PC6 L3) • Independently performs and supervises others in bedside procedures for a straightforward patient; requires limited guidance for a complex patient (PC10 L3) • With minimal direction, performs and interprets POCUS to guide management of an acutely deteriorating patient (PC10 L3)	surgery patient but may require assistance for a complex patient; anticipates, identifies, and manages common postoperative complications • Performs and interprets POCUS to guide ongoing management of a straightforward patient	
4 **<u>Practice Ready</u>** Independently manages complex critical illnesses and leads the critical care team **<u>Framework:</u>** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed	• Independently recognizes and differentiates shock state and initiates evidence-based interventions (PC3, PC6 L4) • Directs ACLS resuscitation independently, performs a team debriefing, and identifies a patient needing targeted temperature management (PC3 L4) • Independently manages a patient presenting with acute coronary syndrome or heart failure and initiates evidence-based interventions (PC6 L4) • Initiates intervention for refractory arrhythmias in a physiologically complex patient (PC6 L4) • Demonstrates understanding of the indications for mechanical-assist devices	• Independently manages ongoing and refractory arrhythmias • Demonstrates knowledge of postacute coronary syndromes sequelae (eg, ventricular rupture, tamponade) and manages them independently • Independently manages a complex patient after cardiovascular collapse with serial assessments and indicated modification of the treatment plan • Adjusts inotropic and vasopressor support in response to a patient's hemodynamic needs, even in a complicated patient • Selects and titrates medical management and identifies the need for mechanical	• Leads a goals-of-care discussion with a patient/caregiver(s) • Identifies a patient who requires transplantation and initiates transfer/consultation • Anticipates potential immediate and long-term postdischarge complications and includes mitigating strategies in the discharge plan

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Evaluation & Management of a Patient with Cardiovascular Failure

Level	Resuscitation	Ongoing Management	Transition of Care
for common or complex critical illness.	and independently stabilizes a patient, mobilizes resources, and consults appropriate specialists (PC3, PC6 L4) • Independently applies evidence-based guidelines for managing a complex patient with cardiovascular failure (PC3 L4) • Demonstrates knowledge of advanced monitoring techniques; independently selects appropriate monitoring modalities and interprets data in a complicated patient (PC3 L4) • Diagnoses and treats right- vs left-sided heart failure in a complex patient (PC6 L4) • Obtains central venous and arterial access in an anatomically and physiologically complex patient (PC10 L4) • Independently uses POCUS or other advanced monitoring to guide management of a complex patient (PC10 L4)	circulatory support in a complex patient with acute decompensated heart failure • Directs the management of a complex perioperative cardiac surgery patient; independently anticipates, identifies, and manages common postop complications • Independently performs and interprets POCUS to guide ongoing management	

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Evaluation & Management of a Patient with Hepatic Dysfunction and Liver Failure

Description of the Activity	Patients with acute or exacerbation of chronic liver dysfunction and hepatic failure are often among the most complex patients to manage. Surgical intensivists must work with a multidisciplinary team of hepatologists, gastroenterologists, interventional radiologists, and transplant surgeons to coordinate the best care for these complex patients.
Functions	❖ Resuscitation ➢ Promptly recognize and evaluate patients with hepatic dysfunction, including acute, ischemic, and decompensated liver failure. ➢ Use a grading scale to characterize the severity of liver dysfunction, such as the Model for End-Stage Liver Disease (MELD) score, Child-Pugh score, or King's College criteria. ➢ Evaluate patients with cirrhosis for pre-, intra-, and posthepatic etiology. ➢ Recognize, evaluate, and perform initial management of hepatic encephalopathy. ▪ Use West Haven criteria. ➢ Perform initial management of patients with variceal bleeding, including recognition, medical management, blood product resuscitation, consultation with gastroenterologists for endoscopy, and interventional radiology evaluation for transjugular intrahepatic portosystemic shunt (TIPS). ➢ Recognize and manage patients with hepatorenal syndrome. ➢ Initiate prophylactic care for surgical patients with a history of portal hypertension, cirrhosis, ascites, varices, or spontaneous bacterial peritonitis (SBP). ➢ Recognize associated coagulopathy, and initiate goal-directed resuscitation. ➢ Identify the indications for and use of point-of-care ultrasound (POCUS) and paracentesis. ▪ Use ultrasound to identify volume status and ascites. ▪ Perform and interpret diagnostic and therapeutic paracentesis. ❖ Ongoing Management ➢ Manage patients with hepatic dysfunction in the pre-, peri-, and postoperative critical care setting to minimize sequelae of decompensation. ➢ Manage patients with acute fulminant liver failure. ▪ Recognize and manage the sequelae of acute liver failure, including hepatic encephalopathy and acute cerebral edema, coagulopathy, vasoplegia, renal failure, acidosis, and hypoglycemia. ▪ Recognize the potential for loss of airway protection and the need for early intubation. ▪ Demonstrate understanding of the pharmacokinetics of toxin overdose, and initiate appropriate treatment. ▪ Use evidence-based criteria (such as King's College) to determine the need for referral for liver transplant. ▪ Initiate discussion with the local transplant team. ➢ Manage patients with hepatic encephalopathy. ▪ Recognize and manage patients with acute cerebral edema, including sodium and serum osmolality.

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Evaluation & Management of a Patient with Hepatic Dysfunction and Liver Failure

	▪ Recognize and manage patients with portosystemic hepatic encephalopathy, including associated medications. ➢ Manage patients with portal hypertension. ▪ Identify the indications for TIPS, and initiate a consultation with interventional radiology. ▪ Recognize the immediate complications after TIPS, including worsened encephalopathy, bleeding, and shunt failure. ▪ Initiate pharmacologic therapy for surgical patients with portal hypertension and cirrhosis. ➢ Manage patients with variceal bleeding. ▪ Coordinate with gastroenterology, interventional radiology, or both for additional hemorrhage control procedures as needed. ▪ Initiate pharmacologic therapy for surgical patients with variceal bleeding. ➢ Manage patients with hepatorenal syndrome. ➢ Initiate appropriate nutritional support. ➢ Recognize and manage the pharmacokinetics of hepatic clearance of medications in patients with liver dysfunction. ❖ Transition Of Care ➢ Coordinate with multidisciplinary care teams, including appropriate consultation with gastroenterology, interventional radiology, and transplant teams. ➢ Communicate an updated plan of care to a patient/caregiver(s) to ensure understanding of the illness severity, prognosis, additional treatment options, and feasibility of carrying out the plan within the patient's psychosocial and socioeconomic context. ➢ Throughout the care continuum, and particularly when there are unanticipated changes in the course of a patient's treatment, provide and lead the team in primary palliative care regarding communication, symptom management, and goal concordance, adjusting as needed and communicating any changes to all involved teams. ➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of subspeciality palliative care and ethics teams as needed. ➢ In the event that disease has become acutely life-limiting and there are no additional disease-directed treatments, identify the end-of-life stage of care, and lead the team in helping patients/caregivers into this stage, prioritizing comfort and symptom-directed therapy as indicated. ➢ Lead the team in reflection on the experience of having been involved in a patient's care, and help others—and self—facilitate healthy ways to process the experience, both inside and outside of the hospital, to support the care team's physical, mental, emotional, and spiritual well-being.
Scope	❖ In scope ➢ Acute liver injury/ischemic hepatitis ➢ Cirrhosis ▪ Portal hypertension ➢ Cirrhotic bleeding ▪ Coagulopathy ▪ TIPS indications

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Evaluation & Management of a Patient with Hepatic Dysfunction and Liver Failure

- Variceal bleeding
- Decompensated liver failure
- Fulminant acute liver failure
  - Ingestion/toxins
- Hepatic encephalopathy
- Hepatorenal syndrome
- Paracentesis

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Evaluation & Management of a Patient with Hepatic Dysfunction & Liver Failure

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• With assistance, diagnoses acute and chronic liver failure in a patient who is critically ill • Generates a limited differential for the etiology of acute liver failure • Describes prognostic models such as Child-Pugh and MELD for a patient with liver failure in the ICU but needs prompting to use them correctly • Identifies differing resuscitation needs of a patient with liver failure but does not describe specific strategies • Identifies a patient with coagulopathy due to liver failure but does not implement strategies to mitigate bleeding risk or address hemorrhage • Recognizes and describes the physiologic consequences and complications of portal hypertension but needs assistance to manage them • Identifies the need for consultants such as hepatology but requires prompting to do so	• Monitors patient response to therapies for hepatic dysfunction, reporting relevant data to the team • Assesses and initiates treatment of a critically ill patient with hepatic encephalopathy with active direction • Evaluates a patient with renal dysfunction and hepatic failure; describes potential etiologies, including hepatorenal syndrome; needs direction to initiate treatment • Describes basic principles of management of nutritional support in a critically ill patient with liver failure with ongoing direction; needs assistance to implement these principles	• Demonstrates limited knowledge of the typical disease course and prognosis of acute and chronic liver failure • Communicates objective data and events in transition of care to the interprofessional team; requires assistance to anticipate future patient needs
2 **Direct Supervision** Initiates straightforward management for many	• Diagnoses and initiates treatment of acute and chronic liver failure in a straightforward patient but does not recognize more subtle signs of progression	• Monitors patient response to therapies for hepatic dysfunction and adjusts accordingly, reporting relevant data to the team (PC8, MK1 L2)	• Identifies prognostic uncertainty in the clinical course for a patient with acute and chronic liver failure (PC8, MK2 L2)

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Evaluation & Management of a Patient with Hepatic Dysfunction & Liver Failure

Level	Resuscitation	Ongoing Management	Transition of Care
critical illnesses but requires active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Identifies likely etiologies of acute liver failure in a straightforward patient; initiates directed treatment with assistance • Describes and uses prognostic models such as Child-Pugh and MELD to guide care of a straightforward patient with liver failure in the ICU • Describes and implements resuscitation strategies for a straightforward patient with liver failure • Identifies a patient with coagulopathy, recognizing variations in the coagulation cascade due to liver failure; implements some strategies to mitigate bleeding risk and address hemorrhage, requiring assistance in a more complex patient • Recognizes and describes the physiologic consequences and complications of portal hypertension and initiates treatment with supervision • Identifies the need for and communicates with consultants such as hepatology	• Assesses and initiates treatment of hepatic encephalopathy with active direction • Evaluates a patient with renal dysfunction and hepatic failure and diagnoses etiologies, including hepatorenal syndrome; begins initial treatment • Applies evidence-based principles in the management of nutritional support in a straightforward patient with liver failure	• Communicates with all team members to coordinate ongoing multidisciplinary care; demonstrates basic understanding of criteria for transfer to a transplant center
3 **Indirect Supervision**	• Assesses and initiates treatment of a complex patient with acute and chronic liver failure with limited guidance	• Monitors patient response to therapies for hepatic dysfunction and adjusts accordingly in a highly complex patient, enlisting the team in management	• Demonstrates understanding of the important role of estimating prognosis; with assistance, integrates objective data into the clinical course and

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Evaluation & Management of a Patient with Hepatic Dysfunction & Liver Failure

Level	Resuscitation	Ongoing Management	Transition of Care
Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **Framework:** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances. May require input in managing the most complicated ICU patients	• Identifies likely etiologies of acute liver failure in a complex patient and implements a treatment plan • Describes and uses prognostic models such as Child-Pugh and MELD to guide the care of a complex patient with liver failure in the ICU • Describes and implements resuscitation strategies for a complex patient with liver failure • Identifies a patient with coagulopathy, recognizing variations in the coagulation cascade due to liver failure; implements strategies to mitigate bleeding risk and address hemorrhage with intermittent assistance • Recognizes and describes the physiologic consequences of portal hypertension and develops and implements a treatment plan for a straightforward patient • Coordinates recommendations from consultants to optimize patient care in resuscitation	• Assesses and initiates treatment of hepatic encephalopathy with limited guidance • Performs a comprehensive evaluation of a patient with renal dysfunction and hepatic failure and diagnoses etiology, including hepatorenal syndrome; develops a treatment plan but needs assistance in a highly complex patient • Applies evidence-based principles in the management of nutritional support for a complex patient with liver failure	prognostication for a patient with acute and chronic liver failure • Coordinates the multidisciplinary team to optimize care, including considering transfer of care to a transplant center when indicated
4 **Practice Ready**	• Independently assesses and initiates comprehensive treatment for hepatic failure	• Leads the team in monitoring patient response to therapies for hepatic dysfunction and adjusts accordingly in a highly complex patient	• Uses evidence-based methods and objective data to determine a prognosis

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Evaluation & Management of a Patient with Hepatic Dysfunction & Liver Failure

Level	Resuscitation	Ongoing Management	Transition of Care
Independently manages complex critical illnesses and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Identifies likely etiologies of acute liver failure in a complex patient and implements a comprehensive treatment plan, incorporating patient history and comorbidities • Uses prognostic models such as Child-Pugh and MELD to guide care for a patient with liver failure in the ICU; leads the team in discussing prognosis, risk-stratifying for procedures, and recommending referral for transplantation • Leads the team in implementing resuscitation strategies for a patient with liver failure, including assessment of volume responsiveness and the use of colloid and vasopressors • Guides the team in correction of coagulopathy and mitigation of bleeding risk, including the use of advanced assessment of coagulation abnormalities such as TEG/ROTEM • Leads the team in comprehensive management of a complex patient with portal hypertension and complications thereof • Leads the team in implementing recommendations from consultants to optimize patient care in resuscitation	• Develops a thorough differential and independently assesses and initiates comprehensive treatment for a patient with hepatic encephalopathy • Accurately diagnoses and develops a comprehensive treatment plan for a patient with renal dysfunction and liver failure • Leads the team in providing nutritional support to a patient with liver failure, incorporating chronicity of illness and comorbid factors	• Leads the multidisciplinary team in transition of care, including coordinating transfer of care to a transplant center when indicated

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Evaluation & Management of a Patient with Sepsis

Description of the Activity	Sepsis is a common cause of shock in critically ill patients. All surgical intensivists should be able to care for patients with life-threatening infections, including rapid recognition, initiation of treatment, and tailoring of therapy. They must also identify the need for source control with appropriate consultation when necessary.
Functions	❖ Resuscitation ➢ Assess the clinical status of patients and triage them based on the sepsis spectrum, demonstrating understanding of pertinent validated scoring systems and diagnostic criteria. ➢ Generate applicable differential diagnoses for potential sources of sepsis. ➢ Direct the use of and interpret necessary laboratory and radiologic studies, with attention to resource use. ➢ Demonstrate proficiency in the bedside procedures necessary for resuscitation and invasive monitoring, such as point-of-care ultrasound (POCUS), central venous line placement, and arterial line placement. ➢ Initiate and direct evidence-based resuscitation, taking into account and adjusting for patient-specific physiologic factors (eg, preexisting cardiac disease). ➢ Initiate an appropriate empiric antibiotic regimen, accounting for factors that may impact drug selection (eg, institutional antibiogram, history of multidrug-resistant organisms) and dosing (eg, renal or hepatic insufficiency). ➢ Consider unique patient factors, such as immunocompromised status, extremes of age, history of chronic antibiotic use, history of colonization, presence of indwelling hardware/prosthetic material, and history of multidrug-resistant infection. ➢ Consider and evaluate for the relevant risk factors for atypical infections (opportunistic, mycobacteria, fungal), such as recent surgical instrumentation, exposure history, prolonged institutionalization, and immunocompromised status. ➢ Recognize the potential need for procedural intervention to achieve source control. ➢ Demonstrate proficiency in bedside procedures to obtain culture samples and source control. ➢ Implement and direct care in compliance with institutional best-practice guidelines while integrating current scientific recommendations. ❖ Ongoing Management ➢ Consider the potential for multifactorial shock with a tailored treatment plan. ➢ Evaluate and optimize volume status, with application of adjunctive devices and maneuvers in patients with physiologic limitations such as heart failure or end-stage renal disease. ➢ Identify indications for and titration of vasoactive and inotropic agents. ➢ Evaluate for drug interactions and toxicity. ➢ Recognize adverse reactions to common antibiotics and therapeutics.

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Evaluation & Management of a Patient with Sepsis

	➢ Consider patient-specific risk factors for antibiotic resistance, and recognize the need for escalation and multidisciplinary consultation. ➢ Perform timely identification and implementation of supportive measures for end-organ dysfunction as a complication of sepsis. ➢ Monitor and interpret patient response to therapy, with prompt recognition of treatment failure and the need for escalation of therapy. ❖ Transition of Care ➢ Reassess patient response to therapy with timely de-escalation of antibiotic treatment based on culture results and clinical response. ➢ Practice antibiotic stewardship by determining the shortest duration of antibiotic treatment necessary based on evidence, accounting for patient- and infection-specific risk factors.
Scope	❖ In scope ➢ Antibiotic stewardship ➢ Diagnostic maneuvers ➢ Differential diagnosis ➢ Evaluation of source ➢ Resuscitation ➢ Resuscitative procedures ➢ Sepsis ➢ Septic shock ➢ Source control (bedside procedures) ❖ Special populations ➢ Chronic infection versus colonization ➢ Extremes of age ➢ History of multidrug resistance ➢ Immunocompromised

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Evaluation & Management of a Patient with Sepsis

Level	Resuscitation	Ongoing Management	Transition of Care
1 **<u>Limited Participation</u>** Demonstrates limited critical care knowledge and skills **<u>Framework:</u>** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Identifies the presence of shock, including sepsis as a possible etiology; orders basic diagnostic studies to begin evaluation of shock but the differential may be limited • Initiates volume resuscitation without recognizing the need for an individualized resuscitation plan • Recognizes the need for procedures for source control of infection but requires prompting to initiate a consultation discussion • Needs direction to select empiric antimicrobials for common sources of sepsis • Initiates vasoactive agents with ongoing assistance for indications and selection • Describes the acuity and severity of illness with guidance; demonstrates familiarity with some validated and pertinent criteria and scoring systems (eg, SIRS/sepsis, SOFA, APACHE II) • Identifies the need for physiologic monitoring but requires prompting for comprehensive implementation • Elicits and documents pertinent H&P details to diagnose a specific etiology of shock but demonstrates limited ability to formulate a diagnostic and therapeutic rationale	• Requires active assistance to assess endpoints of resuscitation • Demonstrates limited recognition for the need to tailor volume administration and vasoactive agents based on interpretation of endpoints of resuscitation • Selects antimicrobials without consideration for end-organ dysfunction • Monitors the effects of sepsis and treatment on volume and renal function with prompting • Identifies indications for RRT in a patient with sepsis • Describes the physiology of septic shock and a clinical rationale for volume resuscitation and use of vasoactive agents but without individualizing them to a specific patient • With guidance, applies evidence-based guidelines to manage vasoactive agents and antimicrobials • Identifies mixed types of shock with active, ongoing guidance • Needs direct guidance to interpret lab and radiologic data for the diagnosis of an infectious source	• Interprets patient response to therapy but requires active assistance to escalate/de-escalate vasopressors and monitoring • Recognizes the need for ongoing monitoring of systemic complications but is needs assistance to create a specific or tailored plan • Continues an antimicrobial treatment plan without a clearly defined treatment duration and clinical rationale • Needs supervision to adjust and wean vasopressor support • Demonstrates limited understanding of the indications for discontinuation of invasive monitoring

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Evaluation & Management of a Patient with Sepsis

Level	Resuscitation	Ongoing Management	Transition of Care
	• Initiates the sepsis bundle with prompting	• Describes and monitors for common systemic complications of septic shock with assistance	
2 **<u>Direct Supervision</u>** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Initiates a diagnostic workup (including labs and imaging) for sepsis/septic shock; identifies a broad differential with some guidance • Initiates volume resuscitation with recognition of patient-specific factors • With intermittent guidance, interprets lab and radiologic data to diagnose common infectious sources • Initiates a consultation for procedural infectious source control, requiring guidance for a complex patient • Selects empiric antimicrobials for common sources of sepsis • Selects a vasoactive agent based on complementary mechanisms of action • Describes the acuity and severity of illness, incorporating validated and pertinent criteria and scoring systems (eg, SIRS/sepsis, SOFA, APACHE II) • Demonstrates understanding of physiologic monitoring and implements it with intermittent guidance • Documents sepsis bundle compliance and reasons for deviation	• Assesses endpoints of resuscitation in a straightforward patient but needs assistance for a more complex patient • Tailors volume administration and vasoactive agents based on interpretation of endpoints of resuscitation with some guidance • Identifies the need for but requires assistance in selection and dose adjustments of antimicrobials to account for end-organ dysfunction • Monitors the effects of sepsis and treatment on volume and renal function • Monitors the effects of RRT on a patient with sepsis with some guidance; works with consultants to make adjustments • Recognizes the physiology of septic shock and a clinical rationale for volume resuscitation and use of vasoactive agents, individualizing treatment to a specific patient • With some guidance, uses evidence-based guidelines to select vasoactive agents and antimicrobials based on complementary mechanisms of action without coverage redundancy or gaps	• Creates escalation/de-escalation antimicrobial and vasopressor plans based on patient response to therapy with some assistance • Creates a tailored plan for monitoring of likely systemic complications of sepsis • Continues an antimicrobial treatment plan with a clearly defined treatment duration and clinical rationale • Adjusts and weans vasopressor support tailored to patient status with guidance • With guidance, discontinues invasive monitoring when a patient's condition indicates

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Evaluation & Management of a Patient with Sepsis

Level	Resuscitation	Ongoing Management	Transition of Care
	• Independently initiates the sepsis bundle	• Identifies mixed types of shock with guidance • Describes and monitors for common systemic complications of septic shock	
3 **<u>Indirect Supervision</u>** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	• Initiates a diagnostic workup (including labs and imaging) to begin evaluation of sepsis/septic shock and identifies a broad differential • Initiates volume resuscitation, incorporating monitoring when indicated by patient-specific factors • Independently and promptly consults an interventionalist for procedural infectious source control • Selects empiric antimicrobials based on an institutional/local antibiogram but requires assistance to incorporate uncommon patient-specific factors • Uses evidence-based guidelines to create a cohesive vasoactive strategy • Describes the acuity and severity of illness, independently incorporating validated and pertinent criteria and scoring systems (eg, SIRS/sepsis, SOFA, APACHE II) • Independently implements physiologic monitoring • Concisely documents a diagnostic and therapeutic rationale in a complex patient	• Assesses endpoints of resuscitation in a straightforward and complex patient • Monitors and adjusts fluid resuscitation and vasopressor therapies using evidence-based management strategies, as indicated by patient status and monitoring, in a patient without major comorbidities • Adjusts antimicrobial dosing, taking into consideration the presence of end-organ dysfunction • Anticipates the potential for renal dysfunction in a septic patient and monitors and adjusts therapy accordingly • Monitors the effects of RRT in a patient with sepsis and collaborates with consultants to make adjustments • Uses evidence-based guidelines to tailor vasoactive agents and antimicrobials based on complementary mechanisms of action • Creates a cohesive therapeutic strategy, accounting for and prioritizing concurrent diagnoses; recognizes the potential for sepsis-related multisystem organ impairment	• Creates a timely escalation/de-escalation plan for antimicrobials, vasopressors, and invasive monitoring techniques • Creates a tailored plan for monitoring and managing common and uncommon systemic complications of sepsis with some input • Demonstrates understanding of the principles of antibiotic stewardship • Adjusts and weans vasopressor support tailored to patient status • Discontinues invasive monitoring when a patient's condition indicates

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Evaluation & Management of a Patient with Sepsis

Level	Resuscitation	Ongoing Management	Transition of Care
		• Interprets lab findings in atypical infections and tailors antimicrobial therapy accordingly	
4 **<u>Practice Ready</u>** Independently manages complex critical illnesses and leads the critical care team **<u>Framework:</u>** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Guides resuscitation in an evidence-based manner and employs disease and patient-specific monitoring techniques • Guides consultation for and coordinates optimal timing of procedural infectious source control • Selects empiric antimicrobials based on an institutional/local antibiogram, patient immune status, and risk factors for drug resistance and atypical infections • Describes the acuity and severity of illness, broadly incorporating validated and pertinent criteria and scoring systems (eg, SIRS/sepsis, SOFA, APACHE II) • Concisely documents diagnostic and therapeutic reasoning while satisfying institutional and regulatory requirements	• Reevaluates for ongoing multifactorial shock in a patient with refractory shock • Directs strategies to mitigate the risk of systemic complications without compromising treatment of the primary infection • Leads comprehensive management of a septic patient with renal dysfunction; collaborates with consultants on the initiation and ongoing use of RRT • Using evidence-based principles and advanced monitoring data, monitors and adjusts therapeutic agents in a complex patient, including fluids and vasopressors • Applies knowledge of disease processes, pathophysiology, and therapeutics to guide treatment for a patient with sepsis-related multiorgan dysfunction • Performs a detailed evaluation for uncommon resistance patterns when initial studies do not explain the clinical scenario	• Guides timely tailoring and discontinuation of antimicrobial treatment based on culture results and clinical response • Creates a tailored plan to monitor for all anticipated systemic complications of sepsis with necessary therapeutic adjustments • Models and advocates for principles of antibiotic stewardship

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Evaluation & Management of a Patient with Respiratory Failure

Description of the Activity	Respiratory failure is one of the most commonly encountered diagnoses in the critically ill. All surgical intensivists must be able to identify and manage mild to severe acute respiratory failure with its diverse causes and presentations. Regardless of clinical setting and resource availability, intensivists should feel comfortable performing a range of invasive and noninvasive interventions tailored to the management of injured and noninjured adults and children based on their scope of practice.
Functions	❖ Resuscitation ➢ Use the patient's history and clinical condition to tailor the diagnosis of respiratory failure, particularly in high-risk conditions. ➢ Identify the indications for, opportunity for, and limits of noninvasive ventilation. ➢ Recognize the need for and the principles of advanced airway management, including the selection of approach, potential complications, and management. ➢ Demonstrate familiarity with specific modes of mechanical ventilation, including their limitations. ❖ Ongoing Management ➢ Identify and respond to patients who are failing noninvasive ventilation, recognizing the need for invasive ventilation. ➢ Identify and respond to the potential complications of mechanical ventilation, including interpretation of ventilator alarms and waveforms. ▪ Identify and manage patient/ventilator dyssynchrony. ➢ Incorporate guideline-based management of critically ill patients with respiratory failure. ➢ Incorporate evidence-based lung-protective ventilatory management strategies. ➢ Demonstrate familiarity with advanced ventilator management techniques, positioning, and pharmacologic adjuncts. ➢ Recognize the indications and principles of bronchoscopy for diagnostic or therapeutic purposes, recognizing its risks and complications. ▪ Perform bronchoscopy. ➢ Recognize and manage ventilator infections. ▪ Tailor the choice of antibiotics using evidenced-based guidelines and hospital antibiograms. ➢ Identify indications for tracheostomy in long-term ventilatory management and its associated complications. ➢ Identify and respond to the need for thoracic decompression and its procedural complications. ❖ Transition of Care ➢ Demonstrate understanding of ventilatory weaning and extubation principles. ➢ Recognize the failure of conventional ventilatory management, initiate referral to lung rescue centers, and initiate goals-of-care conversations.

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Evaluation & Management of a Patient with Respiratory Failure

Scope

- In scope
  - Acute respiratory distress syndrome (ARDS)
  - Aspiration
  - Asthma exacerbation
  - Bronchoscopy
  - Chronic obstructive pulmonary disease (COPD)
  - Cricothyroidotomy
  - Flail chest
  - Intubation
  - Noninvasive mechanical ventilation
  - Obstructive sleep apnea (OSA)/obesity hypoventilation syndrome (OHS)
  - Pleural effusion
  - Pneumonia
  - Pulmonary contusion
  - Pulmonary embolism
  - Pulmonary hypertension
  - Smoke inhalation
  - Spinal cord injury
  - Tension hemothorax/pneumothorax
  - Thoracentesis/chest tube
  - Tracheobronchial injury
  - Tracheostomy (excludes procedure, given alternative specialties)
  - Transfusion-associated circulatory overload (TACO)/transfusion-related acute lung injury (TRALI)
  - Ventilator management, including advanced techniques

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Evaluation & Management of a Patient with Respiratory Failure

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Describes basic modes of noninvasive ventilation and requires assistance with patient selection • With prompting, initiates interventions for airway management and respiratory support in a patient with impending respiratory failure (eg, HFNC) • Demonstrates understanding of basic modes of invasive mechanical ventilation but needs assistance to initiate it • Demonstrates limited familiarity with airway adjuncts for oxygenation/ventilation in a high-risk patient (eg, oral airway, nasal trumpet, bag valve mask) • Recognizes the potential for respiratory deterioration in a trauma patient with injuries such as rib fracture, pulmonary contusion, or inhalation injury • Recognizes immediately life-threatening respiratory conditions, such as tension pneumothorax, aspiration, and airway obstruction • Performs procedural interventions such as chest drainage procedures and bronchoscopy with direction	• Recognizes evidence-based guidelines in respiratory care practice • Identifies basic ventilator alarms (eg, high peak pressures, low tidal volume) • Interprets ventilator waveforms in the care of a mechanically ventilated patient with guidance • Recognizes the contribution of chronic respiratory conditions to acute respiratory failure (eg, COPD) • Demonstrates understanding of indications for bronchoscopy • Identifies when a patient is failing conventional management techniques • Diagnoses respiratory infections and initiates antimicrobial therapy tailored to individual risk factors • Identifies readiness for ventilator weaning but needs assistance to implement specific strategies	• With assistance, identifies a patient physiologically ready for ventilatory weaning and extubation • Identifies the benefit of tracheostomy in a patient on long-term ventilation • Identifies the limitations of institutional respiratory support capabilities with prompting (eg, ECLS) • Recognizes the need for and initiates a goals-of-care conversation
2 **Direct Supervision**	• Selects noninvasive respiratory support modalities for a patient likely to benefit from them	• Incorporates evidence-based guidelines into clinical practice	• Recognizes indicators of success and failure of ventilatory weaning and extubation

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Evaluation & Management of a Patient with Respiratory Failure

Level	Resuscitation	Ongoing Management	Transition of Care
Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Initiates an intervention for airway management and respiratory support in a patient with impending respiratory failure • Initiates basic ventilatory settings for a patient with respiratory failure after intubation and identifies some limitations of standard modes of mechanical ventilation • Demonstrates familiarity with airway adjuncts for oxygenation/ventilation in a high-risk patient (eg, oral airway, nasal trumpet, bag valve mask) and selects the correct adjunct in a straightforward patient • Initiates appropriate support therapies (analgesia, noninvasive pulmonary support) in a trauma patient at risk for deterioration, with injuries such as rib fracture, pulmonary contusion, or inhalation injury • Initiates management of immediately life-threatening respiratory conditions, such as tension pneumothorax, aspiration, or airway obstruction • Performs procedural interventions such as chest drainage procedures and bronchoscopy independently in a straightforward patient	• Responds to basic ventilator alarms with indicated interventions • Interprets ventilator waveforms in the care of a mechanically ventilated patient • Takes initial steps to address altered physiology in a patient with chronic respiratory conditions (eg, nebulizers, optimizing respiratory rate, tidal volume) • With supervision, performs therapeutic and diagnostic bronchoscopy for high-risk conditions such as inhalational injury • Demonstrates familiarity with advanced lung rescue therapies in the face of worsening respiratory failure based on institutional protocols (eg, prone positioning) • Identifies appropriate duration of antibiotic therapy guided by lab and clinical data • Identifies readiness for ventilator weaning and performs weaning maneuvers with assistance	• Refers for and considers timing of tracheostomy but needs assistance to put it in the context of the patient's physiology • Recognizes the limitations of institutional respiratory support capabilities (eg, ECLS) • Initiates a culturally appropriate goals-of-care conversation

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Evaluation & Management of a Patient with Respiratory Failure

Level	Resuscitation	Ongoing Management	Transition of Care
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations Framework: Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	• Optimizes noninvasive support modalities for a surgical and trauma patient when indicated • Independently initiates interventions for airway management and respiratory support in a patient with impending respiratory failure • With some guidance, demonstrates familiarity with advanced ventilator techniques for a patient failing conventional mechanical ventilation strategies • Demonstrates expertise with airway adjuncts for oxygenation/ventilation in a high-risk patient (eg, oral airway, nasal trumpet, bag valve mask) and selects the correct combination of adjuncts for a more complex patient • Initiates appropriate support therapies (analgesia, noninvasive pulmonary support) in a complex trauma patient at risk for deterioration with injuries such as rib fracture, pulmonary contusion, or inhalation injury • Initiates management of immediately life-threatening respiratory conditions (eg, tension pneumothorax, aspiration, airway obstruction) in a straightforward patient • Performs procedural interventions such as bronchoscopy, chest drainage, or	• Incorporates evidence-based guidelines for management of acute respiratory failure and uses available clinical decision support tools in a straightforward patient • Manages ventilator dyssynchrony using pharmacologic adjuncts and ventilator adjustments • Interprets ventilator waveforms and adjusts ventilator settings as indicated in the care of a mechanically ventilated patient • Addresses altered physiology in a patient with chronic respiratory conditions • Performs therapeutic and diagnostic bronchoscopy with indirect supervision for high-risk conditions such as inhalational injury • Initiates advanced lung rescue therapies in the face of worsening respiratory failure based on institutional protocols (eg, prone positioning) • Applies evidence-based guidelines to the management of a patient with a respiratory infection • Identifies readiness for ventilator weaning and performs weaning maneuvers	• Incorporates pharmacologic and supportive adjuncts in ventilator liberation strategies • Refers for and considers timing of tracheostomy, incorporating the context of the patient's physiology • Identifies a patient who would benefit from referral for an advanced intervention (eg, ECLS) • Facilitates culturally competent multidisciplinary conversations with a patient/caregiver(s) regarding goals of care

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Evaluation & Management of a Patient with Respiratory Failure

Level	Resuscitation	Ongoing Management	Transition of Care
	cricothyroidotomy in a complex and high-risk patient		
4 **Practice Ready** Independently manages complex critical illnesses and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Implements strategies to address a patient for whom noninvasive ventilation has failed • Initiates harm-mitigating strategies (eg, noninvasive management, low tidal volume ventilation, fluid status optimization) to prevent respiratory decompensation • Implements advanced strategies to address a patient for whom conventional invasive ventilation (eg, prone positioning, ECLS) has failed • Anticipates the difficult airway and manages it with advanced techniques • Adjusts appropriate support therapies (analgesia, noninvasive pulmonary support) and customizes them to the response of a complex trauma patient at risk for deterioration with injuries such as rib fracture, pulmonary contusion, or inhalation injury • Independently assesses and definitively manages immediately life-threatening respiratory conditions (eg, tension pneumothorax, aspiration, airway obstruction) • Leads the team in a procedural intervention in a complex or high-risk	• Incorporates evidence-based guidelines for management of acute respiratory failure and uses available clinical decision support tools in a complex patient • Manages ventilator dyssynchrony using pharmacologic adjuncts and ventilator adjustments in a complex patient • Interprets ventilator waveforms and adjusts ventilator settings as indicated in the care of a complex, mechanically ventilated patient • Mitigates respiratory comorbidities in a complex patient (eg, breath stacking in a patient with COPD) • Supervises therapeutic and diagnostic bronchoscopy for high-risk conditions such as inhalational injury when indicated • Addresses challenges that arise with advanced lung rescue therapies in the face of worsening respiratory failure • Manages respiratory infections in a complex patient • Develops and implements a weaning strategy in even a highly complex patient	• Initiates weaning from advanced respiratory support modalities (eg, drop and stretch) • Considers timing of tracheostomy, incorporating the context of a complex patient's physiology, such as a patient on anticoagulation or with recent neck surgery • Refers a patient who would benefit from advanced interventions (eg, ECLS) • Leads culturally competent multidisciplinary conversations with a patient/caregiver(s) regarding goals of care

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Evaluation & Management of a Patient with Respiratory Failure

Level	Resuscitation	Ongoing Management	Transition of Care
	patient (eg, chest drainage, bronchoscopy, cricothyrotomy)		

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Evaluation & Management of a Patient with Neurologic Dysfunction/Delirium/Encephalopathy or Brain Injury

Description of the Activity	All surgical intensivists should be able to perform focused and timely care for critically ill patients with neurologic dysfunction. Surgical intensivists are often called to diagnose and manage neurologic dysfunction, considering a broad differential diagnosis and focusing it appropriately based on clinical context.
Functions	❖ Resuscitation ➢ Promptly recognize patients with neurologic dysfunction. ➢ Synthesize essential information from a patient's history, physical examination, medical and surgical history, medications, baseline functional status, and cognitive function to determine potential care challenges. ➢ Use and interpret available diagnostic tests and imaging to determine the diagnosis and treatment plan. ➢ Lead an interdisciplinary team to ensure streamlined care and communication with patients/caregivers, including decision-making that addresses and considers a patient's goals of care. ➢ Recognize whether any specialty-specific surgical care will be needed, including transfer to a tertiary or quaternary center. ➢ Lead a collaborative, multidisciplinary team that includes referring practitioners, consulting teams, or outside providers to expedite care. ❖ Ongoing Management ➢ Recognize and manage complications of common neurological bedside procedures. ➢ Implement appropriate pharmacologic and nonpharmacologic strategies for the prevention and treatment of neurologic disorders. ➢ Appropriately use and apply evidence-based scoring systems to evaluate for neurologic dysfunction. ➢ Recognize the severity of neurologic dysfunction, and counsel and adjust the management plan accordingly. ➢ Recognize the ethical, moral, and logistical complexity surrounding death by neurological criteria, and apply the current standards and practices for evaluating patients with a potential diagnosis of death by neurological criteria. ➢ Reassess patients for consideration of additional stabilization, intervention, or specialist consultation, and communicate additional status and needs to the relevant teams. ❖ Transition of Care ➢ Throughout the care continuum, and particularly when there are unanticipated changes in the course of a patient's treatment, provide and lead the team in primary palliative care regarding communication, symptom management, and goal concordance. ➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of palliative care and ethics teams as needed. ➢ Customize difficult news to patients/caregivers, setting realistic recovery expectations and facilitating goals-of-care discussions.

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Evaluation & Management of a Patient with Neurologic Dysfunction/Delirium/Encephalopathy or Brain Injury

	➢ Identify when disease has become acutely life-limiting with no further disease-directed treatments, and lead the team in helping transition patients/caregivers to end-of-life care, prioritizing comfort and symptom-directed therapy as indicated. ➢ Lead the team in reflection on difficult patient care experiences, and employ coping strategies that maximize provider well-being and the health of the team. ➢ Systematically de-escalate care, and recognize when patients no longer requires intensive care unit (ICU)-level care. ➢ Select transfer destinations, and communicate with consultants and teams as well as patients/caregivers. ➢ Identify the need for post-ICU recovery services, such as neurological rehabilitation, long-term acute care facility, skilled nursing facility, or acute inpatient rehabilitation, and identify and direct support services for caregivers.
Scope	❖ In scope ➢ Anoxic brain injury ➢ Coma ➢ Death by neurological criteria ➢ Delirium ➢ Infectious neurological disease ➢ Metabolic encephalopathy ➢ Neurogenic shock and resuscitation ➢ Organ donor ➢ Polyneuropathy of critical illness ➢ Spinal cord injury ➢ Status epilepticus ➢ Stroke and intracranial hemorrhage ➢ Traumatic brain injury

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Evaluation & Management of a Patient with Neurologic Dysfunction/Delirium/Encephalopathy or Brain Injury

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Performs workup of neurologic dysfunction, ordering basic diagnostic studies such as imaging, labs, and EEG, but formulates an incomplete differential • Recognizes the severity of a patient's illness but requires ongoing assistance to execute a tailored diagnostic and treatment strategy • Discusses straightforward goals of care with a patient/caregiver(s) (eg, DNR/DNI) and elicits whether an intervention is desired • Provides a status update to a patient/caregiver(s) with assistance • Demonstrates limited communication with other team members, including nursing staff, regarding the resuscitation plan	• Recognizes validated scoring systems to evaluate for neurologic dysfunction and delirium but is unable to apply them • Recognizes changes in patient physiology but is unable to develop a treatment plan • Recognizes limited indications for neurologic monitoring • Implements pharmacologic and nonpharmacologic strategies for preventing and treating neurologic disorders and delirium with prompting • Develops a straightforward plan for managing sedation and analgesia with assistance • Implements organ donor management with ongoing supervision • Articulates basic principles of death by neurological criteria • Demonstrates knowledge of informed consent, surrogate decision-making, advance directives, and other ethical principles surrounding organ donation and death by neurologic criteria, requiring assistance with implementation	• Identifies when the disease has become acutely life-limiting with no further disease-directed treatments • With assistance, identifies a patient who no longer requires ICU-level care • Implements best practices for comfort- and symptom-directed therapy with prompting • Recognizes the potential need for post-ICU procedures (eg, tracheostomy, feeding tube) and recovery services with prompting • Communicates with consultants, teams, and patients/caregiver(s) regarding transfer destinations with ongoing assistance
2 **Direct Supervision**	• Performs workup of neurologic dysfunction, including most of the important elements, and develops a complete differential in a	• Recognizes validated scoring systems to evaluate for neurologic dysfunction and	• With prompting, communicates with a caregiver(s) when disease has become

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Evaluation & Management of a Patient with Neurologic Dysfunction/Delirium/Encephalopathy or Brain Injury

Level	Resuscitation	Ongoing Management	Transition of Care
Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	straightforward patient but requires assistance for a more complex patient • Recognizes severity of patient illness and requires limited assistance to execute a tailored diagnostic and treatment strategy • Discusses complex goals of care with a patient/caregiver(s) (eg, DNR/DNI) and elicits whether an intervention is desired • Provides a status update to a patient/caregiver(s) • Communicates with other team members, including nursing staff, regarding the resuscitation plan but may require some prompting	delirium and applies them to a straightforward patient • Recognizes changes in patient physiology and develops a comprehensive treatment plan • Recognizes straightforward indications for neurologic monitoring • Tailors pharmacologic and nonpharmacologic strategies for preventing and treating neurologic disorders and delirium in a straightforward patient • Develops basic plans for managing sedation and analgesia • Implements organ donor management goals with prompting • Performs a clinical exam for determination of death by neurologic criteria with minimal direction • Navigates a straightforward situation surrounding organ donation and death by neurologic criteria	acutely life-limiting with no further disease-directed treatments • Identifies a straightforward patient who no longer requires ICU-level care • Implements comfort- and symptom-directed therapy with assistance for a straightforward patient • Recognizes the potential need for post-ICU procedures (eg, tracheostomy, feeding tube) and recovery services • Initiates communication with consultants, teams, and patients/caregiver(s) regarding transfer destinations with some prompting
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations	• Performs workup of neurologic dysfunction independently and includes all of the important elements • Requires minimal assistance to execute tailored diagnostic and treatment strategies	• Recognizes validated scoring systems to evaluate for neurologic dysfunction and delirium and applies them in a complex condition	• Communicates with caregiver(s) when disease has become acutely life-limiting with no further disease-directed treatments

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Evaluation & Management of a Patient with Neurologic Dysfunction/Delirium/Encephalopathy or Brain Injury

Level	Resuscitation	Ongoing Management	Transition of Care
Framework: Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	but may require more guidance for complex conditions • Incorporates health care proxy, advance directives, and code status into a goal-concordant plan of care, seeking occasional guidance for complex cases • Provides status updates that are tailored to individual patient/caregiver health literacy and family dynamics, with some guidance for complex cases • Communicates with other team members, including nursing staff, regarding the resuscitation plan and solicits input and suggestions	• Applies evidence-based protocols and shared decision-making to the development of a treatment plan • Interprets data from neurologic monitoring and implements a treatment plan with assistance • Tailors pharmacologic and nonpharmacologic strategies for preventing and treating neurologic disorders and delirium in a complex patient • Executes plans for managing sedation and analgesia in a moderately complex patient, taking comorbidities into consideration • Implements organ donor management with minimal input • Applies the current standards and practices for evaluating patients with a potential diagnosis of death by neurological criteria • Recognizes the need to seek help in managing and resolving ethical, moral, and logistical complexity surrounding organ donation and death by neurologic criteria	• Recognizes when a patient no longer requires ICU-level care and initiates de-escalation, requiring assistance in a highly complex patient • Implements comfort and symptom-directed therapy for a patient, seeking assistance in a highly complex situation • Recognizes the potential need for post-ICU procedures (eg, tracheostomy, feeding tube) and recovery services and considers goal concordance and timing • Communicates with consultants, teams, and patients/caregiver(s) regarding transfer destinations, requiring direction for a complex patient
4 **Practice Ready** Independently manages complex critical illnesses	• Directs the workup of a patient with neurologic dysfunction, develops a comprehensive differential for the	• Leads the team in applying validated scoring systems to evaluate for neurologic dysfunction and delirium	• Recognizes when disease has become acutely life-limiting with no further disease-directed treatments and leads

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Evaluation & Management of a Patient with Neurologic Dysfunction/Delirium/Encephalopathy or Brain Injury

Level	Resuscitation	Ongoing Management	Transition of Care
and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	etiology, and recognizes the need for immediate intervention • Independently executes tailored diagnostic and treatment strategies in a highly complex patient • Recognizes and navigates prognostic uncertainty in communication with a patient/caregiver(s) • Independently provides status updates that are tailored to individual patient/caregiver health literacy and family dynamics • Communicates with other team members, including nursing staff, regarding the resuscitation plan, even in a complex and stressful situation	• Adjusts a complex and comprehensive management plan in response to a decline in neurologic function • Interprets data from neurologic monitoring and implements a treatment plan accordingly • Develops pharmacologic and nonpharmacologic strategies for preventing and treating neurologic disorders and delirium • Oversees initiation, titration, and discontinuation of sedation and analgesia, taking underlying comorbidities into consideration • Supervises the implementation of organ donor management goals • Applies the current standards and practices for evaluating patients with a potential diagnosis of death by neurological criteria, leading the team in navigating the diagnosis of a complex patient • Independently recognizes ethical, moral, and logistical complexity surrounding organ donation and death by neurologic criteria and uses appropriate resources for managing and resolving ethical dilemmas as needed	the transition to end-of-life care, prioritizing comfort and symptom-directed therapy • Recognizes when a patient no longer requires ICU-level care and initiates de-escalation, considering patient factors and specific hospital resources • Implements comfort and symptom-directed therapy in even a highly complex patient • Leads the team in coordinating procedures (eg, tracheostomy, feeding tube) and recovery services, considering goal concordance and timing • Communicates with consultants, teams, and patients/caregiver(s) regarding transfer destinations, even in a highly complex patient

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Evaluation & Management of a Patient with Renal Failure

Description of the Activity	Renal failure is kidney dysfunction that manifests as a disruption in the body's fluid, electrolyte, or acid-base equilibrium. All surgical intensivists must be able to diagnose, classify, and treat renal failure along its entire spectrum of grade and acuity.
Functions	❖ Resuscitation ➢ Apply grading scales to patients with acute renal failure, demonstrating understanding of their prognostic implications and limitations. ▪ Use scales such as RIFLE (Risk, Injury, Failure, Loss, End-stage kidney disease), AKIN (Acute Kidney Injury Network), and KDIGO (Kidney Disease: Improving Global Outcomes). ➢ Classify acute renal failure by etiology and solute handling, such as prerenal, intrarenal, and postrenal. ➢ Recognize common toxins and medications associated with acute renal failure. ➢ Employ temporizing measures in the management of complications associated with acute renal failure. ➢ Identify the indications for and timing of renal replacement therapy (RRT). ➢ Display cognitive and technical competence in obtaining urgent vascular access for RRT. ▪ Identify site selection risks and benefits. ▪ Identify and manage vascular access–related complications. ❖ Ongoing Management ➢ Identify, appraise, and apply renal failure prevention strategies. ➢ Manage patients with acute renal failure. ▪ Perform pharmacologic optimization of acid-base status and electrolyte derangements. ▪ Employ a comprehensive approach to volume status optimization using noninvasive and invasive measures. ▪ Recognize and treat complications associated with uremia. ➢ Demonstrate expertise in diuretic pharmacology, including loop diuretics, thiazide diuretics, potassium-sparing diuretics, osmotic diuretics, carbonic anhydrase inhibitors, and vasopressin receptor antagonists, and identify each of their distinct effects on physiology. ➢ Diagnose and manage the interplay of renal failure in multisystem organ dysfunction, including hepatorenal syndrome and cardiorenal syndrome. ➢ Apply considerations of chronic renal failure to acutely ill patients. ➢ Manage and appreciate the pharmacokinetics, pharmacodynamics, and medication adjustments necessary for patients with renal failure. ➢ Demonstrate understanding of renal replacement strategies, such as intermittent, prolonged intermittent, and continuous CRRT, and the implications of dose and prescription titration.

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Evaluation & Management of a Patient with Renal Failure

	❖ Transition of Care ➢ Coordinate the multidisciplinary care team, including appropriate consultation with nephrology, interventional radiology, and transplant teams. ➢ Recognize how renal comorbidities contribute to risk and prognosis for surgery. ➢ Appreciate limitations in health care resources with regards to RRT. ➢ Communicate an updated plan of care to a patient/caregiver(s) to ensure an understanding of the illness severity, prognosis, additional treatment options, and feasibility of carrying out the plan within the patient's psychosocial and socioeconomic context. ➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of RRT, using assistance of subspeciality palliative care and ethics teams as needed. ➢ In the event that disease has become acutely life-limiting and there are no additional disease-directed treatments, identify the end-of-life stage of care, and lead the team in helping patients/caregivers into this stage, prioritizing comfort and symptom-directed therapy as indicated.
Scope	❖ In scope ➢ Acute renal failure ➢ Chronic renal failure in the critically ill patient ➢ Fundamentals of RRT and modality selection ➢ Goals of care alignment ➢ Multisystem organ failure ➢ Urgent dialysis access

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Evaluation & Management of a Patient with Renal Failure

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Orders basic diagnostic studies to evaluate AKI and CKD and develops a limited differential • Requires active assistance to place RRT access • Describes indications for intervention in AKI/CKD, including RRT	• Defines basic principles and goals of RRT • Demonstrates limited understanding of renal pharmacology, nephrotoxicity, and dose modification in AKI/CKD • Demonstrates limited understanding of multisystem organ dysfunction in renal failure (eg, uremia, hepatorenal syndrome, cardiorenal syndrome, rhabdomyolysis) • Demonstrates understanding of basic management of electrolyte and volume disorders related to renal failure but requires active direction to address them	• Describes with prompting the impact of AKI/CKD on patient outcome • Requests consultation (eg, nephrology, palliative care) for initiation, maintenance, modality transition, or withdrawal of AKI/CKD care with supervision
2 **Direct Supervision** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical	• Interprets clinical and lab data to categorize AKI and CKD by sodium handling, etiology (including volume status), and grade, requiring assistance for comprehensive management • Independently places RRT vascular access with correct site selection and manages complications in a straightforward patient • With direct supervision, implements strategies for prevention and complication mitigation in AKI/CKD	• Describes the strengths and limitations of each RRT modality (eg, IHD vs CRRT) in a straightforward patient • Demonstrates understanding of renal pharmacology and nephrotoxicity in a straightforward patient with AKI/CKD • With direct supervision, manages multisystem organ dysfunction in a patient with renal failure (eg, uremia, hepatorenal syndrome, cardiorenal syndrome, rhabdomyolysis)	• Prognosticates the impact of AKI/CKD on the outcome for a straightforward patient • Incorporates consultant teams (eg, nephrology, palliative care) in initiation, maintenance, modality transition, or withdrawal of AKI/CKD care

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Evaluation & Management of a Patient with Renal Failure

Level	Resuscitation	Ongoing Management	Transition of Care
care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.		• Recognizes and uses knowledge of electrolyte and volume disorders related to renal failure to initiate management with intermittent direction	
3 **<u>Indirect Supervision</u>** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to	• Initiates emergent treatment of AKI and CKD with intermittent guidance, including pharmacologic measures, volume status/electrolyte optimization, and RRT • Independently places RRT vascular access and mitigates complications in a high-risk patient (eg, site selection limitations, coagulopathy, body habitus) • Independently implements strategies for prevention and complication mitigation in a patient with AKI/CKD	• Chooses a patient-tailored RRT modality with indirect supervision • Demonstrates an understanding of renal pharmacology and nephrotoxicity in a complex patient with AKI/CKD • Independently manages multisystem organ dysfunction in renal failure (eg, uremia, hepatorenal syndrome, cardiorenal syndrome, rhabdomyolysis) with limited supervision • Uses advanced knowledge of electrolyte and volume disorders related to renal failure to initiate management in a straightforward patient	• Prognosticates the impact of AKI/CKD on the outcome of a complex scenario, including identifying the need for long-term dialysis access • Coordinates a multidisciplinary team (eg, nephrology, palliative care) for initiation, maintenance, modality transition, or withdrawal of AKI/CKD care

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Evaluation & Management of a Patient with Renal Failure

Level	Resuscitation	Ongoing Management	Transition of Care
manage the most complicated ICU patients.			
4 **Practice Ready** Independently manages complex critical illnesses and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Directs emergent treatment of AKI and CKD, including pharmacologic measures, volume status/electrolyte optimization, and RRT • Independently places or supervises placement of RRT vascular access, including in a high-risk patient, and manages/troubleshoots complications as they occur • Independently incorporates and appraises evidence-based strategies for prevention and complication mitigation of AKI/CKD in a complex patient	• Collaboratively directs management of ongoing RRT, including assessment of treatment response • Applies knowledge of renal pharmacology and nephrotoxicity to a complex patient and anticipates complications in AKI/CKD • Leads the team in managing multisystem organ dysfunction in a patient with renal failure (eg, uremia, hepatorenal syndrome, cardiorenal syndrome, rhabdomyolysis) • Uses advanced knowledge of electrolyte and volume disorders related to renal failure to initiate management in a complex patient	• Communicates complex prognostic information in a critically ill patient with AKI/CKD to the patient/caregiver(s) and the team, including the need for long-term dialysis access • Leads the multidisciplinary team (eg, nephrology, palliative care) in aligning goals for initiation, maintenance, modality transition, or withdrawal of AKI/CKD care

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Evaluation & Management of the Nutritional Needs of a Critically Ill Patient

Description of the Activity	Surgical intensivists must recognize the importance of nutrition in critically ill patients and understand, implement, and manage individualized nutritional strategies for each patient.
Functions	❖ Resuscitation ➢ Evaluate the premorbid nutritional status of critically ill patients. ➢ Consider patients' goals of care when initiating nutritional support. ➢ Pick a suitable route of nutrition for critically ill patients. ➢ Develop an evidence-based nutritional strategy tailored to premorbid and morbid diagnoses, including calculation of nutrition needs. ➢ Recognize the risks and contraindications associated with each route of nutrition and how to address them. ➢ Tailor the use of supplemental micronutrients, vitamins, and minerals to each nutritional support plan. ➢ Recognize patients who may not be safe for oral (PO) intake. ❖ Ongoing Management ➢ Recognize that nutritional support is a dynamic process that requires ongoing reassessment. ➢ Identify and respond to the effects of nutrition on ventilator weaning and wound healing. ➢ Collaborate and communicate with other medical providers, nutritionists, and pharmacists regarding the nutritional needs of critically ill patients with competing issues. ➢ Recognize what laboratory values are important to follow in critically ill patients, and identify their limitations. ➢ Identify the interplay of fluid and electrolyte management with nutrition. ➢ Manage patients with gastrointestinal losses and chronic diarrhea. ❖ Transition Of Care ➢ Recognize when patients are achieving endpoints of nutritional resuscitation. ➢ Recognize the need for long-term feeding access or when nutritional support can be weaned. ➢ Perform ongoing monitoring and reassessment of nutritional status. ➢ In the event that disease has become acutely life-limiting and there are no additional disease-directed treatments, identify the end-of-life stage of care, and lead the team in helping patients/caregivers in this stage prioritize comfort and symptom-directed therapy as indicated.

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Evaluation & Management of the Nutritional Needs of a Critically Ill Patient

Scope	
	❖ In scope ➢ Critically ill patients with obesity ➢ Critically ill patients at risk for malnutrition ➢ Selection of nutritional support and mode of administration ▪ Enteral ▪ Parenteral ➢ Assessment of adequacy of nutritional support ➢ Critically ill patients with electrolyte, vitamin and fluid abnormalities ➢ Critically ill patients with comorbidities impacting nutritional support (e.g. renal dysfunction, hepatic dysfunction)

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Evaluation & Management of Nutritional Needs of a Critically Ill Patient

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Completes an initial nutritional assessment of a critically ill patient but without evaluating baseline nutritional status • Recognizes that a critically ill patient requires nutritional support but requires active assistance to choose the correct route, type, and supplements • Demonstrates limited ability to incorporate the current diagnosis into a nutritional support plan (eg, ECF, short gut, recent surgery, malnutrition) • Displays limited understanding of evidence-based guidelines when developing a nutritional support plan for a patient • Develops a nutrition plan but without considering patient/caregiver preferences or goals of care	• Requires active assistance to interpret nutritional data • Requires active assistance to incorporate fluid and electrolyte balance into a nutritional support plan • Requires active assistance to recognize that a nutritional strategy is inadequate or patient status has changed and make the necessary modifications	• Requires active assistance to develop strategies for ongoing management and reassessment of chronic nutritional support • Requires ongoing assistance to recognize long-term complications of parenteral nutrition (including central access) • Needs active assistance to develop a strategy for chronic nutritional support (eg, conversion of NGT to surgical gastrostomy tube) • With active assistance, initiates a goals-of-care conversation with a patient/caregiver(s) about long-term nutritional support • Requires active assistance to recognize the resources involved in long-term nutritional support
2 **Direct Supervision** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses	• Recognizes the need for and initiates nutritional support in a critically ill patient but for a more complex patient requires assistance to choose the correct route, type, and supplements • Completes an initial nutritional assessment of a critically ill patient but needs some	• Requires some assistance to interpret nutritional data • Requires occasional assistance to incorporate fluid and electrolyte balance into a nutritional support plan • Requires intermittent assistance to recognize that a nutritional strategy is	• Requires intermittent assistance to develop strategies for ongoing management and reassessment of chronic nutritional support in a straightforward patient • Requires intermittent assistance to recognize long-term complications of

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Evaluation & Management of Nutritional Needs of a Critically Ill Patient

Level	Resuscitation	Ongoing Management	Transition of Care
Framework: Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	prompting to include baseline nutritional status • Incorporates the current diagnosis(es) into a nutritional support plan (eg, ECF, short gut, recent surgery, malnutrition) with supervision • Requires prompting to apply evidence-based guidelines when developing a nutritional support plan for a more complex patient • With prompting, implements a nutrition plan taking into account patient/caregiver preferences and goals of care	inadequate or patient status has changed and make the necessary modifications	parenteral nutrition, including central access • Needs some assistance to develop a strategy for chronic nutritional support (eg, conversion of NGT to surgical gastrostomy tube) • With some assistance, initiates a goals-of-care conversation with a patient/caregiver(s) regarding long-term nutritional support • Requires some assistance to recognize the resources involved in long-term nutritional support
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **Framework:** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and	• Chooses the correct route, type, and supplements for a straightforward patient and requires intermittent assistance for a more complex patient • Completes initial nutritional assessment of a critically ill patient and includes baseline nutritional status • Incorporates current diagnosis(es) into a nutritional support plan (eg, ECF, short gut, recent surgery, malnutrition) with minimal input	• Requires occasional assistance to interpret nutritional data in a complex patient • Requires intermittent assistance to incorporate fluid and electrolyte balance into a nutritional support plan and modify the supplement type or route of administration in a complex patient • Recognizes that a nutritional strategy is inadequate or patient status has changed and makes the necessary modifications for a straightforward patient	• Requires minimal assistance to develop strategies for ongoing management and reassessment of chronic nutritional support in a complex patient • Requires minimal assistance to recognize long-term complications of parenteral nutrition, including central access • Needs intermittent assistance to develop a strategy for chronic nutritional support (eg, conversion of NGT to surgical gastrostomy tube) in a complex patient

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Level	Resuscitation	Ongoing Management	Transition of Care
supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	• Applies evidence-based guidelines when developing a nutritional support plan for a more complicated patient • With minimal assistance, implements a nutrition plan, taking into account patient/caregiver preferences and goals of care		• Requires minimal assistance to initiate a goals-of-care conversation with a patient/caregiver(s) surrounding long-term nutritional support • Requires minimal assistance to recognize the resources involved in long-term nutritional support
4 **Practice Ready** Independently manages complex critical illnesses and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Independently develops and implements a nutritional support plan using consultative services as indicated • Incorporates baseline nutritional status into a nutritional support plan and adjusts the plan accordingly • Recognizes implications of the current diagnosis(es) on the nutritional support plan (eg, ECF, short gut, recent surgery, malnutrition) and independently develops and implements a comprehensive plan • Critically appraises and applies evidence-based guidelines when developing a nutritional support plan for a critically ill patient while reconciling uncertainties or conflicting data • Independently engages with a patient/caregiver(s) to formulate an appropriate nutrition plan that aligns with goals of care	• Orders and interprets objective data as it relates to nutritional status and adjusts the nutritional support plan accordingly • Modifies the nutritional support plan (eg, changes in route of administration or supplement type) for a patient with complex needs (eg, hepatic failure, enteroatmospheric fistula) or when status and needs change • Leads and contributes to a multidisciplinary team to optimize patient nutritional status	• Independently develops a chronic nutritional support monitoring plan and adjusts nutritional support accordingly for a complex patient (eg, ECF, hepatic dysfunction) • Anticipates and addresses complications of long-term nutritional support and access • Independently engages with a complex patient and their caregiver(s) to develop a chronic nutritional support plan that aligns with goals of care • Coordinates care and navigates barriers to care for a patient with long-term nutritional support needs

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Evaluation & Management of a Critically Ill Child

Description of the Activity	Surgical intensivists are commonly called on to care for critically ill children. The surgical intensivist should be able to assess, diagnose, and manage critically ill pediatric patients and perform the common critical care procedures necessary for their treatment and monitoring.
Functions	❖ Resuscitation ➢ Perform a comprehensive assessment to evaluate the severity of illness and formulate a differential diagnosis. ➢ Recognize age-related differences in critical illness presentations in infants and children, including vital signs; physical exam; laboratory and diagnostic imaging indications and findings; differential diagnosis, and treatment options. ➢ Recognize age-appropriate considerations in workup relevant to infants and children, including implications of diagnostic radiation, skeletal immaturity, and pediatric-specific diagnostic techniques. ➢ Practice evidence-based pediatric resuscitation management, including weight-based fluid and blood product administration. ➢ Recognize when a patient's status exceeds individual, team, or hospital capabilities, and seek appropriate consultations or transfer. ➢ Recognize and manage limitations in institutional/system resources, and implement an approach to care in resource-limited situations. ➢ Work collaboratively with referring practitioners and consulting teams (including inpatient teams, emergency department team, pediatric team, pharmacy, or teams from outside facilities) to expedite care. ➢ Counsel patient/caregiver(s), ensuring alignment of goals of care; understanding of diagnosis, prognosis, and treatment options; and performing shared decision-making. ➢ Determine whether a procedure is indicated in conjunction with a patient/caregiver(s) and any other involved health care teams, ensuring patient/caregiver comprehension using applicable language services and audio/visual aids and addressing patient/caregiver questions, concerns, and preferences. ➢ Develop a safe sedation approach if indicated, in collaboration with the multidisciplinary team. ➢ Perform straightforward bedside procedures, recognizing age-related differences in equipment and techniques. ❖ Ongoing Care ➢ Monitor endpoints of resuscitation, and reassess the patient to identify whether any additional stabilization or specialist consultation is indicated. ➢ Recognize age-related alterations in pharmacokinetics, and adjust medication dosing and monitoring when indicated. ➢ Recognize fluid and nutritional needs in infants and children and implement age- and weight-appropriate nutritional support. ➢ Perform pediatric-specific advanced ventilatory management. ➢ Perform comprehensive evidence-based critical care management for organ system dysfunction. ➢ Be aware of applicable laws regarding surrogate decision-makers for minors. ➢ Be aware of indications for workup and pathways for management of child physical abuse/neglect. ❖ Transition of Care

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	➢ Reassess the patient at intervals for consideration of additional stabilization, intervention, or specialist care. ➢ Recognize the need for pediatric-specific rehabilitation in the context of child development. ➢ Recognize the need for age-appropriate enrichment and facilitate age-related social support. ➢ Lead an interdisciplinary team to ensure streamlined care and communication to patients/caregiver(s) to include decision-making that addresses and considers a patient's goals of care ➢ Throughout the care continuum, and particularly when there are unanticipated changes in the course of a patient's treatment, provide and lead the team in primary palliative care in communication, symptom management, and goal concordance. ➢ In complex patient care scenarios, lead the team in weighing risks, benefits, and goal concordance of possible therapies, using the assistance of subspeciality palliative care and ethics as needed. ➢ Customize difficult news to patients/caregiver(s), setting realistic recovery expectations and facilitating goals-of-care discussions. ➢ Systematically de-escalate care, and recognize when a patient no longer requires ICU-level care. ➢ Select transfer destination, and communicate with consultants and teams as well as patients/caregivers. ➢ Identify when the disease has become acutely life-limiting with no further disease-directed treatments, and lead the team in helping transition the patient/caregiver(s) to end-of-life care, prioritizing comfort and symptom-directed therapy as indicated. ➢ Lead the team in reflection on difficult patient care experiences, and employ coping strategies that maximize provider well-being and the health of the team.
Scope	❖ In scope ➢ Airway management of infants and children ➢ Cardiac arrest in children ➢ Child physical abuse and neglect ➢ Pediatric burns ➢ Pediatric extracorporeal membrane oxygenation (ECMO) evaluation ➢ Pediatric patients as defined by individual system guidelines and protocols ➢ Pediatric trauma ➢ Pediatric-specific infections ➢ Resuscitation in pediatric shock ➢ Sequelae of life-threatening congenital conditions

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Evaluation & Management of a Critically Ill Child

Level	Resuscitation	Ongoing Management	Transition of Care
1 **<u>Limited Participation</u>** Demonstrates limited critical care knowledge and skills **<u>Framework:</u>** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Recognizes the presence of shock but requires assistance to delineate type and etiology • Demonstrates basic knowledge of resuscitation but requires specific directions to initiate it in a straightforward patient • Requires active assistance to identify indications for advanced monitoring (eg, invasive monitoring, arterial pressure waveform) • Requires active assistance to apply age- and weight-related considerations to the resuscitation of a critically ill child • With prompting, recognizes the potential for child abuse; requires active direction for workup and further management • Requires active assistance to perform bedside procedures (eg, tube thoracostomy, peripheral arterial/central venous catheterization, IV access) and recognize complications • Requires prompting to provide timely, accurate, and accessible updates to a patient/caregiver(s) • Requires continuous direction from the attending physician to lead the team during resuscitation	• Requires active direction from the attending physician for continued assessment and management of a critically ill or injured patient; needs direction on when to modify therapy • Requires direct assistance to apply age- and weight-related considerations to the ongoing care of a critically ill child • Demonstrates familiarity with age-based nutritional assessment but needs assistance to implement it • Demonstrates knowledge of the pathophysiology, pharmacology, and therapeutics of complex critical care conditions; requires assistance to apply this knowledge in a clinical context • Requires active assistance to perform ICU procedures (eg, peripheral arterial/central venous catheterization) and recognize complications • Provides timely and accurate updates to a patient/caregiver(s); with active direction, customizes communication, avoiding personal biases and communication barriers • Requires active assistance to lead and coordinate the multidisciplinary care team during ongoing care	• Requires prompting to de-escalate care and recognize a patient's readiness for liberation from the ICU • Requires prompting to reflect on clinical reasoning for critical care problems • Requires direct assistance to provide timely and accurate updates to a patient/caregiver(s) • Clearly and concisely requests and responds to a consultation, using language that values all members of the health care team

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Evaluation & Management of a Critically Ill Child

Level	Resuscitation	Ongoing Management	Transition of Care
2 **<u>Direct Supervision</u>** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Recognizes the presence of shock and, with prompting, delineates type and etiology • Demonstrates knowledge of resuscitation and, with prompting, initiates it in a straightforward patient • Identifies indications for advanced monitoring, including invasive and arterial pressure waveform monitoring • With prompting, initiates resuscitation of a critically ill child, applying age- and weight-related considerations • Recognizes the potential for child abuse and initiates assessment; requires direction to complete assessment and management • Provides timely, accurate, and accessible updates to a patient/caregiver(s) in a straightforward situation • With prompting, leads the team during resuscitation • Requires direct supervision to perform bedside procedures (eg, tube thoracostomy, peripheral arterial/central venous catheterization, IV access) and recognize complications	• Requires direct supervision for continued assessment and management of a critically ill or injured patient; with prompting, adjusts therapy in response to changes in patient status • Requires direct supervision to apply age- and weight-related considerations to the ongoing care of a critically ill child • Performs age-based nutritional assessment, needing assistance to tailor it to specific patient needs • With direct supervision, synthesizes knowledge of the pathophysiology, pharmacology, and therapeutics of common critical care conditions • Performs ICU procedures (eg, peripheral arterial/central venous catheterization) and recognizes complications in a straightforward patient • With some coaching, coordinates recommendations from different members of the health care team; is cognizant and respectful of all health care team members • Customizes communication with a patient/caregiver(s), avoiding personal biases and communication barriers; actively listens to elicit patient/caregiver preferences and expectations	• De-escalates care and recognizes readiness for ICU liberation in a straightforward patient • With prompting, initiates conversations about the care plan as new clinical data/results arise • Customizes communication while avoiding personal biases and communication barriers with a straightforward patient and their caregiver(s); actively listens to the patient/caregiver(s) to elicit preferences and expectations • With prompting, assimilates recommendations from consultants and communicates with the health care team

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Level	Resuscitation	Ongoing Management	Transition of Care
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **Framework:** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients May require input to manage the most complicated ICU patients The learner can manage a critically ill patient in straightforward circumstances.	• Initiates evidence-based resuscitation for straightforward and complex patients with intermittent direction • Independently identifies indications for advanced monitoring, including invasive and arterial pressure waveform monitoring • With indirect supervision, applies age- and weight-related considerations to the resuscitation of a critically ill child • Recognizes the potential for child abuse and initiates and completes assessment and management, including social services involvement • Independently provides timely, accurate, and accessible updates to a patient/caregiver(s) • Independently leads the team during resuscitation of a straightforward patient • Performs bedside procedures (eg, tube thoracostomy, peripheral arterial/central venous catheterization) and manages complications in a straightforward patient	• With intermittent supervision, performs continued assessment and management of a complex critically ill or injured patient; monitors response to therapy and adjusts treatment in response to the patient's needs • Synthesizes and applies knowledge of the pathophysiology, pharmacology, and therapeutics of common critical care conditions • Performs age-based nutritional assessment and tailors it to specific patient needs • Independently performs ICU procedures (eg, peripheral arterial/central venous catheterization) and recognizes complications • Uses shared decision-making to develop a personalized care plan; delivers complex and difficult information to a patient/caregiver(s) • Coordinates recommendations from different members of the health care team and is cognizant and respectful of all health care team members • Applies evidence-based principles to direct patient care in a complex critical care problem	• De-escalates care and recognizes readiness for ICU liberation in a straightforward patient but requires guidance for a more complex or atypical patient • Independently reflects and adjusts the care plan as new clinical data arise • With indirect supervision, delivers complex and difficult information to a patient/caregiver(s) • Coordinates recommendations from different members of the health care team

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Evaluation & Management of a Critically Ill Child

Level	Resuscitation	Ongoing Management	Transition of Care
4 **Practice Ready** Independently manages complex critical illnesses and leads the critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Independently delineates the etiology of and initiates treatment for shock in a complex patient • Interprets data and tailors resuscitation for a complex patient, recognizing when the patient will benefit from advanced monitoring, including invasive and arterial pressure waveform monitoring • Applies age- and weight-related resources to the resuscitation of a critically ill child • Recognizes the potential for child abuse and directs the team in initiating and completing assessment and management, including social services involvement • Performs bedside procedures (eg, tube thoracostomy, peripheral arterial/central venous catheterization) and manages complications in a complex patient; troubleshoots techniques (eg, arterial/central line placement, including bedside ultrasound) • Independently anticipates, recognizes, and manages procedural complications • Facilitates difficult discussions specific to patient/caregiver needs • Independently leads the team during resuscitation of a complex patient, maintaining communication in a challenging situation; resolves conflict within the interdisciplinary team	• Independently assesses and manages a complex critically ill or injured patient, including treatment of complex injuries and complications carrying over from the initial evaluation and into longitudinal ICU care; adjusts therapies in response to changes in a patient's status • Independently uses age- and weight-related resources in the ongoing care of the critically ill child • Leads the team in performing age-based nutritional assessment and tailors it to specific patient needs, even in a highly complex patient • Synthesizes and applies knowledge of the pathophysiology, pharmacology, therapeutics, and complications of complex critical care conditions • Synthesizes and prioritizes the differential and anticipates potential complications in a complex critical care condition • Assesses a patient at high risk for procedural complications and describes management • Facilitates difficult discussions specific to patient/caregiver needs; negotiates and manages conflict between the patient/caregiver(s) and the health care team	• Independently de-escalates care and recognizes readiness for ICU liberation • Leads the team in debriefing clinical decision-making and identifying areas of improvement • Delivers complex and difficult information to a patient/caregiver(s); independently negotiates and manages conflict between the patient/caregiver(s) and the health care team • Leads and coordinates the care team and a patient/caregiver(s) in addressing goals and transitions of care

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Level	Resuscitation	Ongoing Management	Transition of Care
	• Requests and coordinates consultations for a complex patient; uses this information to address specific aspects of patient management	Independently leads and coordinates the multidisciplinary care team during ongoing care and promotes respect of all health care team members	

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Evaluation & Management of a Critically Ill Older Patient

Description of the Activity	Surgical intensivists should be able to recognize, manage, and tailor treatment paradigms to the unique considerations of geriatric and nongeriatric critically ill patients with frailty. Surgical intensivists should account for the physiological changes of aging, frailty, contributions of comorbid conditions, polypharmacy, baseline cognitive and functional status, and advance directives in the critical care management of this patient population.
Functions	❖ Initial Care ➢ Obtain a focused and relevant patient history, including medical history, polypharmacy, history of antiplatelet and anticoagulant therapy, place of residence, baseline functional status, cognitive function, nutritional status, and the events leading to the current state of illness. ➢ Obtain collateral information from caregivers, emergency medical services, and other health care providers when patients are unable to provide the information themselves. ➢ Perform a comprehensive physical examination to identify age and frailty-related changes across multiple organ systems, alterations in thermal regulation, and manifestations of osteoporosis and sarcopenia. ➢ Obtain laboratory and imaging studies and other diagnostic tests in conjunction with patients' clinical presentation and history to formulate accurate diagnoses and treatment plans. ➢ Anticipate age-related alterations in patient physiology (decreased cardiac reserve, diminished pulmonary function, altered drug metabolism, impaired immune response) and initiate or adjust the resuscitation paradigm and treatment plan accordingly. ➢ Acknowledge the importance of early identification of a health care proxy and advance directives. ➢ Anticipate the difference in level of care required for optimal patient management. ❖ Ongoing Care ➢ Assess patients for responsiveness to their current treatment plan, and consider the need for additional resuscitative measures, procedural or operative interventions, and specialist consultation. ➢ Use clinically applicable imaging and laboratory studies to guide ongoing treatment. ➢ Demonstrate understanding of age-related alterations in pharmacokinetics and the need for dose adjustment of medications. ➢ Incorporate frailty assessment into ongoing management. ➢ Recognize the increased risk of delirium in patients, and institute evidence-based protocols for delirium prevention, diagnosis, and treatment. ➢ Determine the presence and impact of malnutrition on patients' critical illness. ➢ Appreciate the importance of patient-centered goals-of-care discussions, including escalation or de-escalation of treatment paradigms, ensuring patient/caregiver understanding of the diagnosis, prognosis, and treatment options and facilitating shared decision-making, including advance directives. ❖ Transitional Care ➢ Identify the need for physical and occupational therapy evaluations and treatments. ➢ Identify the need for speech pathology evaluation, treatment, and management of dysphagia.

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Evaluation & Management of a Critically Ill Older Patient

	➢ Demonstrate understanding of the increased rate and impact of critical illness myopathy in older adult and frail patients. ➢ Recognize and plan for ongoing feeding, respiratory access, and durable medical equipment when needed. ➢ Identify the need for post-ICU recovery phase services, such as long-term acute care and skilled nursing facilities. ➢ Identify patients with resolution of their critical illness and candidacy for transfer to a lower level of care. ➢ Initiate appropriate transition to hospice or comfort-focused care with consideration of patient prognosis and advance directives. ➢ Recognize the anticipated level of future dependence and care requirements in the best- and worst-case scenarios.
Scope	❖ In scope ➢ Critically ill older adults (65 years of age or older) ➢ Critically ill adults who are frail or at risk for frailty

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Evaluation & Management of a Critically Ill Older Patient

Level	Resuscitation	Ongoing Management	Transition of Care
1 **<u>Limited Participation</u>** Demonstrates limited critical care knowledge and skills **<u>Framework:</u>** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Obtains an H&P of an older adult patient but omits some important elements unique to these patients (eg, baseline cognitive/functional status, polypharmacy, comorbidities, place of residence) • Needs prompting to seek information from collateral sources such as family members, EMS, and additional health care providers when a patient is unable to provide this information • Requires prompting to evaluate patient frailty, nutritional status, and risk of delirium • Requires prompting to recognize a patient receiving anticoagulation therapy and considerations for management (eg, type of anticoagulant, need for and management of reversal) • Initiates resuscitation without consideration of age-related physiologic changes • Requires prompting to incorporate all aspects of the health care proxy, advance directive, and code status into a goal-concordant plan of care that reflects acute illness	• Incorporates nutritional assessment with prompting and initiates workup for basic nutritional deficiencies/malnutrition but omits complex nutritional deficiencies/diagnoses • With prompting, initiates nutritional support, with preference for enteral support; recognizes the potential for aspiration and includes some measures to mitigate it (eg, HOB elevation) • Demonstrates limited knowledge of and ability to tailor the medication regimen, dosing, and potential drug interactions for an older adult patient • Resuscitates without active consideration of age-related physiologic changes; requires prompting to modify therapy in response to patient status • With active direction, resumes anticoagulant therapy in a patient previously receiving it (eg, chronic atrial fibrillation); requires prompting to recognize potential complications • Requires supervision to address the causes and symptoms of delirium and initiate management	• Requires prompting to de-escalate care and recognize readiness for liberation from the ICU • Coordinates ancillary service evaluations (eg, PT/OT/ST) with prompting • With direction, initiates patient assessment by transition of care services (eg, case management, social work) • With prompting, recognizes the need to assess a patient's long-term care needs, reflecting patient/caregiver preferences and goals of care • Exhibits limited participation in conversations with a patient/caregiver(s) regarding goal-concordant treatment; offers aggressive therapy (eg, long-term feeding access, tracheostomy) but requires prompting to consider patient prognosis, goals of care, and advance directives

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Level	Resuscitation	Ongoing Management	Transition of Care
	• Requires active supervision to complete triage of an older patient to the necessary level of care • With prompting, recognizes the potential for elder abuse; requires active direction for workup and further management	• Communicates the plan of care to a patient/caregiver(s) without consideration of patient-specific factors	
2 **<u>Direct Supervision</u>** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses **<u>Framework:</u>** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures	• Incorporates important elements unique to older adult patients (baseline cognitive/functional status, polypharmacy, comorbidities, place of residence) in the initial assessment of a straightforward patient, requiring ongoing guidance for a more complex patient • Seeks information from collateral sources (family members, EMS, additional health care providers) when a patient is unable to provide it but requires guidance to ensure all necessary elements are included • Performs basic nutritional and frailty assessments using standard tools; identifies risk factors for delirium • Identifies a patient receiving anticoagulation therapy but requires some direction to develop a management plan (type of anticoagulant, need for and management of reversal) • Initiates resuscitation with consideration of some but not all age-related physiologic changes	• Independently incorporates nutritional assessment and initiates workup for basic nutritional deficiencies/malnutrition but omits complex nutritional deficiencies/diagnoses • Initiates nutritional support, with preference for enteral support; recognizes the potential for aspiration and includes some measures to mitigate it (eg, HOB elevation) • Demonstrates proficiency in tailoring the medication regimen and dosing for an older adult patient; with some coaching, recognizes potential drug interactions • Resuscitates with some consideration of age-related physiologic changes but requires guidance to fully incorporate them into the treatment plan • Identifies evidence-based guidelines for resuming anticoagulant therapy in a patient previously receiving it (eg, chronic atrial fibrillation) but requires some coaching to do so	• De-escalates care and recognizes readiness for ICU liberation in a straightforward patient • Coordinates ancillary service evaluations (PT/OT/ST) independently but requires guidance to tailor timing to patient needs • Initiates patient assessment by transition of care services (eg, case management, social work) based on immediate needs, requiring guidance to anticipate long-term needs/change in status • Actively participates in conversations with a patient/caregiver(s) regarding risks, benefits, and goals of care concordance; requires ongoing direction to discuss aggressive therapies; demonstrates limited consideration of prognosis, goals of care, and advance directives

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Evaluation & Management of a Critically Ill Older Patient

Level	Resuscitation	Ongoing Management	Transition of Care
The attending gives active help throughout to direct the clinical course.	• With some direction, incorporates health care proxy, advance directive, and code status into a goal-concordant plan of care for a straightforward patient • Completes triage of an older adult patient to the required level of care in a straightforward situation, requiring guidance in a more complex situation (considering comorbidities/functional status, institutional guidelines and resource availability) • Recognizes the potential for elder abuse and initiates assessment; requires direction to complete assessment and management	• Identifies causes and symptoms of delirium independently and initiates straightforward management; requires guidance to initiate a delirium prevention plan • Communicates the plan of care to a patient/caregiver(s) with consideration for some but not all patient-specific factors	
3 <u>Indirect Supervision</u> Manages most critical illnesses but may require guidance for more complex patients or atypical presentations <u>Framework:</u> Demonstrates a sufficient fund of knowledge for basic and most complex critical care	• Independently incorporates important elements unique to an older adult patient, including baseline cognitive/functional status, polypharmacy, comorbidities, and place of residence, in the initial assessment • Independently seeks information from collateral sources (family members, EMS, additional health care providers), requiring guidance for a complex or atypical patient • Performs a comprehensive nutritional and frailty assessment using evidence-based tools, seeking guidance for a complex or atypical patient	• Incorporates nutritional assessment independently and addresses most nutritional deficiencies, requiring guidance for complex nutritional conditions • Demonstrates competence in tailoring a medication regimen and dosing to a patient; recognizes potential for drug interactions • Resuscitates with some consideration of age-related physiologic changes and tailors the treatment plan accordingly, requiring guidance for a more complex patient	• De-escalates care and recognizes readiness for ICU liberation but requires guidance in a more complex patient • Coordinates ancillary services evaluations (eg, PT/OT/ST) independently, tailoring timing to patient needs, but requires guidance in a complex situation • Initiates transition of care services (eg, case management, social work) independently but requires guidance for complex discharge planning

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Evaluation & Management of a Critically Ill Older Patient

Level	Resuscitation	Ongoing Management	Transition of Care
Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances May require input to manage the most complicated ICU patients	• Identifies a patient receiving anticoagulation therapy and develops a management plan (type of anticoagulant, need for and management of reversal), requiring some guidance for a complex or atypical patient • Incorporates age-related physiologic changes into resuscitation independently, seeking guidance for a complex or atypical patient • Incorporates health care proxy, advance directives, and code status into a goal-concordant plan of care independently, seeking guidance on a more complex case (eg, no advance directive and patient lacks capacity for decision-making, disagreement between directives and family wishes, noncooperative caregiver(s), more than one surrogate or LAR) • Independently triages a geriatric and frail patient to the required level of care; seeks attending input in a resource-limited and complex or atypical situation • Recognizes the potential for elder abuse and initiates and completes assessment and management, including social services involvement	• Initiates nutritional support, with preference for enteral support; recognizes the potential for aspiration and implements evidence-based measures to mitigate it (eg, HOB elevation) • Using evidence-based guidelines, resumes anticoagulant therapy in a patient previously receiving it (eg, chronic atrial fibrillation), and monitors for complications • Addresses the causes and symptoms of delirium and initiates treatment using evidence-based protocols, requiring guidance in a more complex patient • Communicates a plan of care to a patient/caregiver(s) independently with consideration of most patient-specific factors and goal-concordance; requires guidance to refine communication in a complex or atypical situation (eg, directives and family wishes, noncooperative family, more than one surrogate or legal representative)	• Identifies a patient for whom death is imminent and initiates discussions with family/caregiver(s) about transitioning to comfort-focused care; leads (with minimal assistance) caregivers in decision-making regarding long-term ventilatory and feeding access while considering patient prognosis, goals of care, and advance directives but requires attending input for a more complex or atypical patient
4 Practice Ready	• Incorporates important elements unique to an older adult patient (baseline cognitive/functional status, polypharmacy,	• Incorporates nutritional status and complex nutritional conditions into a treatment plan	• Independently de-escalates care and recognizes readiness for ICU liberation (MK1 L4)

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Evaluation & Management of a Critically Ill Older Patient

Level	Resuscitation	Ongoing Management	Transition of Care
Independently manages complex critical illnesses and leads a critical care team <u>Framework</u>: Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	comorbidities, place of residence) in the initial patient assessment independently, including in a complex/atypical case • Independently seeks collateral information from other sources (eg, family members, EMS, additional health care providers) when a patient is unable to provide this information, even in a complex situation • Anticipates and independently uses evidence-based tools to evaluate frailty and nutritional status in an older patient • Identifies a patient receiving anticoagulation therapy and independently develops a management plan (type of anticoagulant, need for and management of reversal), even for a complex or atypical patient • Independently Integrates age-related physiology in the complex resuscitation of an older adult patient • Leads the care team in involving the health care proxy and advance directives in decision-making (eg, no advance directives and patient lacks capacity for decision-making, disagreement between directives and family wishes, noncooperative family, more than one surrogate or LAR) • Independently triages an older patient to the required level of care, including in a resource-limited or atypical situation	• Demonstrates expertise in tailoring a medication regimen and dosing for a patient; proactively identifies the potential for drug interactions and adjusts therapies • Resuscitates with some consideration of age-related physiologic changes; assesses responsiveness and tailors the treatment plan accordingly • Promptly initiates nutritional support, with preference for enteral support; recognizes the potential for aspiration and proactively implements evidence-based measures to mitigate it (eg, HOB elevation) in a complex patient • Using evidence-based guidelines, coordinates with consultants and resumes anticoagulant therapy in a patient previously receiving it (eg, chronic atrial fibrillation); manages complications in a complex patient (eg, TBI, GI bleed) • Addresses the causes and symptoms of delirium and independently manages using evidence-based protocols • Communicates a plan of care to the patient/caregiver independently with consideration of most patient-specific factors and goal-concordance, including in a complex or atypical situation	• Coordinates ancillary service evaluations (eg, PT/OT/ST), addressing disparities within the plan of care • Communicates understanding of the prolonged post-ICU recovery phase and initiates transition of care services (eg, case management, social work) • Leads conversations with a patient/caregiver(s) with nuanced consideration of risks, benefits, and goal concordance of therapies in a complex situation; independently leads decision-making for long-term ventilatory and feeding access with consideration of prognosis, goals of care, and advance directives • Identifies a patient for whom death is imminent and leads the caregiver(s) in the transition to comfort-focused care

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Evaluation & Management of a Critically Ill Older Patient

Level	Resuscitation	Ongoing Management	Transition of Care
	• Recognizes the potential for elder abuse and directs the team in initiating and completing assessment and management, including social services involvement		

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Evaluation & Management of a Patient with Thermal Injury

Description of the Activity	Thermal injuries are a common problem encountered by critical care physicians. These injuries encompass hyperthermic, hypothermic, chemical, and electrical etiologies. All surgical intensivists should be able to perform initial management and stabilization and direct the timing and sequence of subsequent therapies.
Functions	❖ Resuscitation ➢ Demonstrate an understanding of and use institutional resources, including response systems and decontamination for patients with thermal injury. ➢ Identify the potential for inhalation injury or airway compromise, with consideration of difficult airway management and complex mechanical ventilation strategies. ➢ Deploy a validated method to assess the magnitude of thermal injury (size, depth). ➢ Initiate goal-directed fluid resuscitation for patients with thermal injuries, and address vascular access considerations. ➢ Identify failure to meet resuscitation endpoints, and adjust resuscitation strategies accordingly. ➢ Employ a plan for thermoregulation with consideration of passive and active strategies, anticipating the physiologic derangements associated with extremes of core body temperature. ➢ Address initial wound care and analgesia. ➢ Recognize the potential for associated injuries after thermal mechanisms, and perform a comprehensive assessment. ➢ Recognize the indications for escharotomy, fasciotomy, and bronchoscopy after thermal injury, and facilitate the performance of these procedures when indicated. ➢ Demonstrate understanding of the technical aspects of bronchoscopy and escharotomy. ❖ Ongoing Management ➢ Coordinate wound management, including topical antimicrobial therapy, specialized modalities, timing of debridement, and reconstructive options. ➢ Identify infectious complications, and initiate next steps in management, employing guideline-directed treatments and antibiotic stewardship principles. ➢ Address pain management and sedation needs, incorporating multimodal analgesia, including nonpharmacologic therapies, strategies to minimize delirium, and consideration of long-term objectives. ➢ Direct a nutritional evaluation, including rapid assessment of premorbid nutritional status and implementation of an action plan that encompasses nutritional needs and goals. ➢ Coordinate care between consulting and ancillary services. ➢ Communicate an updated plan of care to a patient/caregiver(s) to ensure understanding of the illness severity, prognosis, additional treatment options, and feasibility of carrying out the plan within the patient's psychosocial and socioeconomic context.

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Evaluation & Management of a Patient with Thermal Injury

	❖ Transition of Care ➢ Recognize and manage limitations in resource allocation, and initiate timely transfer using established criteria to an appropriate facility. ➢ Address the need for long-term wound care planning, incorporating destination reconstruction and therapy. ➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of subspecialty palliative care and ethics teams as needed. ➢ Anticipate long-term psychosocial effects and early engagement in available resources. ➢ In the event that disease has become acutely life-limiting and there are no additional disease-directed treatments, identify the end-of-life stage of care, and lead the team in helping patients/caregivers into this stage, prioritizing comfort and symptom-directed therapy as indicated.
Scope	❖ In scope ➢ Burn (thermal and chemical) ➢ Cold-induced injury (frostbite, frostnip, chilblains) ➢ Electrical injury ➢ Hypothermia/hyperthermia ➢ Inhalation injury ➢ Stevens-Johnson syndrome/toxic epidermal necrolysis/toxic shock syndrome ➢ Thermal injury involving children and adolescents

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Evaluation & Management of a Patient with Thermal Injury

Level	Resuscitation	Ongoing Management	Transition of Care
1 **Limited Participation** Demonstrates limited critical care knowledge and skills **Framework:** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Identifies situations in which inhalation injury may occur • Initiates fluid resuscitation relevant to the size and type of thermal injury with prompting; identifies some of the goals of resuscitation (urine output, lactate) • Requires prompting to ensure activation of institutional burn and decontamination protocols • Assesses the magnitude of thermal injury; initiates wound management with active direction • Obtains core body temperature; addresses thermoregulation with prompting • Performs primary and secondary surveys and obtains history • With prompting, updates a caregiver(s) on a patient's condition and anticipated treatment course and confirms code status	• In a patient with inhalation injury, recognizes the need for modified ventilatory strategies, requiring assistance to implement them • Requires active assistance to incorporate fluid and electrolyte balance into a nutritional support plan • Performs basic wound management with active assistance in a straightforward patient • Recognizes and addresses infectious complications with assistance • Provides pain and sedation treatment when indicated • With prompting, requests a multidisciplinary consultation (eg, PT, OT) and implements recommendations • With prompting, recognizes the indications for escharotomy and bronchoscopy, requiring direct supervision to perform them • Communicates an updated plan to a patient/caregiver(s)	• With prompting, initiates patient transfer for specialized care when meeting institutional criteria • Develops a long-term wound care plan with coaching • Requires prompting to consult services (plastic, reconstructive surgery) to assist with long-term wound care as needed • Consults palliative and recovery services • Participates in a goals-of-care and end-of-life discussion with coaching
2 **Direct Supervision** Initiates straightforward management for many critical illnesses but requires	• Recognizes a situation in which inhalation injury may occur and initiates management, requiring prompting to perform comprehensive management	• Modifies ventilatory strategies with direct supervision for a patient with an inhalation injury	• Initiates patient transfer for specialized care when meeting institutional criteria • Develops a long-term wound care plan

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Evaluation & Management of a Patient with Thermal Injury

Level	Resuscitation	Ongoing Management	Transition of Care
active direction for further management and complex critical illnesses **Framework:** Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Initiates fluid resuscitation in a patient and tailors it to resuscitation endpoints • Ensures activation of institutional burn and decontamination protocols • Assesses the magnitude of thermal injury (including complicating factors such as burn type and location) and initiates wound management with some direction; with prompting, evaluates for associated injuries • Initiates maneuvers to address thermoregulation with some guidance • Performs a primary and secondary survey and obtains a history, including comorbid conditions • Updates a caregiver(s) regarding a patient's condition and anticipated treatment course and confirms code status	• Requires some assistance to incorporate fluid and electrolyte balance into a nutritional support plan; preferentially initiates enteral nutrition • Performs wound care management for a straightforward patient, requiring assistance for a more complex patient; with direction, plans operative intervention if needed • With prompting, incorporates preventative strategies to mitigate infectious complications • Adjusts the pain and sedation plan for a straightforward patient • Requests multidisciplinary consultations (eg, PT, OT) and implements recommendations with guidance • Recognizes indications for escharotomy and bronchoscopy and performs these procedures in a straightforward patient with some guidance • Communicates an updated plan and consensus opinion on prognosis to a patient/caregiver(s)	• Consults services (plastic, reconstructive surgery) to assist with long-term wound care • Consults palliative and recovery services and coordinates care for a straightforward patient • Participates in prognostic, goals-of-care, and end-of-life care discussions
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex	• Identifies situations in which inhalation injury and need for airway management may occur and intervenes immediately	• Modifies ventilatory strategies with limited supervision to include complex modes and difficult ventilatory weaning in a patient with inhalation injury	• Directs patient allocation to appropriate specialty treatment centers when resource limitations have been reached • Develops a long-term wound care plan and provides anticipatory guidance to a

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Evaluation & Management of a Patient with Thermal Injury

Level	Resuscitation	Ongoing Management	Transition of Care
patients or atypical presentations **Framework:** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	• Initiates fluid resuscitation and identifies when fluid resuscitation endpoints are not met • Notifies supervisors to activate institutional management plans for mass casualty and decontamination protocols • Rapidly assesses the magnitude of thermal injury, including burn size, depth, location, and type (eg, scald, contact) and the potential for associated injuries; initiates wound management with intermittent direction • Initiates measures to correct thermoregulation abnormalities (eg, active and passive measures) • Identifies comorbid conditions that may affect overall thermal injury care • Participates in a structured goals-of-care discussion with caregiver(s) that includes the anticipated course of care	• Formulates a nutritional plan for a complex patient with minimal assistance, taking into account enteral and parenteral access • Directs wound management with early debridement and grafting for a straightforward patient, requiring some assistance for a more complex patient • Implements evidence-based protocols to manage infectious complications; with intermittent direction, recognizes the potential for fungal and atypical infections • Implements and modifies a pain and sedation management plan as requirements change • Requests multidisciplinary consultations (eg, PT, OT) and coordinates recommendations • Independently identifies the need for and performs procedures such as escharotomy and bronchoscopy • Directs consultative services to formulate a consensus opinion regarding the treatment plan and prognosis and communicates it to a patient/caregiver(s); provides an appraisal of overall care and anticipated recovery to a caregiver(s)	patient/caregiver(s) and treatment teams regarding expectations • Anticipates and consults services (plastic, reconstructive surgery) to assist with long-term wound care • Consults palliative and recovery services and coordinates care for a complex patient • Uses shared decision-making and a multidisciplinary team approach during a goals-of-care discussion

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Evaluation & Management of a Patient with Thermal Injury

Level	Resuscitation	Ongoing Management	Transition of Care
4 **<u>Practice Ready</u>** Independently manages complex critical illnesses and leads the critical care team **<u>Framework:</u>** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed for common or complex critical illness.	• Independently manages inhalation injury, including the difficult airway • Tailors the resuscitation strategy for a complex patient; adjusts the fluid resuscitation strategy when endpoints are not met • Proactively triggers institutional management plans for mass casualty and decontamination protocols; manages and coordinates institutional resources based on patient volume and burden of injury • Rapidly assesses the magnitude of thermal injury, including burn size and depth and type of burn, and identifies associated injuries; initiates wound management independently • Independently manages comorbid conditions as they affect overall thermal injury care • Conducts a structured goals-of-care discussion with a caregiver(s) that includes prognosis, prognostication information, and anticipated course of care	• Independently modifies ventilatory strategies to include complex modes and difficult ventilatory weaning for a patient with severe inhalation injury • Advises the team on advanced nutritional considerations, such as micronutrient deficiencies, specialized formulations, and metabolic side effects • Supervises complex wound management with early debridement and grafting; selects skin substitutes; modifies treatment for a patient with comorbid conditions that impede wound healing • Incorporates preventative strategies to mitigate infectious complications; recognizes the occurrence of infections and initiates treatment, recognizing the potential for fungal and atypical infections • Tailors sedation and pain management for a patient with a complex pain syndrome • Obtains multidisciplinary consultations (eg, PT, OT) and coordinates recommendations for a complex patient (eg, with multiple injuries, comorbidities) • Supervises team members when performing procedures, including escharotomy and bronchoscopy	• Facilitates and directs patient allocation to specialty treatment centers during local and regional response • Supervises the management of complex wound care and provides anticipatory guidance regarding long-term care and expectations • Facilitates consistent communication with multidisciplinary team(s) to formulate consensus opinion regarding prognosis • Coordinates palliative and recovery services for a complex patient • Resolves conflicts and discrepancies between multidisciplinary teams and patient/caregiver(s) using available resources and psychosocial support services

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Evaluation & Management of a Patient with Thermal Injury

Level	Resuscitation	Ongoing Management	Transition of Care
		• Provides a comprehensive appraisal of overall care and likely trajectory of recovery to caregiver(s), incorporating cultural considerations; resolves conflict regarding consensus opinion on a patient's treatment plan and prognosis	

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Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

Description of the Activity	Surgical intensivists often encounter patients who may require ECLS for acute respiratory failure, acute cardiac failure, and other indications. Surgical intensivists are often called to consider the role of ECLS in these patients and must be knowledgeable in the initiation, management, and discontinuation of ECLS.
Functions	❖ Resuscitation ➢ Identify patients who are candidates for ECLS. ➢ Determine the appropriate timing of ECLS initiation. ➢ Weigh the potential favorable and unfavorable outcomes of ECLS, and counsel patients/caregivers. ➢ Coordinate care with consulting teams to assess the need for intervention and interprofessional management, recognizing resource limitations. ➢ Guide the periprocedural management of patients on ECLS. ▪ Recognize the need for potential anticoagulation. ▪ Identify various cannulation considerations and configurations. ▪ Recognize complications of ECLS cannulation. ➢ Initiate and adjust ECLS settings to optimize patient physiology. ❖ Ongoing Management ➢ Manage the ECLS circuit to optimize patient physiology. ➢ Manage medications and other support devices to optimize patient physiology. ➢ Recognize and manage complications of ECLS. ➢ Consider how continuous renal replacement circuits interact with the ECLS circuit. ❖ Transition of Care ➢ Manage the weaning of ECLS treatment, and identify candidates for decannulation. ➢ Coordinate ongoing therapy and rehabilitation with the interprofessional health care team. ➢ Prepare for the potential long-term needs of patients requiring ECLS support. ▪ Consider appropriate timing of tracheostomy. ▪ Consider patients for advanced cardiac support therapies, durable mechanical support, or cardiac transplantation. ▪ Consider patients for pulmonary transplantation evaluation. ➢ Lead an interdisciplinary team to ensure streamlined care and communication to patients/caregivers to include decision-making that addresses and considers patients' goals of care.

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Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

	➢ Throughout the care continuum, and particularly when there are unanticipated changes in the course of a patient's ECLS treatment, provide and lead the team in primary palliative care regarding communication, symptom management, and goal concordance. ➢ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of subspeciality palliative care and ethics teams as needed. ➢ Customize difficult news to patients/caregivers, setting realistic recovery expectations and facilitating goals-of-care discussions. ➢ Identify when disease has become acutely life-limiting with no further disease-directed treatments, and lead the team in helping transition patients/caregivers to end-of-life care, prioritizing comfort and symptom-directed therapy as indicated. ➢ Lead the team in reflection on difficult patient care experiences, and employ coping strategies that maximize provider well-being and the health of the team.
Scope	❖ In scope ➢ All conditions that require ECLS support in adults and children

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Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

Level	Resuscitation	Ongoing Management	Transition of Care
1 **<u>Limited Participation</u>** Demonstrates limited critical care knowledge and skills **<u>Framework:</u>** What a learner directly out of residency should know Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures Requires continuous direct supervision by the attending for patient management	• Identifies ECLS as a possible treatment for a patient with severe cardiac and respiratory failure • Demonstrates limited knowledge of ECLS settings • Demonstrates understanding of the differences between VV and VA ECLS • Demonstrates limited knowledge of cannulation and its effect on a patient's physiology and potential complications • Provides a status update about a straightforward patient to the patient/caregiver(s) • Recognizes institutional limitations regarding ECLS (eg, not available) • Contacts faculty and consultants for cannulation and relays patient information about eligibility for ECLS when prompted	• Recognizes that the ECLS circuit requires adjustment in settings based on patient physiology • Demonstrates limited understanding that modifications in other treatments and support may be necessary while a patient is on ECLS • Requires continuous supervision to address underlying causes of respiratory and cardiac failure in the context of progressing overall patient care • Demonstrates limited understanding of various ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) • Provides status updates about a straightforward patient to the patient/caregiver(s) • Conveys recommendations from consulting services	• Articulates improvements in clinical status but is unable to formulate or implement a plan to wean a patient from ECLS • Identifies the potential long-term needs of a patient on ECLS (tracheostomy, transplant, rehabilitative services) but requires ongoing assistance to develop and implement a plan to meet these needs • Identifies the need for primary palliative care discussions and observes these conversations
2 **<u>Direct Supervision</u>** Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses	• Identifies when conventional therapies for a patient with severe cardiac and respiratory failure have failed and ECLS is the next treatment option • Demonstrates understanding of ECLS settings and considers changes to the setting based on patient physiology in the immediate postcannulation period	• Demonstrates understanding of the basics of ECLS circuit settings and their impact on patient physiology, proposing changes in management when necessary • Recognizes that modifications in other treatments and support may be necessary while a patient is on ECLS and implements them with assistance	• Initiates a plan for ECLS weaning enacted by the attending but is unable to adjust it without active input • Articulates when a patient is ready for a procedure/step such as tracheostomy, transplant, or rehabilitative services but requires assistance to execute a plan to accomplish it

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Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

Level	Resuscitation	Ongoing Management	Transition of Care
Framework: Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	• Demonstrates understanding of the indications for VV vs VA ECLS • Assists in pericannulation management of a patient, including anticoagulation, vascular access, cannula configuration, and potential complications • Coordinates communication with a complex patient and their caregiver(s) and provides them with status updates • Recognizes team and systems limitations to initiating ECLS • When ECLS therapy is indicated, discusses patient-related factors that impact eligibility for ECLS with faculty and consultants	• Identifies underlying causes of respiratory and cardiac failure in the context of overall patient care but needs assistance to address them • Recognizes ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) but requires assistance to manage them • Coordinates communication with a complex patient and their caregiver(s) and provides them with status updates • Develops a plan in conjunction with consulting service recommendations with some guidance	• Participates in primary palliative care discussions but does not fully incorporate the unique needs of patients on ECLS into these conversations
3 **Indirect Supervision** Manages most critical illnesses but may require guidance for more complex patients or atypical presentations **Framework:** Demonstrates a sufficient fund of knowledge for basic and most complex critical care Independently performs most ICU procedures and supervises procedures on straightforward patients	• Identifies a patient with evidence-based indications for ECLS and considers contraindications for ECLS • Develops standard initial settings for ECLS based on patient physiology and, with assistance, makes real-time adjustments in the immediate postcannulation period • Performs pericannulation management of a patient, including anticoagulation, vascular access, cannula configuration, and potential complications, requiring assistance for a complex patient or scenario • Actively coordinates and participates in patient/caregiver conversations regarding	• Considers and develops a plan for changes to ECLS settings based on patient clinical status • Applies ventilator support changes related to ECLS • Identifies underlying causes of respiratory and cardiac failure in the context of progressing overall patient care and develops a plan for treatment • Adjusts medication dose based on altered pharmacokinetics due to the ECLS circuit with intermittent guidance	• Initiates a plan for ECLS weaning enacted by the attending and adjusts it independently according to patient status • Identifies when a patient requires a tracheostomy and, with some guidance, coordinates care that includes rehabilitative services • Identifies a patient who is a candidate for transplantation but requires some guidance to initiate evaluation • Recognizes when a patient is not improving and initiates a primary palliative care discussion with

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Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

Level	Resuscitation	Ongoing Management	Transition of Care
The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.	treatment and prognosis, incorporating patient/caregiver goals and values • Transfers a patient as necessary based on unit and hospital resource availability or limitations • Mobilizes and coordinates the interprofessional team in periprocedural care to initiate ECLS	• Modifies ventilator support related to ECLS • Recognizes renal replacement needs and considers implications of ECLS support • Develops a plan for various ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) and provides immediate intervention for ECLS malfunctions • Actively participates in a patient/caregiver conversation regarding treatment and prognosis, incorporating patient/caregiver goals and values • Seeks interprofessional discussions and develops a care plan regarding ECLS treatment within the context of overall patient care	consideration of the unique needs of a patient on ECLS
4 **Practice Ready** Independently manages complex critical illnesses and leads a critical care team **Framework:** Demonstrates an attending-level fund of knowledge Independently performs and supervises procedures The attending is available at the request of the learner but is not routinely needed	• Selects a patient for ECLS according to evidence-based indications and contraindications • Tailors initial settings for ECLS based on patient physiology and makes real-time adjustments in the immediate postcannulation period • Supervises pericannulation management of a patient, including anticoagulation, vascular access, cannula configuration, and potential complications • Leads patient/caregiver conversations regarding treatment and prognosis,	• Guides changes to ECLS settings based on patient clinical status • Manages ventilator support accounting for ECLS and with consideration for a patient's changing physiology • Leads and educates the team on the management of underlying causes of respiratory and cardiac failure • Modifies medications based on altered pharmacokinetics due to the ECLS circuit • Manages complex renal replacement needs on ECLS	• Recognizes readiness to wean a patient from ECLS and develops, initiates, and adjusts the weaning plan • Coordinates care for tracheostomy if indicated and adjusts techniques/workflows for it; independently engages and leads the team in working with rehabilitative services when indicated • Identifies a patient who is a candidate for transplantation and initiates evaluation

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Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

Level	Resuscitation	Ongoing Management	Transition of Care
for common or complex critical illness.	incorporating patient/caregiver goals and values ● When transfer is necessary based on unit and hospital resources, availability, or limitations, prepares the patient and mobilizes systems resources for safe transfer ● Independently mobilizes, coordinates, and supervises the interprofessional team in periprocedural care to initiate ECLS	● Supervises the team in the development of a plan for ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) and educates the team on immediate interventions for ECLS malfunctions ● Leads a patient/caregiver conversation regarding treatment and prognosis, incorporating patient/caregiver goals and values ● Leads an interprofessional discussion and develops a care plan for ECLS treatment within the context of overall patient care in a complex situation, including when a lack of consensus exists within the care team regarding optimal management	● Recognizes when a patient is not improving and initiates and leads a primary palliative care discussion with consideration of the unique needs of a patient on ECLS Continuously readdresses goals of care for a patient on ECLS, incorporating their physiology and prognosis, unique needs, and goals and values