

TABLE 321-1 CALCULATION OF ACUTE PHYSIOLOGY AND CHRONIC HEALTH EVALUATION II (APACHE II) SCORE^a

Acute Physiology Score									
Score	4	3	2	1	0	1	2	3	4
Rectal temperature (°C)	≥41	39.0–40.9		38.5–38.9	36.0–38.4	34.0–35.9	32.0–33.9	30.0–31.9	≤29.9
Mean blood pressure (mmHg)	≥160	130–159	110–129		70–109		50–69		≤49
Heart rate (beats/min)	≥180	140–179	110–139		70–109		55–69	40–54	≤39
Respiratory rate (breaths/min)	≥50	35–49		25–34	12–24	10–11	6–9		≤5
Arterial pH	≥7.70	7.60–7.69		7.50–7.59	7.33–7.49		7.25–7.32	7.15–7.24	<7.15
Oxygenation									
If $FI_{O_2} > 0.5$, use $(A - a) D_{O_2}$	≥500	350–499	200–349		<200				
If $FI_{O_2} \leq 0.5$, use Pa_{O_2}					>70	61–70		55–60	<55
Serum sodium (meq/L)	≥180	160–179	155–159	150–154	130–149		120–129	111–119	≤110
Serum potassium (meq/L)	≥7.0	6.0–6.9		5.5–5.9	3.5–5.4	3.0–3.4	2.5–2.9		<2.5
Serum creatinine (mg/dL)	≥3.5	2.0–3.4	1.5–1.9		0.6–1.4		<0.6		
Hematocrit (%)	≥60		50–59.9	46–49.9	30–45.9		20–29.9		<20
WBC count (10^3 /mL)	≥40		20–39.9	15–19.9	3–14.9		1–2.9		<1
Glasgow Coma Score ^{b,c}									
<i>Eye Opening</i>	<i>Verbal (Nonintubated)</i>			<i>Verbal (Intubated)</i>			<i>Motor Activity</i>		
4—Spontaneous	5—Oriented and talks			5—Seems able to talk			6—Verbal command		
3—Verbal stimuli	4—Disoriented and talks			3—Questionable ability to talk			5—Localizes to pain		
2—Painful stimuli	3—Inappropriate words			1—Generally unresponsive			4—Withdraws from pain		
1—No response	2—Incomprehensible sounds						3—Decorticate		
	1—No response						2—Decerebrate		
							1—No response		
Points Assigned to Age and Chronic Disease									
<i>Age, Years</i>	<i>Score</i>								
<45	0								
45–54	2								
55–64	3								
65–74	5								
≥75	6								
<i>Chronic Health (History of Chronic Conditions)^d</i>	<i>Score</i>								
None	0								
If patient is admitted after elective surgery	2								
If patient is admitted after emergency surgery or for reason other than after elective surgery	5								

^aThe APACHE II score is the sum of the acute physiology score (vital signs, oxygenation, laboratory values), the Glasgow coma score, age, and chronic health points. The worst values during the first 24 h in the ICU should be used. ^bGlasgow coma score (GCS) = eye-opening score + verbal (intubated or nonintubated) score + motor score. ^cFor GCS component of acute physiology score, subtract GCS from 15 to obtain points assigned. ^dHepatic: cirrhosis with portal hypertension or encephalopathy; cardiovascular: class IV angina (at rest or with minimal self-care activities); pulmonary: chronic hypoxemia or hypercapnia, polycythemia, ventilator dependence; renal: chronic peritoneal or hemodialysis; immune: immunocompromised host.

Abbreviations: (A – a) D_{O_2} , alveolar-arterial oxygen difference; FI_{O_2} , fraction of inspired oxygen; Pa_{O_2} , partial pressure of oxygen; WBC, white blood cell count.

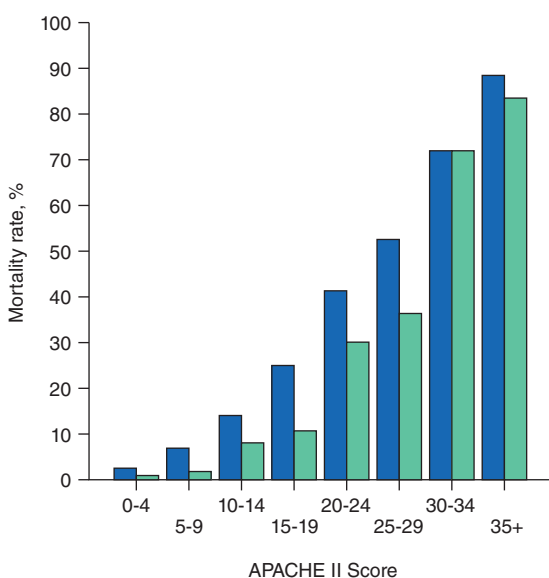


FIGURE 321-1 APACHE II survival curve. Blue, nonoperative; green, postoperative.

most common cause of high-cardiac-output hypotension is sepsis (Chap. 325). Other causes include liver failure, severe pancreatitis, burns and other trauma that elicit the systemic inflammatory response syndrome (SIRS), anaphylaxis, thyrotoxicosis, and peripheral arteriovenous shunts.

In summary, the most common categories of shock are hypovolemic, cardiogenic, and high-cardiac-output with decreased SVR (high-output hypotension). Certainly more than one category can occur simultaneously (e.g., hypovolemic and septic shock).

The initial assessment of a patient in shock should take only a few minutes. It is important that aggressive resuscitation is instituted on the basis of the initial assessment, particularly since early resuscitation from septic and cardiogenic shock may improve survival (see below). If the initial bedside assessment yields equivocal or confounding data, more objective assessments such as echocardiography and/or invasive vascular monitoring may be useful. The goal of early resuscitation is to reestablish adequate tissue perfusion and thus to prevent or minimize end-organ injury.

MECHANICAL VENTILATORY SUPPORT

(See also Chap. 323) During the initial resuscitation of patients in shock, principles of advanced cardiac life support should be followed.