

ECLS Registry Report

International Summary

January, 2012



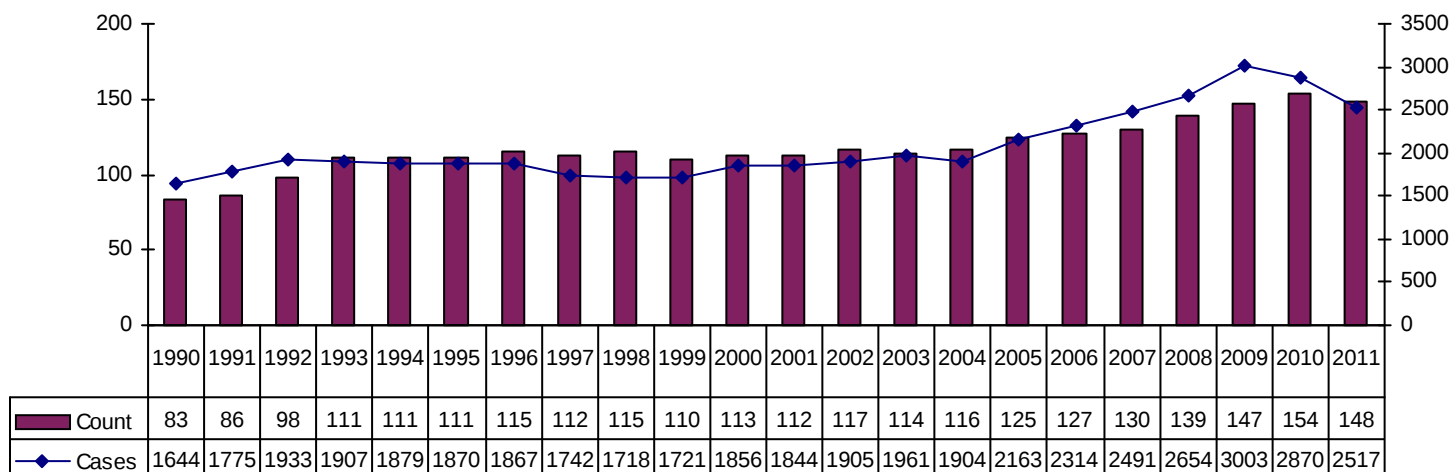
Extracorporeal Life Support Organization
2800 Plymouth Road
Building 300, Room 303
Ann Arbor, MI 48109

Overall Outcomes

	<i>Total Patients</i>	<i>Survived ECLS</i>		<i>Survived to DC or Transfer</i>	
Neonatal					
Respiratory	25,267	21,337	84%	18,846	75%
Cardiac	4,579	2,770	60%	1,807	39%
ECPR	749	473	63%	288	38%
Pediatric					
Respiratory	5,220	3,382	65%	2,901	56%
Cardiac	5,708	3,649	64%	2,751	48%
ECPR	1,477	786	53%	587	40%
Adult					
Respiratory	2,893	1,823	63%	1,572	54%
Cardiac	1,896	1,003	53%	733	39%
ECPR	648	243	38%	183	28%
Total	48,437	35,466	73%	29,668	61%

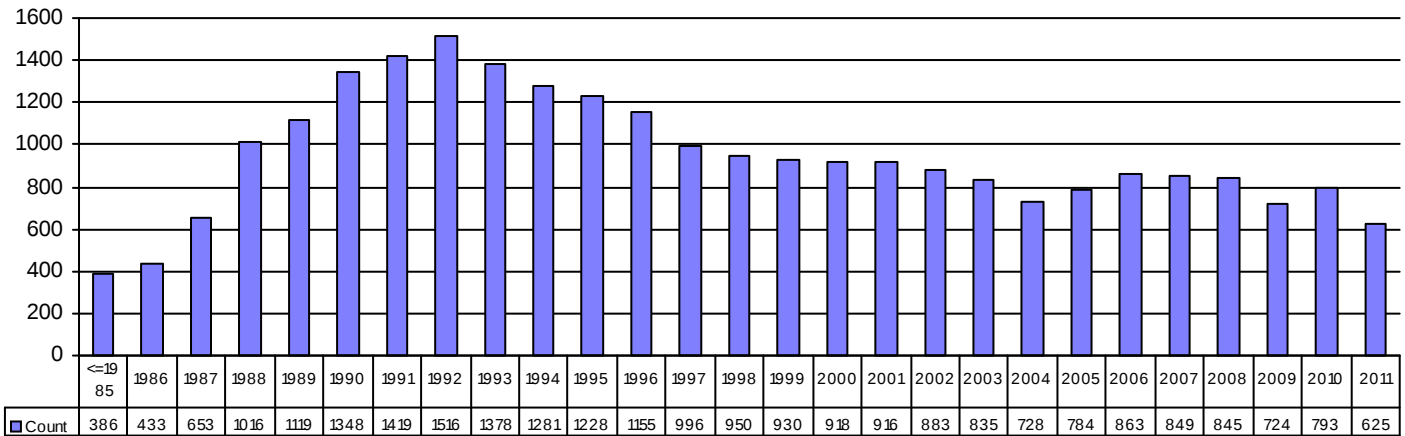
Centers

Centers by Year



Neonatal Respiratory (0-30 days)

Annual Respiratory Neonatal Runs



Neonatal Respiratory Runs by Year

	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
<=1985	386	386	114	473	303	78%
1986	433	819	121	840	355	82%
1987	653	1,472	121	411	558	85%
1988	1,016	2,488	131	673	841	83%
1989	1,119	3,607	134	500	917	82%
1990	1,348	4,955	144	672	1,095	81%
1991	1,419	6,374	153	827	1,141	80%
1992	1,516	7,890	153	1,200	1,181	78%
1993	1,378	9,268	158	959	1,095	79%
1994	1,281	10,549	161	936	973	76%
1995	1,228	11,777	163	794	927	75%
1996	1,155	12,932	166	1,176	842	73%
1997	996	13,928	173	1,131	742	74%
1998	950	14,878	187	1,093	682	72%
1999	930	15,808	182	812	673	72%
2000	918	16,726	188	936	693	75%
2001	916	17,642	189	949	650	71%
2002	883	18,525	190	944	624	71%
2003	835	19,360	195	1,001	549	66%
2004	728	20,088	196	956	472	65%
2005	784	20,872	205	1,006	529	67%
2006	863	21,735	208	1,033	577	67%
2007	849	22,584	198	1,229	565	67%
2008	845	23,429	214	1,133	563	67%
2009	724	24,153	212	1,327	489	68%
2010	793	24,946	205	2,549	541	68%
2011	625	25,571	212	1,175	393	63%

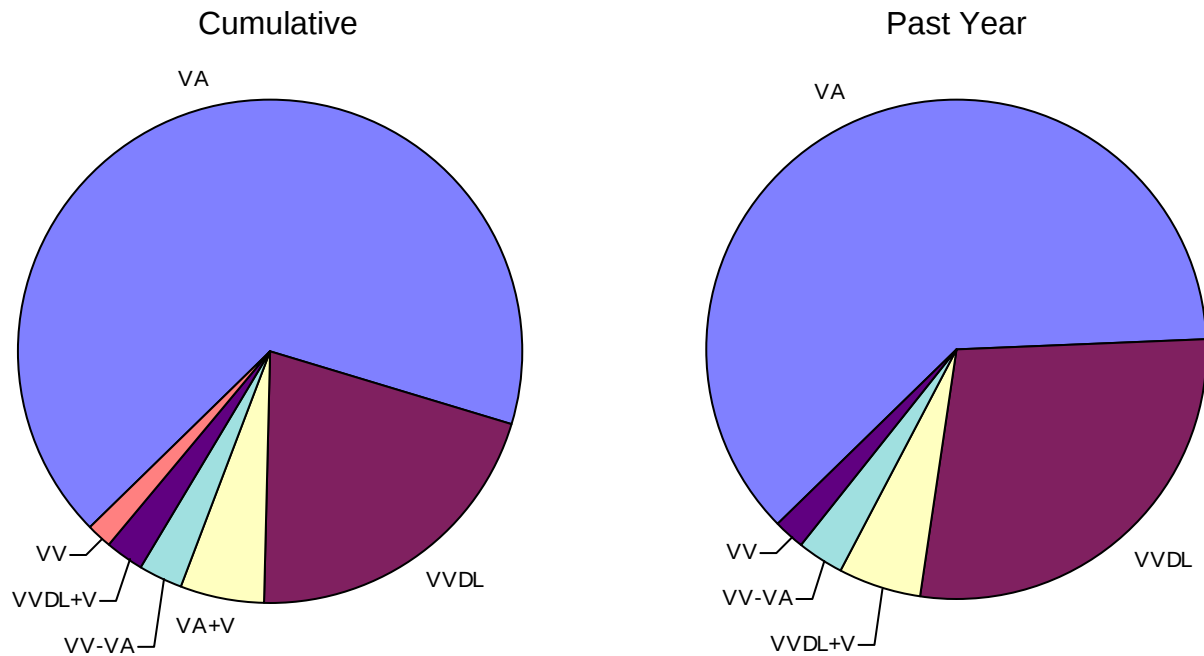
Run time in hours. Survived = survival to discharge or transfer based on number of runs

Neonatal Respiratory Runs by Diagnosis

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
CDH	6,376	250	2549	3,233	51%
MAS	7,825	131	1327	7,333	94%
PPHN/PFC	4,222	152	1176	3,265	77%
RDS	1,511	135	1093	1,272	84%
Sepsis	2,654	140	1200	1,980	75%
Pneumonia	349	239	1002	199	57%
Air Leak Syndrome	118	166	656	87	74%
Other	2,516	178	1227	1,601	64%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Neonatal Respiratory Support Mode



Neonatal Respiratory Support Mode Details

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VA	17,107	177	2549	12,202	71%
VVDL	5,220	146	1133	4,426	85%
VA+V	1,348	180	1176	983	73%
VV-VA	743	242	1229	465	63%
VVDL+V	660	154	682	530	80%
VV	392	157	1227	299	76%
Unknown	42	173	1072	25	60%
VA-VV	32	289	956	21	66%
Other	27	236	956	19	70%

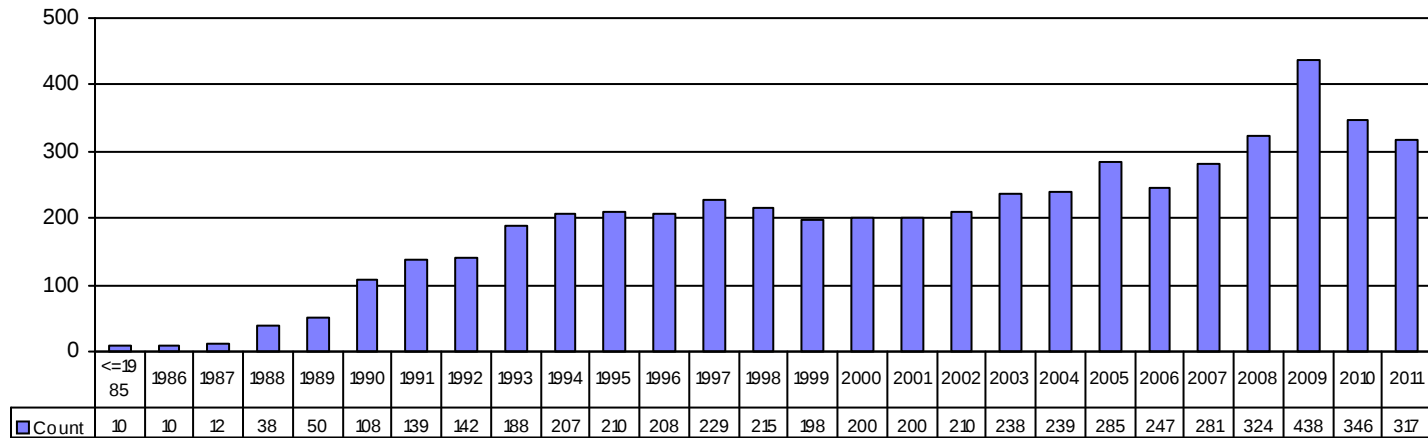
Run time in hours. Survived = survival to discharge or transfer based on number of runs

Neonatal Respiratory Complications

	<i>No. Reported</i>	<i>% Reported</i>	<i>No. Survived</i>	<i>% Survived</i>
Mechanical: Oxygenator failure	1,529	6.0%	809	53%
Mechanical: Raceway rupture	83	0.3%	48	58%
Mechanical: Other tubing rupture	155	0.6%	110	71%
Mechanical: Pump malfunction	439	1.7%	291	66%
Mechanical: Heat exchanger malfunction	198	0.8%	131	66%
Mechanical: Clots: oxygenator	4,394	17.2%	2,819	64%
Mechanical: Clots: bridge	2,477	9.7%	1,659	67%
Mechanical: Clots: bladder	3,814	14.9%	2,572	67%
Mechanical: Clots: hemofilter	736	2.9%	317	43%
Mechanical: Clots: other	1,869	7.3%	1,055	56%
Mechanical: Air in circuit	1,241	4.9%	863	70%
Mechanical: Cracks in pigtail connectors	685	2.7%	477	70%
Mechanical: Cannula problems	2,978	11.6%	1,986	67%
Hemorrhagic: GI hemorrhage	426	1.7%	189	44%
Hemorrhagic: Cannulation site bleeding	1,845	7.2%	1,184	64%
Hemorrhagic: Surgical site bleeding	1,605	6.3%	701	44%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	2,776	10.9%	1,783	64%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	662	2.6%	258	39%
Neurologic: Brain death clinically determined	232	0.9%	0	0%
Neurologic: Seizures: clinically determined	2,411	9.4%	1,467	61%
Neurologic: Seizures: EEG determined	262	1.0%	128	49%
Neurologic: CNS infarction by US/CT	1,884	7.4%	1,020	54%
Neurologic: CNS hemorrhage by US/CT	1,785	7.0%	788	44%
Renal: Creatinine 1.5 - 3.0	1,782	7.0%	914	51%
Renal: Creatinine > 3.0	345	1.3%	126	37%
Renal: Dialysis required	815	3.2%	326	40%
Renal: Hemofiltration required	3,809	14.9%	2,021	53%
Renal: CAVHD required	443	1.7%	205	46%
Cardiovascular: Inotropes on ECLS	5,243	20.5%	3,185	61%
Cardiovascular: CPR required	583	2.3%	235	40%
Cardiovascular: Myocardial stun by echo	1,242	4.9%	721	58%
Cardiovascular: Cardiac arrhythmia	989	3.9%	518	52%
Cardiovascular: Hypertension requiring vasodilators	3,147	12.3%	2,253	72%
Cardiovascular: PDA: R->L	444	1.7%	226	51%
Cardiovascular: PDA: L->R	388	1.5%	251	65%
Cardiovascular: PDA: bidirectional	412	1.6%	239	58%
Cardiovascular: PDA: unknown	249	1.0%	161	65%
Cardiovascular: Tamponade: blood	146	0.6%	59	40%
Cardiovascular: Tamponade: serous	44	0.2%	16	36%
Cardiovascular: Tamponade: air	11	0.0%	6	55%
Pulmonary: Pneumothorax requiring treatment	1,553	6.1%	902	58%
Pulmonary: Pulmonary hemorrhage	1,167	4.6%	502	43%
Infectious: Culture proven infection (see Infections)	1,520	5.9%	803	53%
Infectious: WBC < 1,500	149	0.6%	62	42%
Metabolic: Glucose < 40	758	3.0%	453	60%
Metabolic: Glucose > 240	962	3.8%	529	55%
Metabolic: pH < 7.20	861	3.4%	326	38%
Metabolic: pH > 7.60	1,411	5.5%	1,037	73%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	1,867	7.3%	1,199	64%

Pediatric Respiratory (> 30 days and < 18 years)

Annual Respiratory Pediatric Runs



Pediatric Respiratory Runs by Year

	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
<=1985	10	10	131	282	5	50%
1986	10	20	234	450	1	10%
1987	12	32	195	595	6	50%
1988	38	70	245	648	13	34%
1989	50	120	215	612	29	58%
1990	108	228	268	853	49	45%
1991	139	367	293	1,256	73	53%
1992	142	509	298	933	69	49%
1993	188	697	285	1,144	99	53%
1994	207	904	287	1,156	121	58%
1995	210	1,114	281	1,372	109	52%
1996	208	1,322	296	1,483	124	60%
1997	229	1,551	277	1,258	139	61%
1998	215	1,766	251	1,015	127	59%
1999	198	1,964	247	1,332	120	61%
2000	200	2,164	264	2,437	107	54%
2001	200	2,364	241	2,239	95	48%
2002	210	2,574	229	1,108	130	62%
2003	238	2,812	227	881	143	60%
2004	239	3,051	234	1,222	140	59%
2005	285	3,336	241	1,280	154	54%
2006	247	3,583	268	1,326	130	53%
2007	281	3,864	254	1,309	157	56%
2008	324	4,188	251	1,987	173	53%
2009	438	4,626	288	2,968	244	56%
2010	346	4,972	264	2,140	205	59%
2011	317	5,289	277	2,465	173	55%

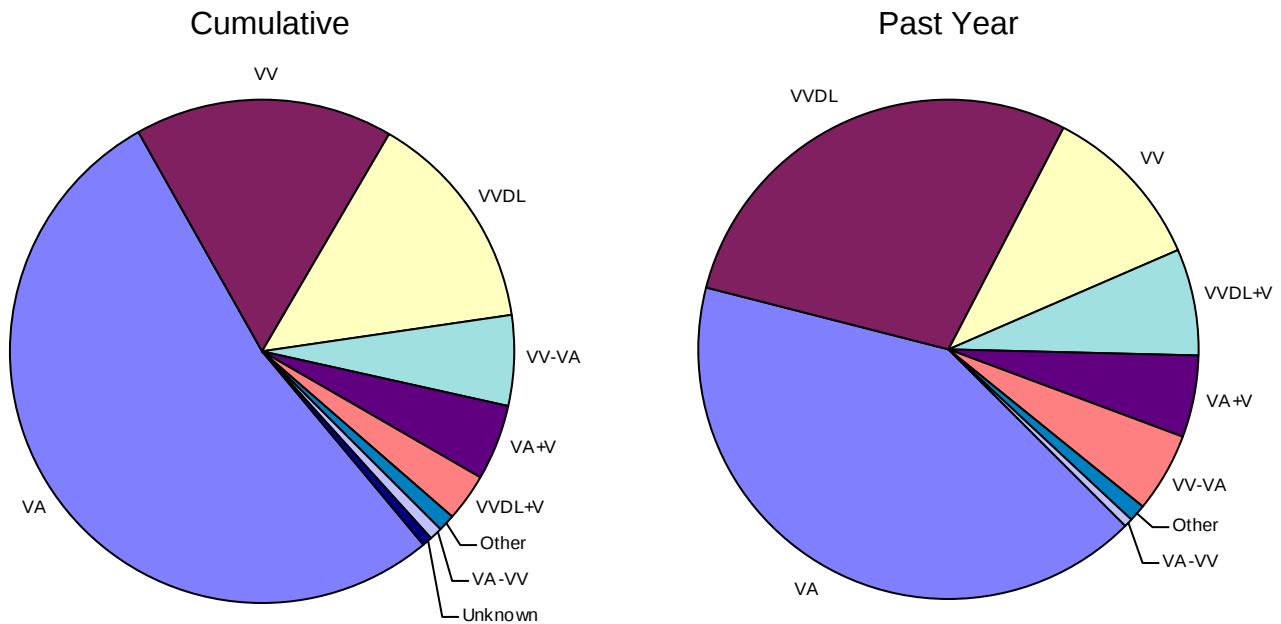
Run time in hours. Survived = survival to discharge or transfer based on number of runs

Pediatric Respiratory Runs by Diagnosis

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
Viral pneumonia	1,030	322	1372	650	63%
Bacterial pneumonia	568	282	1411	328	58%
Pneumocystis pneumonia	31	363	1144	15	48%
Aspiration pneumonia	210	269	2437	140	67%
ARDS, postop/trauma	124	251	935	73	59%
ARDS, not postop/trauma	419	310	2026	219	52%
Acute resp failure, non-ARDS	884	250	1483	461	52%
Other	2,023	222	2968	1,049	52%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Pediatric Respiratory Support Mode



Pediatric Respiratory Support Mode Details

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VA	2,810	255	2465	1,421	51%
VV	875	258	2437	559	64%
VVDL	749	243	1686	514	69%
VV-VA	316	360	1340	145	46%
VA+V	242	246	1483	112	46%
VVDL+V	166	266	903	107	64%
Other	62	390	2968	40	65%
VA-VV	34	449	1466	20	59%
Unknown	33	209	753	15	45%
VVA	2	170	213	2	100%

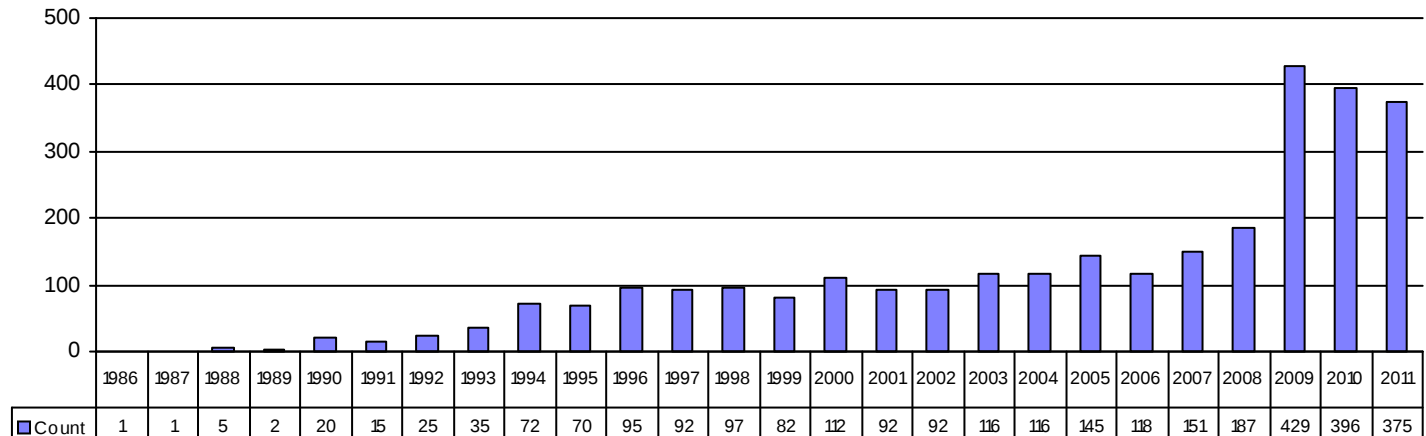
Run time in hours. Survived = survival to discharge or transfer based on number of runs

Pediatric Respiratory Complications

	No. Reported	% Reported	No. Survived	% Survived
Mechanical: Oxygenator failure	681	12.9%	292	43%
Mechanical: Raceway rupture	40	0.8%	19	48%
Mechanical: Other tubing rupture	121	2.3%	57	47%
Mechanical: Pump malfunction	132	2.5%	62	47%
Mechanical: Heat exchanger malfunction	22	0.4%	11	50%
Mechanical: Clots: oxygenator	511	9.7%	256	50%
Mechanical: Clots: bridge	245	4.6%	132	54%
Mechanical: Clots: bladder	316	6.0%	169	53%
Mechanical: Clots: hemofilter	239	4.5%	105	44%
Mechanical: Clots: other	601	11.4%	308	51%
Mechanical: Air in circuit	201	3.8%	100	50%
Mechanical: Cracks in pigtail connectors	72	1.4%	37	51%
Mechanical: Cannula problems	814	15.4%	416	51%
Hemorrhagic: GI hemorrhage	217	4.1%	55	25%
Hemorrhagic: Cannulation site bleeding	870	16.4%	442	51%
Hemorrhagic: Surgical site bleeding	756	14.3%	346	46%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	530	10.0%	227	43%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	279	5.3%	71	25%
Neurologic: Brain death clinically determined	280	5.3%	0	0%
Neurologic: Seizures: clinically determined	311	5.9%	105	34%
Neurologic: Seizures: EEG determined	76	1.4%	26	34%
Neurologic: CNS infarction by US/CT	210	4.0%	72	34%
Neurologic: CNS hemorrhage by US/CT	316	6.0%	71	22%
Renal: Creatinine 1.5 - 3.0	521	9.9%	162	31%
Renal: Creatinine > 3.0	242	4.6%	69	29%
Renal: Dialysis required	723	13.7%	226	31%
Renal: Hemofiltration required	1,178	22.3%	528	45%
Renal: CAVHD required	396	7.5%	155	39%
Cardiovascular: Inotropes on ECLS	2,428	45.9%	1,064	44%
Cardiovascular: CPR required	308	5.8%	66	21%
Cardiovascular: Myocardial stun by echo	87	1.6%	26	30%
Cardiovascular: Cardiac arrhythmia	384	7.3%	132	34%
Cardiovascular: Hypertension requiring vasodilators	862	16.3%	514	60%
Cardiovascular: PDA: R->L	5	0.1%	1	20%
Cardiovascular: PDA: L->R	20	0.4%	7	35%
Cardiovascular: PDA: bidirectional	6	0.1%	2	33%
Cardiovascular: PDA: unknown	1	0.0%	0	0%
Cardiovascular: Tamponade: blood	101	1.9%	40	40%
Cardiovascular: Tamponade: serous	22	0.4%	7	32%
Cardiovascular: Tamponade: air	18	0.3%	4	22%
Pulmonary: Pneumothorax requiring treatment	684	12.9%	281	41%
Pulmonary: Pulmonary hemorrhage	409	7.7%	121	30%
Infectious: Culture proven infection (see Infections)	945	17.9%	441	47%
Infectious: WBC < 1,500	181	3.4%	55	30%
Metabolic: Glucose < 40	66	1.2%	20	30%
Metabolic: Glucose > 240	556	10.5%	213	38%
Metabolic: pH < 7.20	368	7.0%	100	27%
Metabolic: pH > 7.60	146	2.8%	79	54%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	248	4.7%	68	27%

Adult Respiratory (18 years and over)

Annual Respiratory Adult Runs



Adult Respiratory Runs by Year

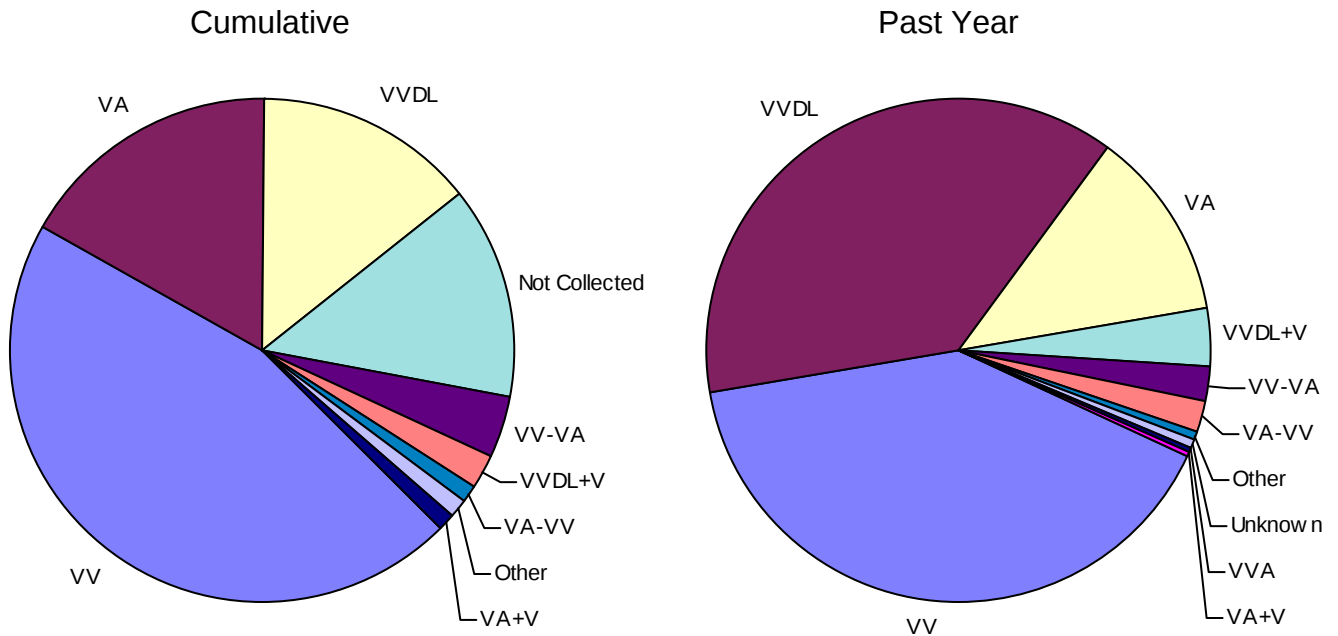
	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
1986	1	1	16	16	0	0%
1987	1	2	300	300	1	100%
1988	5	7	189	330	1	20%
1989	2	9	234	379	1	50%
1990	20	29	197	671	10	50%
1991	15	44	387	1,246	5	33%
1992	25	69	260	1,083	14	56%
1993	35	104	299	1,326	19	54%
1994	72	176	245	788	35	49%
1995	70	246	199	1,357	40	57%
1996	95	341	178	826	44	46%
1997	92	433	242	981	41	45%
1998	97	530	212	1,238	46	47%
1999	82	612	206	803	39	48%
2000	112	724	211	1,308	62	55%
2001	92	816	232	1,417	54	59%
2002	92	908	196	1,942	51	55%
2003	116	1,024	214	2,035	70	60%
2004	116	1,140	209	1,142	61	53%
2005	145	1,285	198	1,220	72	50%
2006	118	1,403	257	5,014	45	38%
2007	151	1,554	230	2,750	78	52%
2008	187	1,741	195	1,596	100	53%
2009	429	2,170	254	3,018	253	59%
2010	396	2,566	245	1,663	241	61%
2011	375	2,941	238	2,245	212	57%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Adult Respiratory Runs by Diagnosis

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
Viral pneumonia	115	277	1357	76	66%
Bacterial pneumonia	503	232	1585	302	60%
Aspiration pneumonia	75	202	1663	47	63%
ARDS, postop/trauma	232	240	1656	121	52%
ARDS, not postop/trauma	415	299	5014	203	49%
Acute resp failure, non-ARDS	192	238	1317	105	55%
Other	1,409	202	3018	741	53%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Adult Respiratory Support Mode**Adult Respiratory Support Mode Details**

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VV	1,336	236	5014	774	58%
VA	511	161	2035	214	42%
VVDL	410	230	2245	278	68%
Not Collected	407	227	1357	204	50%
VV-VA	109	462	3018	32	29%
VVDL+V	64	287	990	44	69%
VA-VV	35	250	976	19	54%
Other	33	208	791	16	48%
VA+V	33	144	578	14	42%
VVA	3	539	888	0	0%

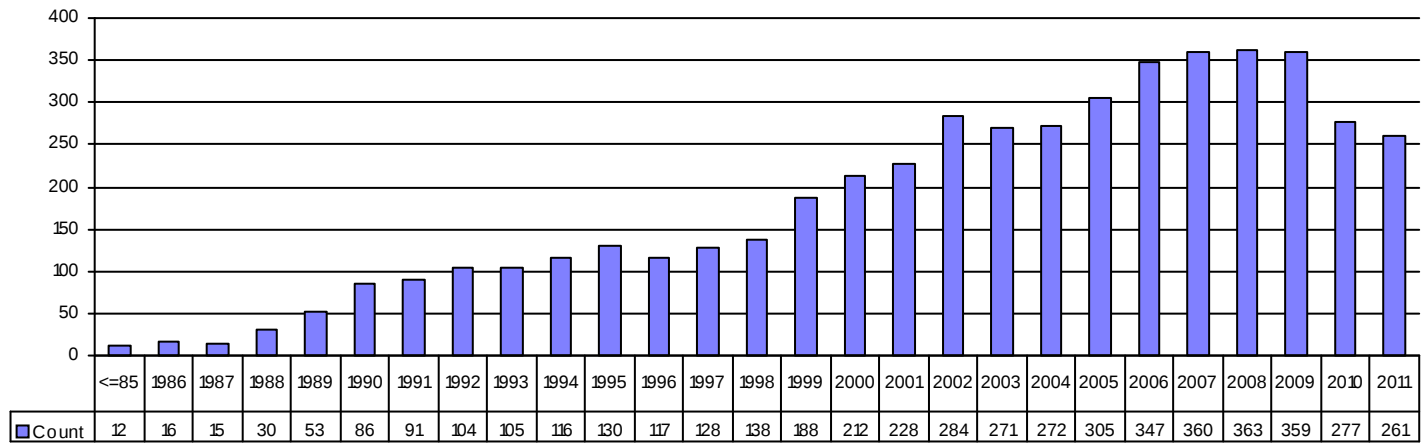
Run time in hours. Survived = survival to discharge or transfer based on number of runs

Adult Respiratory Complications

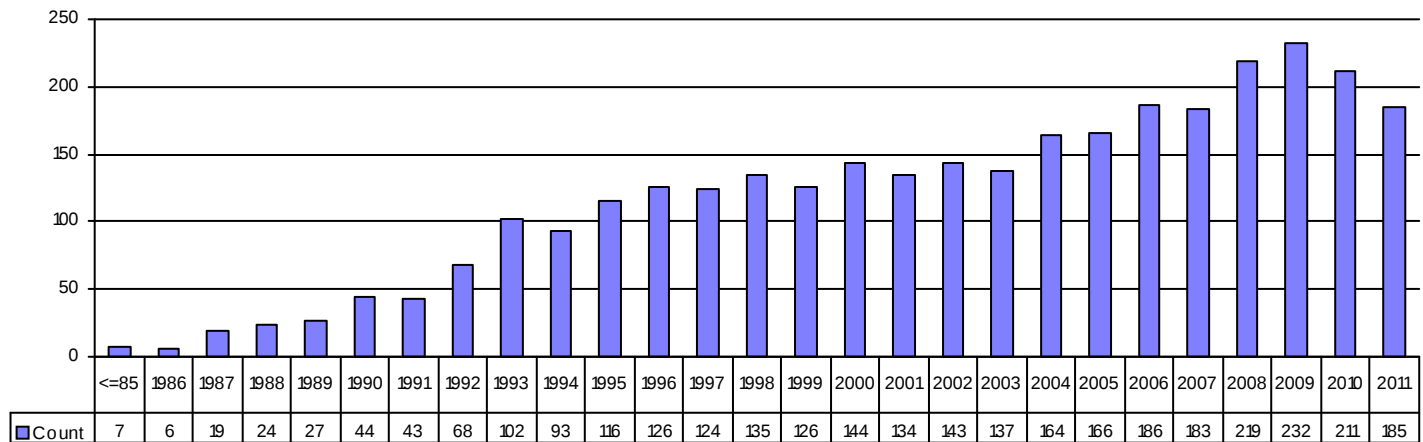
	No. Reported	% Reported	No. Survived	% Survived
Mechanical: Oxygenator failure	504	17.1%	227	45%
Mechanical: Raceway rupture	8	0.3%	2	25%
Mechanical: Other tubing rupture	44	1.5%	13	30%
Mechanical: Pump malfunction	68	2.3%	25	37%
Mechanical: Heat exchanger malfunction	14	0.5%	6	43%
Mechanical: Clots: oxygenator	384	13.1%	207	54%
Mechanical: Clots: bridge	72	2.4%	40	56%
Mechanical: Clots: bladder	80	2.7%	46	57%
Mechanical: Clots: hemofilter	105	3.6%	43	41%
Mechanical: Clots: other	222	7.5%	116	52%
Mechanical: Air in circuit	52	1.8%	28	54%
Mechanical: Cracks in pigtail connectors	29	1.0%	6	21%
Mechanical: Cannula problems	237	8.1%	102	43%
Hemorrhagic: GI hemorrhage	151	5.1%	45	30%
Hemorrhagic: Cannulation site bleeding	519	17.6%	269	52%
Hemorrhagic: Surgical site bleeding	521	17.7%	215	41%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	202	6.9%	73	36%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	111	3.8%	30	27%
Neurologic: Brain death clinically determined	111	3.8%	0	0%
Neurologic: Seizures: clinically determined	37	1.3%	16	43%
Neurologic: Seizures: EEG determined	13	0.4%	6	46%
Neurologic: CNS infarction by US/CT	64	2.2%	12	19%
Neurologic: CNS hemorrhage by US/CT	116	3.9%	19	16%
Renal: Creatinine 1.5 - 3.0	550	18.7%	204	37%
Renal: Creatinine > 3.0	378	12.9%	148	39%
Renal: Dialysis required	418	14.2%	165	39%
Renal: Hemofiltration required	686	23.3%	352	51%
Renal: CAVHD required	368	12.5%	152	41%
Cardiovascular: Inotropes on ECLS	1,736	59.0%	813	47%
Cardiovascular: CPR required	256	8.7%	53	21%
Cardiovascular: Myocardial stun by echo	40	1.4%	18	45%
Cardiovascular: Cardiac arrhythmia	482	16.4%	167	35%
Cardiovascular: Hypertension requiring vasodilators	185	6.3%	102	55%
Cardiovascular: PDA: R->L	2	0.1%	1	50%
Cardiovascular: Tamponade: blood	76	2.6%	33	43%
Cardiovascular: Tamponade: serous	6	0.2%	4	67%
Cardiovascular: Tamponade: air	4	0.1%	3	75%
Pulmonary: Pneumothorax requiring treatment	395	13.4%	182	46%
Pulmonary: Pulmonary hemorrhage	241	8.2%	90	37%
Infectious: Culture proven infection (see Infections)	616	20.9%	273	44%
Infectious: WBC < 1,500	70	2.4%	26	37%
Metabolic: Glucose < 40	39	1.3%	10	26%
Metabolic: Glucose > 240	463	15.7%	197	43%
Metabolic: pH < 7.20	263	8.9%	89	34%
Metabolic: pH > 7.60	91	3.1%	39	43%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	242	8.2%	80	33%

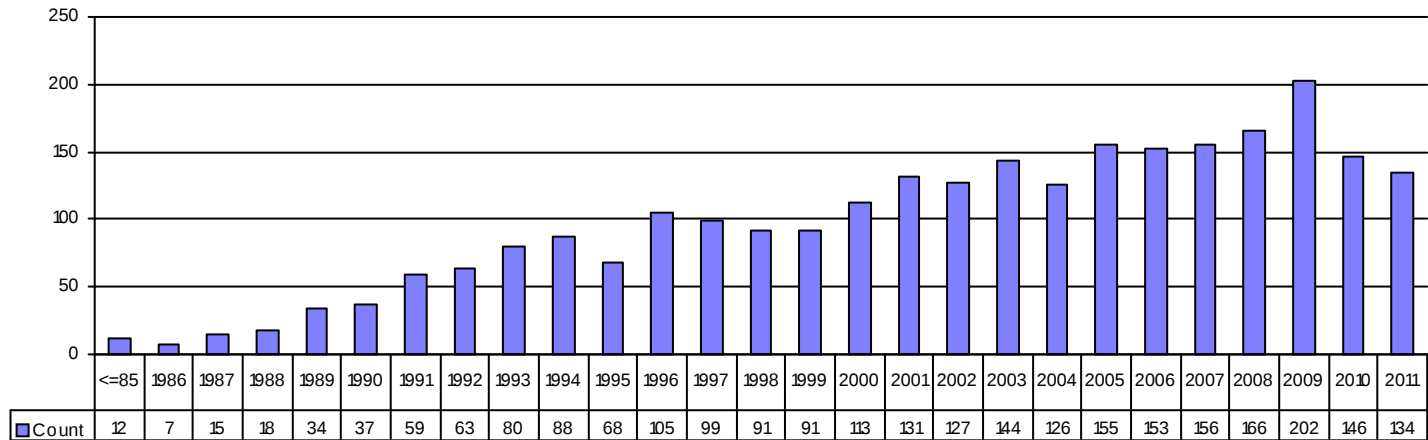
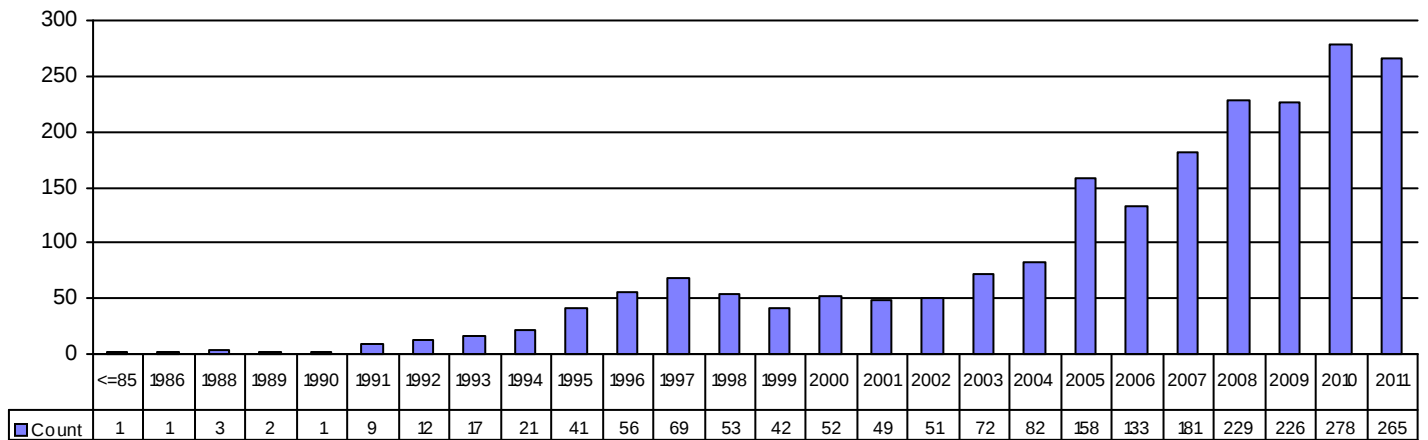
Cardiac

Annual Cardiac Runs (0 - 30 days old)



Annual Cardiac Runs (31 days and < 1 year of age)



Annual Cardiac Runs (1 year and < 16 years of age)**Annual Cardiac Runs (16 years old and over)**

Cardiac Runs by Year**Age Group: 0 - 30 days**

	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
<=85	12	12	97	167	9	75%
1986	16	28	137	286	11	69%
1987	15	43	105	217	7	47%
1988	30	73	118	269	16	53%
1989	53	126	125	344	30	57%
1990	86	212	123	348	39	45%
1991	91	303	145	600	37	41%
1992	104	407	165	547	42	40%
1993	105	512	168	831	41	39%
1994	116	628	176	667	39	34%
1995	130	758	152	701	45	35%
1996	117	875	136	767	42	36%
1997	128	1,003	157	1,126	42	33%
1998	138	1,141	150	765	51	37%
1999	188	1,329	146	867	65	35%
2000	212	1,541	132	645	66	31%
2001	228	1,769	147	1,198	81	36%
2002	284	2,053	137	907	100	35%
2003	271	2,324	160	954	103	38%
2004	272	2,596	149	989	112	41%
2005	305	2,901	155	1,871	107	35%
2006	347	3,248	144	726	121	35%
2007	360	3,608	153	952	145	40%
2008	363	3,971	150	721	148	41%
2009	359	4,330	155	1,524	157	44%
2010	277	4,607	152	1,099	128	46%
2011	261	4,868	152	1,009	107	41%

Cardiac Runs by Year**Age Group: 31 days and < 1 year**

	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
<=85	7	7	96	196	2	29%
1986	6	13	91	136	4	67%
1987	19	32	106	312	9	47%
1988	24	56	132	353	8	33%
1989	27	83	132	293	13	48%
1990	44	127	125	544	19	43%
1991	43	170	120	375	20	47%
1992	68	238	135	414	24	35%
1993	102	340	145	1,080	41	40%
1994	93	433	144	691	37	40%
1995	116	549	158	916	34	29%
1996	126	675	132	721	47	37%
1997	124	799	177	864	45	36%
1998	135	934	166	1,183	55	41%
1999	126	1,060	142	739	54	43%
2000	144	1,204	147	871	74	51%
2001	134	1,338	155	1,077	56	42%
2002	143	1,481	163	1,246	64	45%
2003	137	1,618	149	548	70	51%
2004	164	1,782	153	1,157	71	43%
2005	166	1,948	150	836	89	54%
2006	186	2,134	156	1,260	88	47%
2007	183	2,317	181	780	89	49%
2008	219	2,536	166	910	99	45%
2009	232	2,768	150	1,042	145	63%
2010	211	2,979	164	1,059	107	51%
2011	185	3,164	158	1,216	94	51%

Cardiac Runs by Year**Age Group: 1 year and < 16 years**

	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
<=85	12	12	76	170	6	50%
1986	7	19	90	127	2	29%
1987	15	34	92	215	9	60%
1988	18	52	87	197	7	39%
1989	34	86	119	261	14	41%
1990	37	123	133	509	12	32%
1991	59	182	111	432	26	44%
1992	63	245	133	428	21	33%
1993	80	325	144	715	36	45%
1994	88	413	130	720	27	31%
1995	68	481	143	984	30	44%
1996	105	586	142	504	43	41%
1997	99	685	138	664	45	45%
1998	91	776	165	1,137	38	42%
1999	91	867	156	1,029	37	41%
2000	113	980	137	818	50	44%
2001	131	1,111	160	1,490	61	47%
2002	127	1,238	166	1,119	65	51%
2003	144	1,382	186	987	76	53%
2004	126	1,508	175	1,026	64	51%
2005	155	1,663	185	1,207	87	56%
2006	153	1,816	138	624	91	59%
2007	156	1,972	162	963	90	58%
2008	166	2,138	129	578	103	62%
2009	202	2,340	154	1,282	137	68%
2010	146	2,486	124	882	82	56%
2011	134	2,620	159	1,138	80	60%

Cardiac Runs by Year**Age Group: 16 years and over**

	<i>Annual Runs</i>	<i>Cumulative Runs</i>	<i>Average Run Time</i>	<i>Longest Run Time</i>	<i>No. Survived</i>	<i>% Survived</i>
<=85	1	1	136	136	0	0%
1986	1	2	112	112	0	0%
1988	3	5	231	370	0	0%
1989	2	7	63	102	1	50%
1990	1	8	147	147	0	0%
1991	9	17	134	382	1	11%
1992	12	29	87	303	2	17%
1993	17	46	107	251	3	18%
1994	21	67	117	622	6	29%
1995	41	108	106	438	19	46%
1996	56	164	91	564	17	30%
1997	69	233	87	900	30	43%
1998	53	286	109	786	15	28%
1999	42	328	114	550	14	33%
2000	52	380	106	431	18	35%
2001	49	429	89	408	16	33%
2002	51	480	102	404	18	35%
2003	72	552	126	576	27	38%
2004	82	634	112	733	30	37%
2005	158	792	124	844	53	34%
2006	133	925	139	965	67	50%
2007	181	1,106	121	761	69	38%
2008	229	1,335	115	937	104	45%
2009	226	1,561	118	871	91	40%
2010	278	1,839	151	2,105	128	46%
2011	265	2,104	128	737	94	35%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Cardiac Runs by Diagnosis**Age Group: 0 - 30 days**

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
Congenital Defect	4,149	144	1524	1,575	38%
Cardiac Arrest	71	130	517	18	25%
Cardiogenic Shock	68	155	621	27	40%
Cardiomyopathy	113	214	867	69	61%
Myocarditis	55	259	868	27	49%
Other	412	180	1871	175	42%

Age Group: 31 days and < 1 year

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
Congenital Defect	2,423	148	1260	1,081	45%
Cardiac Arrest	78	133	587	37	47%
Cardiogenic Shock	43	155	1157	15	35%
Cardiomyopathy	149	210	1073	85	57%
Myocarditis	68	212	1246	50	74%
Other	403	167	1059	190	47%

Age Group: 1 year and < 16 years

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
Congenital Defect	1,207	135	1282	554	46%
Cardiac Arrest	94	113	525	37	39%
Cardiogenic Shock	91	128	692	47	52%
Cardiomyopathy	418	190	1490	246	59%
Myocarditis	206	181	1207	138	67%
Other	604	150	1138	317	52%

Age Group: 16 years and over

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
Congenital Defect	159	122	733	52	33%
Cardiac Arrest	107	83	1017	32	30%
Cardiogenic Shock	279	112	900	105	38%
Cardiomyopathy	248	149	2105	113	46%
Myocarditis	75	163	761	51	68%
Other	1,236	119	1222	470	38%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Cardiac Congenital Diagnoses

Age Group: 0 - 30 days	Total Runs	Avg Run Time	Longest Run Time	Survived	% Survived
Left to right shunt (ASD / VSD / PDA / AV canal / AVSD / ECD)	217	137	989	76	35%
Left-sided obstructive (aortic stenosis / mitral stenosis / coarctation)	396	150	1,524	131	33%
Hypoplastic left heart	1,066	138	1,198	329	31%
Right-sided obstructive (pulmonary stenosis / pulmonary or tricuspid atresia)	176	128	701	73	41%
Cyanotic incr. pulmonary flow (truncus arteriosus / TGA / TGV)	208	143	716	67	32%
Cyanotic incr. pulm. congestion (TAPVR / PAPVR)	553	151	888	241	44%
Cyanotic decr. pulmonary flow (TOF / DORV / Ebstein's)	519	162	1,126	208	40%
Other	1,014	138	831	450	44%

Cardiac Congenital Diagnoses

Age Group: 31 days and < 1 year	Total Runs	Avg Run Time	Longest Run Time	Survived	% Survived
Left to right shunt (ASD / VSD / PDA / AV canal / AVSD / ECD)	539	153	1,080	236	44%
Left-sided obstructive (aortic stenosis / mitral stenosis / coarctation)	218	151	1,260	84	39%
Hypoplastic left heart	280	153	1,216	107	38%
Right-sided obstructive (pulmonary stenosis / pulmonary or tricuspid atresia)	105	124	718	49	47%
Cyanotic incr. pulmonary flow (truncus arteriosus / TGA / TGV)	70	146	997	31	44%
Cyanotic incr. pulm. congestion (TAPVR / PAPVR)	114	139	771	46	40%
Cyanotic decr. pulmonary flow (TOF / DORV / Ebstein's)	214	155	891	89	42%
Other	883	144	1,183	439	50%

Cardiac Congenital Diagnoses

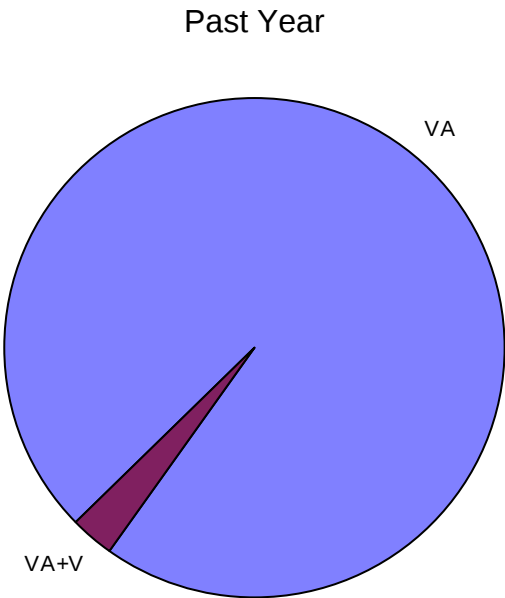
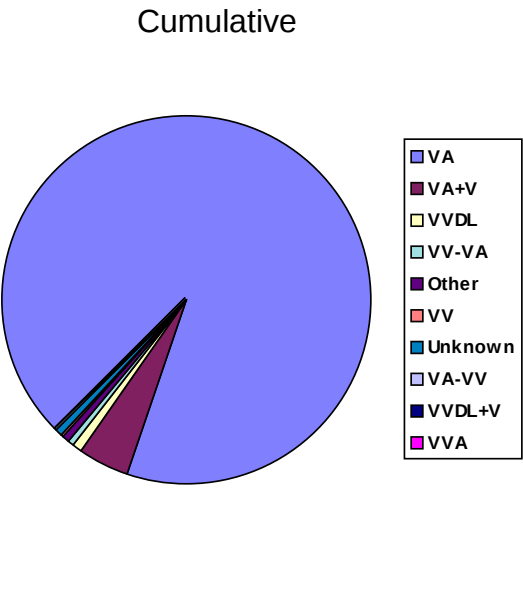
Age Group:	1 year and < 16 years	Total Runs	Avg Run Time	Longest Run Time	Survived	% Survived
	Left to right shunt (ASD / VSD / PDA / AV canal / AVSD / ECD)	232	143	781	98	42%
	Left-sided obstructive (aortic stenosis / mitral stenosis / coarctation)	160	109	1,029	84	53%
	Hypoplastic left heart	95	152	674	44	46%
	Right-sided obstructive (pulmonary stenosis / pulmonary or tricuspid atresia)	92	118	480	47	51%
	Cyanotic incr. pulmonary flow (truncus arteriosus / TGA / TGV)	10	84	281	2	20%
	Cyanotic incr. pulm. congestion (TAPVR / PAPVR)	3	8	10	1	33%
	Cyanotic decr. pulmonary flow (TOF / DORV / Ebstein's)	172	134	1,133	78	45%
	Other	443	141	1,282	200	45%

Cardiac Congenital Diagnoses

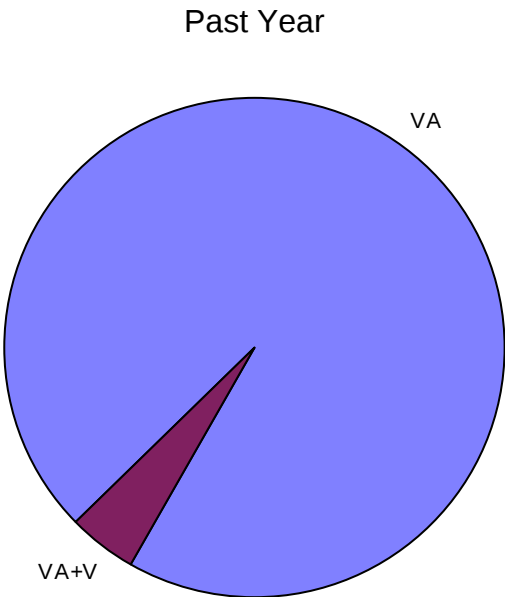
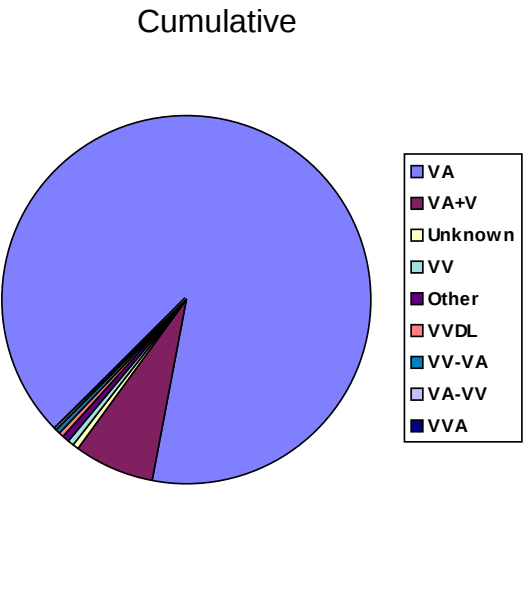
Age Group:	16 years and over	Total Runs	Avg Run Time	Longest Run Time	Survived	% Survived
	Left to right shunt (ASD / VSD / PDA / AV canal / AVSD / ECD)	22	177	733	7	32%
	Left-sided obstructive (aortic stenosis / mitral stenosis / coarctation)	54	89	420	17	31%
	Hypoplastic left heart	4	64	95	0	0%
	Right-sided obstructive (pulmonary stenosis / pulmonary or tricuspid atresia)	9	95	279	4	44%
	Cyanotic incr. pulmonary flow (truncus arteriosus / TGA / TGV)	3	97	152	1	33%
	Cyanotic decr. pulmonary flow (TOF / DORV / Ebstein's)	22	144	404	12	55%
	Other	45	136	446	11	24%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

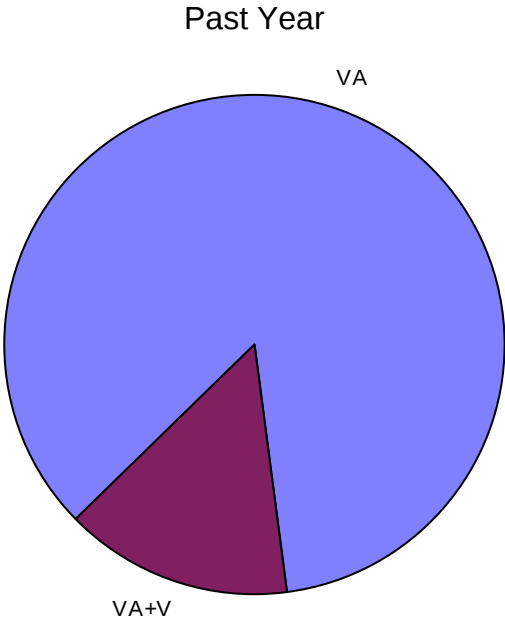
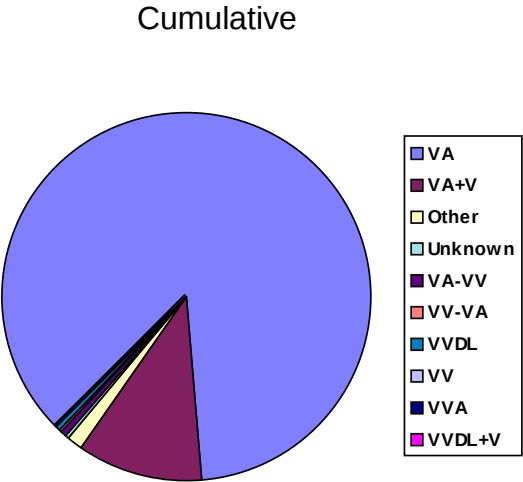
Cardiac Support Mode (0 - 30 days old)



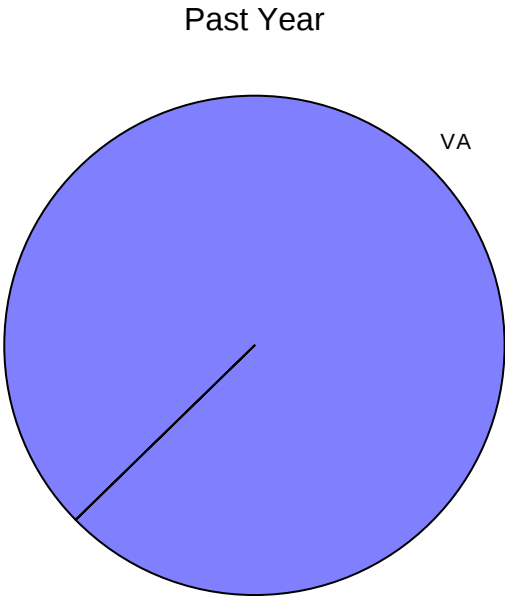
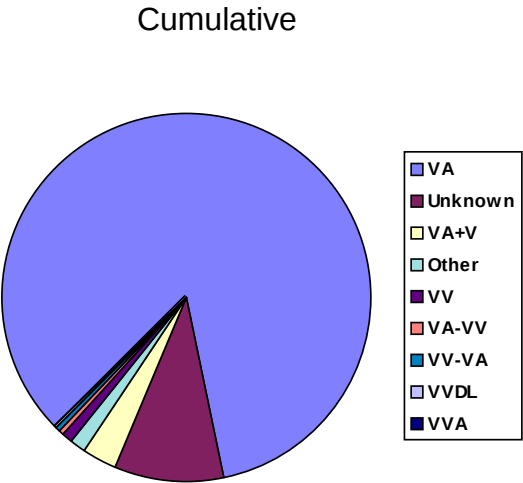
Cardiac Support Mode (31 days and < 1 year of age)



Cardiac Support Mode (1 year and < 16 years of age)



Cardiac Support Mode (16 years old and over)



Cardiac Support Mode Details**Age Group: 0 - 30 days**

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VA	4,498	148	1,871	1,742	39%
VA+V	219	175	1,524	89	41%
VVDL	41	140	721	27	66%
VV-VA	28	230	838	4	14%
Other	24	144	431	6	25%
VV	23	128	805	11	48%
Unknown	18	111	548	7	39%
VA-VV	11	325	526	1	9%
VVDL+V	5	113	209	4	80%
VVA	1	190	190	0	0%

Age Group: 31 days and < 1 year

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VA	2,856	153	1,260	1,303	46%
VA+V	221	168	891	110	50%
Unknown	19	106	253	9	47%
Other	18	145	503	10	56%
VV	18	104	288	11	61%
VVDL	17	143	392	8	47%
VV-VA	7	247	480	3	43%
VA-VV	6	270	718	2	33%
VVA	2	183	190	2	100%

Age Group: 1 year and < 16 years

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VA	2,258	146	1,490	1,145	51%
VA+V	284	165	1,133	156	55%
Other	31	204	633	15	48%
Unknown	12	132	264	7	58%
VA-VV	11	306	812	6	55%
VV-VA	9	81	136	5	56%
VVDL	6	181	409	2	33%
VV	5	125	180	1	20%
VVA	3	206	277	1	33%
VVDL+V	1	124	124	1	100%

Age Group: 16 years and over

	<i>Total Runs</i>	<i>Avg Run Time</i>	<i>Longest Run Time</i>	<i>Survived</i>	<i>% Survived</i>
VA	1,770	123	2,105	711	40%
Unknown	199	103	900	63	32%
VA+V	67	120	550	21	31%
Other	28	139	504	13	46%
VV	18	98	351	5	28%
VA-VV	10	229	626	6	60%
VV-VA	8	185	374	1	13%
VVDL	3	36	85	3	100%
VVA	1	207	207	0	0%

Run time in hours. Survived = survival to discharge or transfer based on number of runs

Cardiac Complications (0-30 days)

	No. Reported	% Reported	No. Survived	% Survived
Mechanical: Oxygenator failure	368	7.6%	87	24%
Mechanical: Raceway rupture	15	0.3%	3	20%
Mechanical: Other tubing rupture	27	0.6%	7	26%
Mechanical: Pump malfunction	80	1.6%	22	28%
Mechanical: Heat exchanger malfunction	31	0.6%	17	55%
Mechanical: Clots: oxygenator	549	11.3%	154	28%
Mechanical: Clots: bridge	213	4.4%	65	31%
Mechanical: Clots: bladder	328	6.7%	83	25%
Mechanical: Clots: hemofilter	206	4.2%	50	24%
Mechanical: Clots: other	649	13.3%	198	31%
Mechanical: Air in circuit	151	3.1%	41	27%
Mechanical: Cracks in pigtail connectors	33	0.7%	16	48%
Mechanical: Cannula problems	300	6.2%	101	34%
Hemorrhagic: GI hemorrhage	45	0.9%	5	11%
Hemorrhagic: Cannulation site bleeding	513	10.5%	150	29%
Hemorrhagic: Surgical site bleeding	1,540	31.6%	461	30%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	533	10.9%	150	28%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	182	3.7%	33	18%
Neurologic: Brain death clinically determined	56	1.2%	0	0%
Neurologic: Seizures: clinically determined	363	7.5%	107	29%
Neurologic: Seizures: EEG determined	134	2.8%	34	25%
Neurologic: CNS infarction by US/CT	174	3.6%	45	26%
Neurologic: CNS hemorrhage by US/CT	548	11.3%	127	23%
Renal: Creatinine 1.5 - 3.0	617	12.7%	138	22%
Renal: Creatinine > 3.0	92	1.9%	24	26%
Renal: Dialysis required	466	9.6%	93	20%
Renal: Hemofiltration required	1,265	26.0%	333	26%
Renal: CAVHD required	307	6.3%	50	16%
Cardiovascular: Inotropes on ECLS	2,958	60.8%	1,015	34%
Cardiovascular: CPR required	165	3.4%	22	13%
Cardiovascular: Myocardial stun by echo	326	6.7%	79	24%
Cardiovascular: Cardiac arrhythmia	714	14.7%	199	28%
Cardiovascular: Hypertension requiring vasodilators	427	8.8%	167	39%
Cardiovascular: PDA: R->L	21	0.4%	8	38%
Cardiovascular: PDA: L->R	64	1.3%	19	30%
Cardiovascular: PDA: bidirectional	20	0.4%	5	25%
Cardiovascular: PDA: unknown	10	0.2%	3	30%
Cardiovascular: Tamponade: blood	292	6.0%	81	28%
Cardiovascular: Tamponade: serous	19	0.4%	9	47%
Cardiovascular: Tamponade: air	6	0.1%	2	33%
Pulmonary: Pneumothorax requiring treatment	152	3.1%	38	25%
Pulmonary: Pulmonary hemorrhage	272	5.6%	54	20%
Infectious: Culture proven infection (see Infections)	368	7.6%	78	21%
Infectious: WBC < 1,500	70	1.4%	15	21%
Metabolic: Glucose < 40	121	2.5%	31	26%
Metabolic: Glucose > 240	656	13.5%	217	33%
Metabolic: pH < 7.20	324	6.7%	68	21%
Metabolic: pH > 7.60	264	5.4%	121	46%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	213	4.4%	63	30%

Cardiac Complications (31 days and < 1 year)

	<i>No. Reported</i>	<i>% Reported</i>	<i>No. Survived</i>	<i>% Survived</i>
Mechanical: Oxygenator failure	266	8.4%	77	29%
Mechanical: Raceway rupture	20	0.6%	10	50%
Mechanical: Other tubing rupture	21	0.7%	4	19%
Mechanical: Pump malfunction	70	2.2%	25	36%
Mechanical: Heat exchanger malfunction	12	0.4%	5	42%
Mechanical: Clots: oxygenator	247	7.8%	107	43%
Mechanical: Clots: bridge	114	3.6%	42	37%
Mechanical: Clots: bladder	142	4.5%	58	41%
Mechanical: Clots: hemofilter	114	3.6%	35	31%
Mechanical: Clots: other	295	9.3%	126	43%
Mechanical: Air in circuit	83	2.6%	40	48%
Mechanical: Cracks in pigtail connectors	29	0.9%	10	34%
Mechanical: Cannula problems	180	5.7%	71	39%
Hemorrhagic: GI hemorrhage	61	1.9%	10	16%
Hemorrhagic: Cannulation site bleeding	373	11.8%	151	40%
Hemorrhagic: Surgical site bleeding	1,058	33.4%	410	39%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	316	10.0%	105	33%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	103	3.3%	27	26%
Neurologic: Brain death clinically determined	109	3.4%	0	0%
Neurologic: Seizures: clinically determined	296	9.4%	76	26%
Neurologic: Seizures: EEG determined	99	3.1%	31	31%
Neurologic: CNS infarction by US/CT	140	4.4%	44	31%
Neurologic: CNS hemorrhage by US/CT	182	5.8%	51	28%
Renal: Creatinine 1.5 - 3.0	305	9.6%	68	22%
Renal: Creatinine > 3.0	59	1.9%	15	25%
Renal: Dialysis required	354	11.2%	74	21%
Renal: Hemofiltration required	698	22.1%	249	36%
Renal: CAVHD required	157	5.0%	43	27%
Cardiovascular: Inotropes on ECLS	1,964	62.1%	821	42%
Cardiovascular: CPR required	98	3.1%	17	17%
Cardiovascular: Myocardial stun by echo	150	4.7%	50	33%
Cardiovascular: Cardiac arrhythmia	541	17.1%	210	39%
Cardiovascular: Hypertension requiring vasodilators	405	12.8%	198	49%
Cardiovascular: PDA: R->L	2	0.1%	1	50%
Cardiovascular: PDA: L->R	18	0.6%	9	50%
Cardiovascular: PDA: bidirectional	1	0.0%	0	0%
Cardiovascular: PDA: unknown	4	0.1%	1	25%
Cardiovascular: Tamponade: blood	164	5.2%	62	38%
Cardiovascular: Tamponade: serous	13	0.4%	2	15%
Cardiovascular: Tamponade: air	1	0.0%	1	100%
Pulmonary: Pneumothorax requiring treatment	94	3.0%	30	32%
Pulmonary: Pulmonary hemorrhage	167	5.3%	40	24%
Infectious: Culture proven infection (see Infections)	372	11.8%	125	34%
Infectious: WBC < 1,500	43	1.4%	5	12%
Metabolic: Glucose < 40	45	1.4%	10	22%
Metabolic: Glucose > 240	369	11.7%	142	38%
Metabolic: pH < 7.20	153	4.8%	35	23%
Metabolic: pH > 7.60	120	3.8%	53	44%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	133	4.2%	41	31%

Cardiac Complications (1 year and < 16 years)

	No. Reported	% Reported	No. Survived	% Survived
Mechanical: Oxygenator failure	243	9.3%	104	43%
Mechanical: Raceway rupture	19	0.7%	9	47%
Mechanical: Other tubing rupture	34	1.3%	12	35%
Mechanical: Pump malfunction	57	2.2%	28	49%
Mechanical: Heat exchanger malfunction	11	0.4%	6	55%
Mechanical: Clots: oxygenator	196	7.5%	99	51%
Mechanical: Clots: bridge	68	2.6%	35	51%
Mechanical: Clots: bladder	60	2.3%	30	50%
Mechanical: Clots: hemofilter	64	2.4%	19	30%
Mechanical: Clots: other	246	9.4%	134	54%
Mechanical: Air in circuit	79	3.0%	31	39%
Mechanical: Cracks in pigtail connectors	29	1.1%	11	38%
Mechanical: Cannula problems	170	6.5%	72	42%
Hemorrhagic: GI hemorrhage	73	2.8%	20	27%
Hemorrhagic: Cannulation site bleeding	457	17.4%	239	52%
Hemorrhagic: Surgical site bleeding	778	29.7%	368	47%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	234	8.9%	102	44%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	105	4.0%	38	36%
Neurologic: Brain death clinically determined	192	7.3%	0	0%
Neurologic: Seizures: clinically determined	123	4.7%	26	21%
Neurologic: Seizures: EEG determined	28	1.1%	6	21%
Neurologic: CNS infarction by US/CT	113	4.3%	44	39%
Neurologic: CNS hemorrhage by US/CT	95	3.6%	21	22%
Renal: Creatinine 1.5 - 3.0	379	14.5%	127	34%
Renal: Creatinine > 3.0	202	7.7%	64	32%
Renal: Dialysis required	312	11.9%	90	29%
Renal: Hemofiltration required	510	19.5%	230	45%
Renal: CAVHD required	184	7.0%	75	41%
Cardiovascular: Inotropes on ECLS	1,623	61.9%	775	48%
Cardiovascular: CPR required	113	4.3%	29	26%
Cardiovascular: Myocardial stun by echo	140	5.3%	68	49%
Cardiovascular: Cardiac arrhythmia	521	19.9%	219	42%
Cardiovascular: Hypertension requiring vasodilators	301	11.5%	185	61%
Cardiovascular: PDA: R->L	2	0.1%	1	50%
Cardiovascular: PDA: L->R	10	0.4%	1	10%
Cardiovascular: PDA: unknown	2	0.1%	2	100%
Cardiovascular: Tamponade: blood	138	5.3%	70	51%
Cardiovascular: Tamponade: serous	11	0.4%	6	55%
Pulmonary: Pneumothorax requiring treatment	69	2.6%	31	45%
Pulmonary: Pulmonary hemorrhage	154	5.9%	55	36%
Infectious: Culture proven infection (see Infections)	290	11.1%	117	40%
Infectious: WBC < 1,500	31	1.2%	8	26%
Metabolic: Glucose < 40	43	1.6%	12	28%
Metabolic: Glucose > 240	358	13.7%	144	40%
Metabolic: pH < 7.20	143	5.5%	39	27%
Metabolic: pH > 7.60	61	2.3%	33	54%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	124	4.7%	43	35%

Cardiac Complications (16 years and over)

	No. Reported	% Reported	No. Survived	% Survived
Mechanical: Oxygenator failure	363	17.3%	130	36%
Mechanical: Raceway rupture	4	0.2%	0	0%
Mechanical: Other tubing rupture	7	0.3%	2	29%
Mechanical: Pump malfunction	17	0.8%	4	24%
Mechanical: Heat exchanger malfunction	3	0.1%	1	33%
Mechanical: Clots: oxygenator	239	11.4%	98	41%
Mechanical: Clots: bridge	31	1.5%	18	58%
Mechanical: Clots: bladder	8	0.4%	2	25%
Mechanical: Clots: hemofilter	48	2.3%	13	27%
Mechanical: Clots: other	156	7.4%	52	33%
Mechanical: Air in circuit	31	1.5%	8	26%
Mechanical: Cracks in pigtail connectors	11	0.5%	1	9%
Mechanical: Cannula problems	96	4.6%	27	28%
Hemorrhagic: GI hemorrhage	83	3.9%	21	25%
Hemorrhagic: Cannulation site bleeding	441	21.0%	182	41%
Hemorrhagic: Surgical site bleeding	567	26.9%	197	35%
Hemorrhagic: Hemolysis (hgb > 50 mg/dl)	207	9.8%	63	30%
Hemorrhagic: Disseminated intravascular coagulation (DIC)	105	5.0%	31	30%
Neurologic: Brain death clinically determined	141	6.7%	0	0%
Neurologic: Seizures: clinically determined	49	2.3%	7	14%
Neurologic: Seizures: EEG determined	11	0.5%	2	18%
Neurologic: CNS infarction by US/CT	69	3.3%	14	20%
Neurologic: CNS hemorrhage by US/CT	33	1.6%	3	9%
Renal: Creatinine 1.5 - 3.0	568	27.0%	187	33%
Renal: Creatinine > 3.0	403	19.2%	100	25%
Renal: Dialysis required	334	15.9%	76	23%
Renal: Hemofiltration required	323	15.4%	78	24%
Renal: CAVHD required	321	15.3%	97	30%
Cardiovascular: Inotropes on ECLS	1,576	74.9%	586	37%
Cardiovascular: CPR required	115	5.5%	19	17%
Cardiovascular: Myocardial stun by echo	124	5.9%	38	31%
Cardiovascular: Cardiac arrhythmia	437	20.8%	127	29%
Cardiovascular: Hypertension requiring vasodilators	129	6.1%	61	47%
Cardiovascular: PDA: R->L	1	0.0%	0	0%
Cardiovascular: PDA: L->R	4	0.2%	2	50%
Cardiovascular: Tamponade: blood	127	6.0%	35	28%
Cardiovascular: Tamponade: serous	4	0.2%	2	50%
Pulmonary: Pneumothorax requiring treatment	58	2.8%	16	28%
Pulmonary: Pulmonary hemorrhage	79	3.8%	20	25%
Infectious: Culture proven infection (see Infections)	353	16.8%	105	30%
Infectious: WBC < 1,500	41	1.9%	16	39%
Metabolic: Glucose < 40	58	2.8%	5	9%
Metabolic: Glucose > 240	435	20.7%	156	36%
Metabolic: pH < 7.20	200	9.5%	36	18%
Metabolic: pH > 7.60	171	8.1%	71	42%
Metabolic: Hyperbilirubinemia (> 2 direct or > 15 total)	260	12.4%	75	29%