



Emergency Medical Services Agency

**Pediatric/Neonatal  
Disaster and Medical Surge  
Plan and Preparedness Toolkit**



May 2011





## **Background**

The events of the Katrina Hurricane (2005), H1N1 Pandemic Flu (2009), Haiti Earthquake (2010) and Japan Earthquake/Tsunami/Nuclear Crisis (2011) demonstrate the need for a strong collaborative approach integrating newborns, infants and children into disaster planning. The resources required for the care of neonates and children are limited and regionally distributed. Successful neonatal and pediatric all-hazard preparedness relies on a strong network of committed public health agencies, emergency medical services, hospitals and communities. First steps to effective response include preserving bed capacity, competency and equipment to support a system of emergency care for infants and children within the county under normal conditions.

The Contra Costa EMS for Children (EMSC) Plan implemented in 2000 has been fundamental to improving and sustaining standards of care for the pediatric population from birth to age 18. The plan was updated in 2008 and is available on the Contra Costa County EMS website at [www.cccems.org](http://www.cccems.org). The Contra Costa EMSC Plan provides the essential foundation to build an effective infrastructure of sustainable neonatal and pediatric disaster preparedness.

The next step to providing effective disaster preparedness involves the practice of including neonates and pediatrics in all county, provider agency and hospital-based disaster exercises. This toolkit has been developed to facilitate this preparedness and is to be used in conjunction with California EMS Authority EMS for Children (EMSC) Pediatric Disaster Preparedness Guidelines for LEMSAs (EMSA #197) and EMSC Pediatric Disaster Preparedness Guidelines for Hospitals (EMSA #198). Both documents can be found at <http://www.emsa.ca.gov/systems/EMSC/default.asp>.

## **Contra Costa County Disaster Risk Profile**

According to the Contra Costa Emergency Plan the primary threats to Contra Costa County are:

- Earthquakes and aftershocks
- Hazardous materials releases
- Transportation accidents
- Floods caused by levee or dam failures
- Landslides
- Wildfires
- Communicable disease outbreaks
- National security incidents including bioterrorism



**A catastrophic event is anticipated to cause<sup>1</sup>:**

- Widespread damage and death, with possible disruption to the health care system including hospitals, clinics, emergency care, primary care and public health services;
- Secondary hazards, such as fires and hazardous materials releases, that may require the redirection of resources, population evacuation, and/or shelter-in-place events;
- Absence of key personnel due to injury or delay in assuming emergency functions (while assuring the safety and welfare of their families and homes);
- Depletion of essential equipment and supplies;
- Serious transportation limitations, including impassable roads that further delay emergency workers; and
- Communication disruptions for over 48 hours after a major event, making accurate information about the nature and extent of damage, including health care and resources initially unavailable or difficult to obtain.
- The need for mutual aid is likely to be required to meet the medical care and transport requirements of pediatric and neonatal populations affected by disaster.

**Contra Costa Pediatric Population Demographics**

Any type of disaster occurring within our county is likely to impact children. Currently there are over 253,000 children in Contra Costa, in the following distribution as of 2009.

**Contra Costa County: 2009 Child Populations by Age and Gender**

<b>Child Population, by Age and Gender in 2009</b>				
<b>Age</b>	<b>Female</b>	<b>Male</b>	<b>Total</b>	<b>Pediatric population Based on projected 21% Increase by 2035</b>
0 - 2 years	19,627	20,394	40,021	48,425
3 - 5 years	19,609	20,360	39,969	48,362
6 - 10 years	33,641	34,817	68,458	82,834
11 - 13 years	21,358	22,113	43,471	52,600
14 - 17 years	29,956	31,593	61,549	74,474
<b>Total 0 - 17</b>	<b>124,191</b>	<b>129,277</b>	<b>253,468</b>	<b>306,695</b>

Definition: Population under age 18 by age and gender.

Data Source: [As cited on kidsdata.org](http://kidsdata.org), State of California, Department of Finance, Race/Ethnic Population with Age and Sex Detail, 1990-1999, 2000-2050. Accessed online at <http://www.dof.ca.gov> (June 2009).

<sup>1</sup> Contra Costa Health Services Emergency Plan, June 2010



## Contra Costa County Pediatric Special Needs Children

Every county has a subset of children who are categorized as special needs. These children require accommodations and special services to adequately care for them in the event of disaster. Typically they are highly reliant on their families to provide for their activities of daily living and may be well known to the health care system that serves them. In 2009 there were 19,523 special needs children of which 6183 (2.5%) had major disabilities.

Contra Costa County	Percent	Range: 0 - 55%
Autism	7.7%	
Deaf	0.7%	
Deaf-Blindness	0.0%	
Emotional Disturbance	4.5%	
Hard of Hearing	1.6%	
Learning Disability	39.8%	
Mental Retardation	5.4%	
Multiple Disability	0.5%	
Orthopedic Impairment	2.5%	
Other Health Impairment	4.9%	
Speech or Language Impairment	31.3%	
Traumatic Brain Injury	0.2%	
Visual Impairment	0.9%	

Definition: Percentage of public school students enrolled in special education, by type of disability (e.g. 8.8% of special education students in California in 2010 had autism).

Data Source: [As cited on kidsdata.org](http://kidsdata.org), Special Tabulation by the State of California, Department of Education, Special Education Division: Assessment, Evaluation and Support.



## **Contra Costa County Pediatric EMS Service Levels: Normal Conditions**

There are approximately 60,000 pediatric emergency department visits per year seen in the nine community emergency departments that serve Contra Costa County.<sup>2</sup> This represents 21-23% of the county's pediatric population under normal conditions. Greater than 85% of these children arrive at emergency departments transported by parents or caregivers. The remaining 15% arrive by EMS.

According to population projections, Contra Costa's child population will increase by 21% by 2035. This effectively adds another 53,000 children to our pediatric community and based on current pediatric emergency department utilization will result in another 10,000 children being seen at Contra Costa emergency departments. By 2035 it is projected that Contra Costa Emergency Departments will serve over 70,000 children every year.

In 2009 the EMS Authority published the first EMS for Children CEMSIS (California EMS Information System) Trauma report. The report reflects data from 20 counties and 41 Trauma Centers in California serving over 6.7 million children including Contra Costa and Alameda County. Data was collected from January 1, 2009 through June 30, 2009 and included 4,470 pediatric trauma patients. The report reflects demographic information regarding pediatric trauma care in non-surge conditions in California.

During the CEMSIS study period of 2005 to 2009, the Contra Costa Trauma System served approximately 338 children (<14 years of age). Pediatric trauma represents a small but high-risk population in our community requiring specialized but limited resources. In events such as a large multi-casualty incident (MCI) involving children or other catastrophic event involving the general population, the need for pediatric trauma resources may dramatically increase and has the potential to easily overwhelm current pediatric emergency care resources.

In 2009 the EMS Authority's California EMS Information System (CEMSIS), using data extracted from the Trauma Registries from Local EMS Agencies, reported on the incidence of pediatric trauma in California between 2005-2009. The data demonstrated the following:

- Blunt trauma is the most frequent type of trauma found in all age groups.
- Most pediatric trauma victims have an Injury Severity Score (ISS) of 0-9 (minor trauma).
- Critical Trauma scores (ISS > 15) most frequently occur in children > 15 years old.
- Infants and toddlers < 4 years of age have disproportionately higher trauma mortality rate.

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<sup>2</sup> 2008 Contra Costa EMSC Program Evaluation Update



Contra Costa EMS recommends that this information be considered when attempting to project utilization of pediatric trauma services for local and regional surge and non-surge planning.

2005-2009 Injury Severity Score <sup>3</sup> (n = 4,489)						
Age	< 1	1- 4	5 - 9	10 -14	15 -18	Total
ISS 0-9	118	461	438	597	1,479	3,093
ISS 10-15	14	18	80	99	325	589
ISS 16-24	33	59	65	107	229	488
ISS 25+	21	8	33	34	185	319
Total	186	614	616	837	2,218	4,489
2005-2009 Mortality Rate by Age						
Mortality Rate	3%	2%	1%	1%	2%	1%
2005-2009 Type of Injury by Age (n = 4,470)						
Blunt	141	529	563	762	1,635	3,630
Penetrating	2	18	15	55	482	572
Other/Unspecified	49	59	29	25	92	254
Burn	1	8	0	1	4	14
Total	193	614	607	843	2,213	4,470

#### Contra Costa Pediatric Hospitalizations Under Normal Conditions<sup>4</sup>

Understanding which conditions typically affect children helps communities anticipate what will be needed in a disaster. For example it has been found that after both Katrina and Haiti, exacerbations of reactive airway conditions dramatically increased.

Ten Most Common Primary Diagnosis Resulting in Hospitalization	2007
Asthma/Bronchitis	597
Diabetes	76
Fractures	306
Mental Diseases and Disorders	551
Metabolic/Nutritional Disorders	173
Pneumonia/Pleurisy	288
Poisoning	60
Seizures/Headaches	175
Traumatic Injuries	118
Viral Illnesses or Fevers of Unknown Origin	125
Burns	22

<sup>3</sup> ISS score of >15 is associated with critical trauma requiring immediate intervention and associated with increased morbidity and mortality.

<sup>4</sup> Definition: Ten most common primary diagnoses for hospital stay for children ages 0-17, excluding childbirth, by place of residence in Contra Costa. Data Source: [As cited on kidsdata.org](http://kidsdata.org), Special Tabulation by the State of California, Office of Statewide Health Planning and Development.



## Calculating Pediatric Inpatient Surge Requirements

The California State EMS Authority, EMS for Children Pediatric Disaster Preparedness Guidelines recommends:

*“That all hospitals plan for a 15-20% increase in the number of children who require inpatient care over and above a facility’s normal experience and to plan to care for those children for at least 3 days.”*

This formula requires each emergency department/facility to determine how many children they admit to the hospital. These numbers may or may not be readily available, but if they are this estimate may be useful in quantifying how many children the facility will likely have to respond to.

However, using a crude estimate based on NACHRI and OSHPD data it is known that 5-10% of pediatric ED visits require admission under normal conditions. This formula was applied to Contra Costa demographics and serves as an educated estimate of what could happen under normal and surge conditions.

<b>Contra Costa Inpatient Projections Under Normal Conditions<sup>5</sup></b>	
Contra Costa pediatric ED utilization 2009	59,570 children/year
Calculated 5-10 % pediatric inpatient <b>annual</b> admission rate from ED visits in county under normal conditions	2,978- 5,956 children/year
Calculated 5-10 % pediatric inpatient <b>monthly</b> admission rate from ED visits in county under normal conditions	248-496 children countywide by month
Calculated 5-10 % pediatric inpatient admission rate by month if distributed evenly between all 9 hospitals	27 -54 children/month/hospital
Calculated 5-10 % pediatric inpatient admission rate by week if distributed evenly among all 9 hospitals	6-12 children/week/hospital
<b>Pediatric Inpatient Projections Under Surge Conditions</b>	
<b>15% Surge</b>	<b>20% Surge</b>
6.9- 13.8 children/week/hospital	7.2- 14.4 children /week/hospital
28 - 55 children/month/hospital	29 - 58 children/month/hospital

Estimating inpatient pediatric surge requirements for infectious agents such as pandemic flu is challenging and projections need to be adjusted for the virulence of the infectious agent. With more aggressive infectious agents, inpatient length of stay (LOS) would be longer and significantly impact the availability of pediatric inpatient bed capacity.

<sup>5</sup> Monthly and weekly numbers reported as averages based on annual ED utilization



During the 2009 H1N1 Pandemic the average LOS for pediatric patients in Contra Costa County and California was three days. 18-25% of pediatric inpatient admissions required PICU level care with length of stays averaging 14 days. During this period of time the county’s designated pediatric regional center routinely functioned at a 30% ED surge capacity and experienced periodic episodes where that ED surge spiked to 50% critically stretching resources, staff and equipment. At the height of the pandemic, the designated pediatric regional center explored moving general care patients into community hospitals. This scenario had not been anticipated and was triggered by conditions of pediatric center inpatient saturation and sustained ED surges of up to 50%. Fortunately, shortly after this request, H1N1 cases dropped dramatically throughout the county. The pandemic had subsided.

### Calculating Emergency Department Surge

To calculate potential pediatric ED influx it is useful to look at historical Contra Costa pediatric emergency department utilization and calculate surge percentages based on this demographic data. Annual pediatric ED volume per year is estimated to be approximately 59,570/year.<sup>6</sup> NACHRI and OSHPD data report that under normal conditions that up to 95% of pediatric emergency department visits do not require inpatient admission. Pediatric ED care predominately involves routine non-emergent medical care, with infants and toddlers making up the highest number of ED visits under normal conditions.

Contra Costa ED Demographics	Number of Pediatric ED visits Normal and Surge Conditions				
	Normal	15% increase	20% increase	25% increase	30% increase
Children (< 15 years) based on n = 59,570 pediatric ED visits per year					
Average number children seen per week countywide	1,146/wk	172	229	287	344
Total number of Emergency Departments (EDs) in Contra Costa	9				
Average number children seen per week/facility	127/ED/wk	19	25	32	38
Average number children seen per day countywide	163/day	24	33	41	49
Average number children seen per day/facility	18/ED/day	2-3	3-4	4-5	5-6

For earthquake projections the number of pediatric victims requiring trauma care and inpatient services would dramatically increase. Using the PEDSS tool, it is estimated that 0.15% of all children in each age category would have significant injuries requiring emergent care in the following distribution:

<sup>6</sup> As of 2008 Contra Costa EMSC Program Evaluation and Update





Age	Total	Number of Victims (0.15% of total)
0 - 2 years	40,021	60
3 - 5 years	39,969	60
6 - 10 years	68,458	103
11 - 13 years	43,471	65
14 - 17 years	61,549	92
<b>Total 0 - 17</b>	<b>253,468</b>	<b>380</b>

Using the injury projection formula of the Pediatric Emergency Decision Support System (PEDSS) tool, the distribution of injury types for all age categories during a catastrophic earthquake would affect the estimated 380 victims in the following manner:

Distribution of injury types for children with all age categories combined (n=380)		
Injury Type*	Percentage	Number Children Affected using PEDSS
Extremity Fracture	45	171
Abdominal Trauma	12.5	48
Laceration	10	38
Closed Head Injury	8	30
Anxiety	8	30
Asthma	5	19
Burn	5	19
Chest Trauma	5	19
Spine Injury	3	11
Requiring Intubation	12	46

\* Percentages do not sum to 100% as some patients sustained multiple injuries

The unique pediatric considerations that must be taken into account when planning for children who may be victims of disaster are<sup>7</sup>:

- Developmental and cognitive levels of children may impede their ability to escape danger
- Triage guidelines differ for children
- Appropriate-sized equipment/supplies as well as age- and weight-appropriate medications, including antibiotics and antidotes, are required
- Higher respiratory rates per minute, puts children at greater risk for exposure due to aerosolized agents
- More permeable skin and larger skin surface area to mass ration increases children's exposure to risk to some agents and to environmental temperatures
- Children have special susceptibilities to dehydration and shock

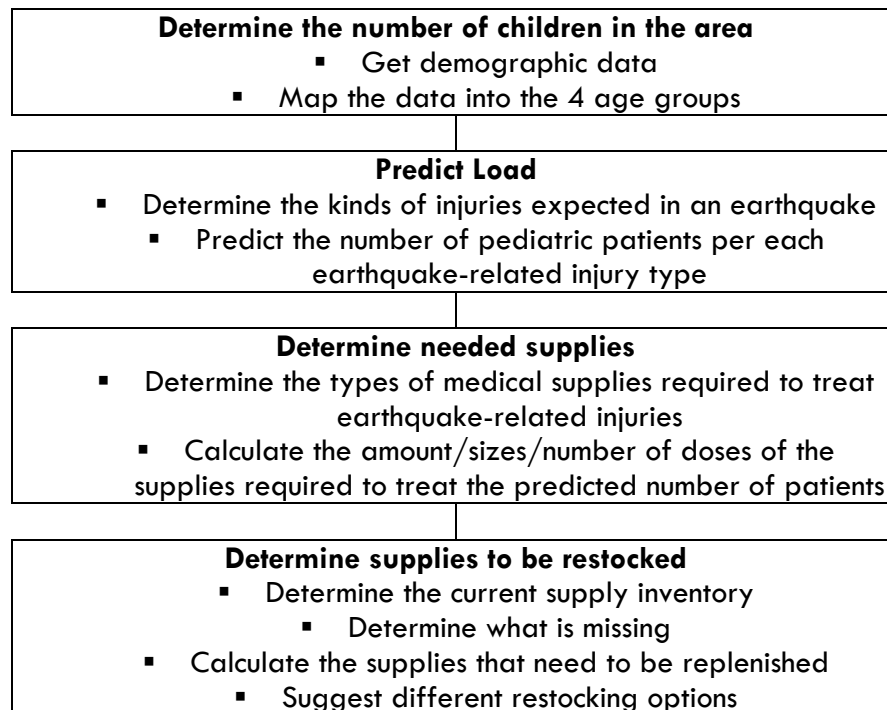
<sup>7</sup> Illinois EMS for Children, "Disaster Preparedness Exercises Addressing the Pediatric Population", Dec 2006



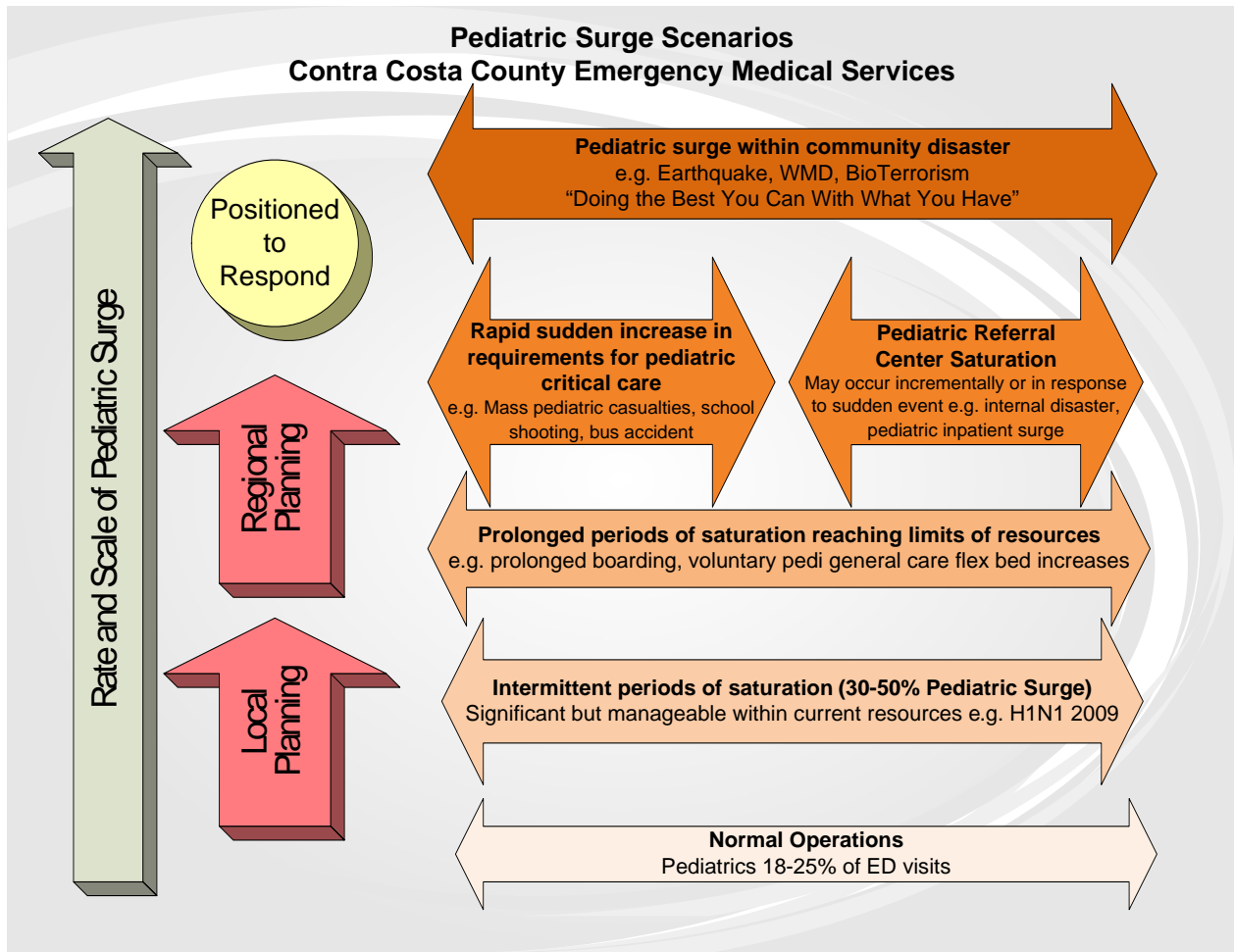
- Children have increased vulnerability to the effects of radiation exposure, requiring more vigorous medical response than adults
- Adult decontamination units are not ideal for children and they are more vulnerable to hypothermia during the decontamination process
- Children with special health care needs are particularly at risk if their survival depends upon medications or technology such as respirators
- Children do not carry identification and may become separated from parents/caregivers
- Children may not be able to communicate family or medical history due to their age or cognitive development

### Catastrophic Earthquake

Earthquake is a major concern in Contra Costa and one of the events most likely to cause a range of disruptions that may range from mild to catastrophic, depending on the strength of the earthquake. In order to determine the potential influx of pediatric patients, the nature of their injuries and the required medical supplies needed during a large-scale earthquake event, the Pediatric Emergency Decision Support System (PEDSS) web tool was used. This tool can be found on the Children’s Los Angeles National Disaster Training Website at [www.chladisastercenter.org](http://www.chladisastercenter.org). The PEDSS web tool user manual or automated calculator can be used to complete these tasks. This flowchart illustrates the basic steps taken by PEDSS.<sup>8</sup>



<sup>8</sup> Children’s Hospital Los Angeles, “PEDSS User Manual”



## Pediatric Surge Scenarios and Triggers

During the H1N1 Pandemic, Contra Costa EMS developed the following models to describe likely pediatric surge scenarios. Levels of inpatient and ED utilization were found to be good markers to gauge capacity of the local health system and in retrospect could be useful as triggers for pediatric and neonatal surge preparedness for hospital and county-based medical surge plans. It should be noted that due to the regional nature and demographics of pediatric inpatient resources it is likely that these conditions would develop concurrently and with significant variability during an actual event.



### Regional Pediatric Hospital Status Alert Tool<sup>9</sup>

Variables Impacting Staging	Stage <sup>10</sup>			
	Alert	Phase I	Phase 2	Phase 3
ED Census/24 hours	70-80	81-90	91-100	>101
ED Admits/24 hours	16-20	21-24	25-29	>30
EDII <sup>11</sup> 0900-0000	70-95	96-120	121-145	>145
Daily Census Total	156-198	199-234	235-276	>276
Wait Time for 2 <sup>nd</sup> Triage	1 hour	2 hours	3 hours	4 hours
Number of ED-I and ED-II (aka ED overflow) patients in lobby and tracking after triage	ED-I = 8 ED-II = 10	ED-I = 12 ED-II = 15	ED-I = 20 ED-II = 20	ED-I = 25 ED-II = 30
Number of patients left without being seen	>10	>15	>20	>25
Hospital Census <sup>12</sup>	160	170	188	199
PICU Census	21	22-23	23 + overflow	23 + overflow
Turnaways Yes/No	No	No	1-4	>4
Action Plan: <sup>13</sup> (Potential Responses)	<ul style="list-style-type: none"> <li>▪ Hospital Yellow alert</li> <li>▪ Double Triage</li> <li>▪ Seasonal Volume Staffing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hospital Red alert</li> <li>▪ Triple Triage</li> <li>▪ Consider HCC<sup>14</sup> Activation</li> <li>▪ Clinic C utilization</li> <li>▪ Additional ED Staff</li> <li>▪ Triage pts to separate waiting areas e.g. flu, acutely ill &amp; injured</li> <li>▪ Add ancillary and support staff e.g. pharmacy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hospital Red Alert</li> <li>▪ HCC Activation</li> <li>▪ 4 Triple Triage Areas</li> <li>▪ Pass through Triage Tent for flu-like symptoms</li> <li>▪ Labor Pool Staff</li> <li>▪ Limit Elective Surgeries</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hospital Red Alert</li> <li>▪ HCC Activation</li> <li>▪ Alternative treatment sites; garage, OPC, Claremont</li> <li>▪ Labor Pool Staffing</li> <li>▪ Disaster Tree</li> <li>▪ Cancel non-emergent surgeries</li> </ul>

The example reflects operational changes that Regional Pediatric Referral Centers may implement to respond to a pediatric/neonatal surge. This example was developed in response to H1N1.

<sup>9</sup> Example provided by Children’s Hospital and Research Center Oakland.

<sup>10</sup> The Hospital status alert: GREEN, YELLOW, RED indicates how busy the hospital is. Rapid discharge policies are activated as needed. Attrition may remain in check when activating rapid discharge but may be disruptive for families.

<sup>11</sup> ED II is an ED overflow area. It remains closed and un-staffed when not in use.

<sup>12</sup> May not reflect ED volume. NICU surge capacity > 39 patients

<sup>13</sup> ED leadership uses these guidelines as an assessment tool to determine staging.

<sup>14</sup> HCC=Hospital Command Center

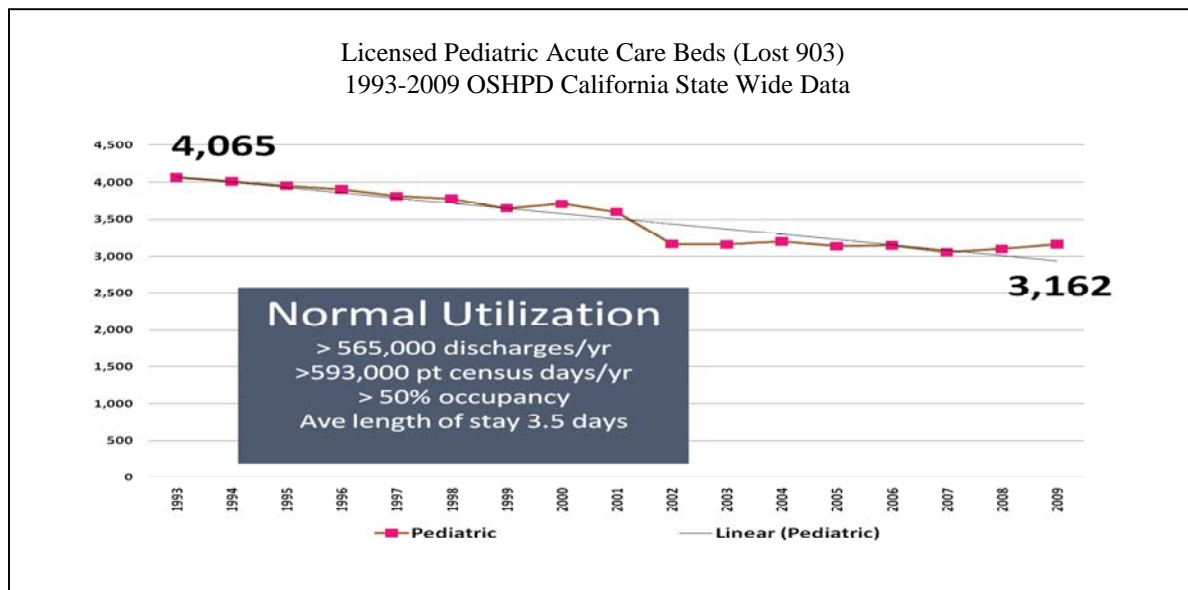


## The Need to Enhance Contra Costa Pediatric and Neonatal Capabilities

The State EMSA Pediatric Disaster Guidelines for Hospitals<sup>15</sup> states “It is inevitable that all hospitals in a large-scale disaster involving pediatric patients will be overwhelmed.” However, under current conditions most counties and regions are likely to be overwhelmed in much less dire situations than a “large scale disaster.” Nationally, Children’s Hospitals represent only 5% of the hospitals but deliver over 40% of the pediatric care in the United States, particularly in children with serious or chronic illnesses.

According to the California Children’s Hospital Association, eight pediatric regional centers provide:

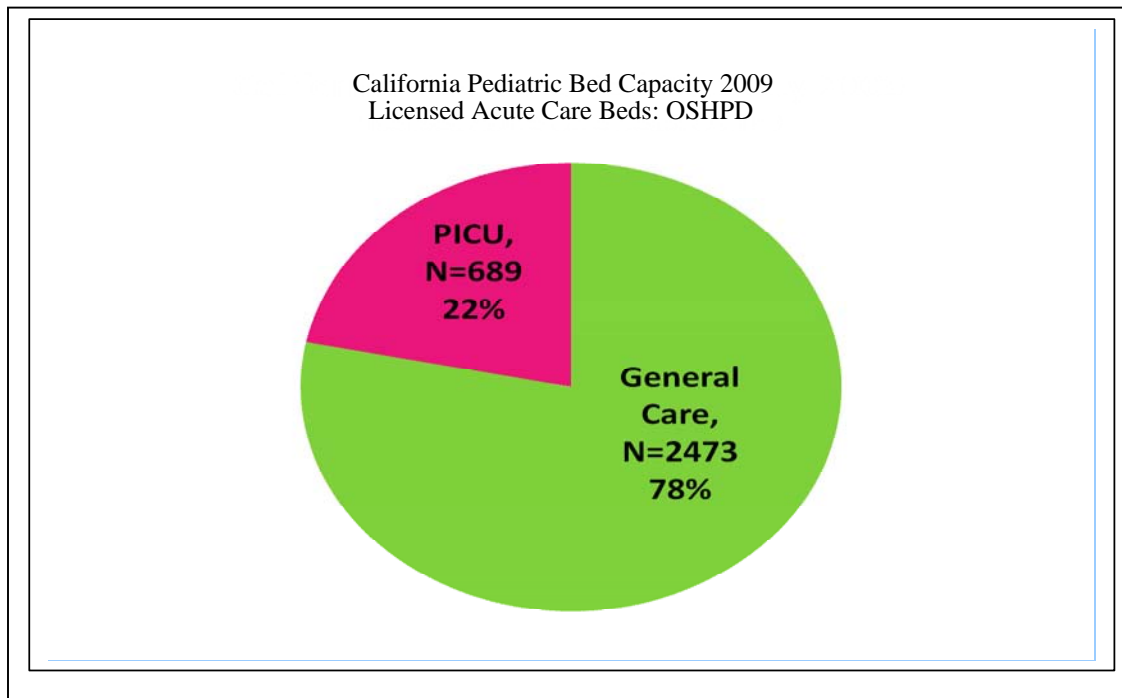
- 55% of the inpatient care
- 1.5 million pediatric outpatient visits
- 55% of the pediatric critical care beds
- 60% of the pediatric organ transplants
- 72% of the pediatric open heart surgeries
- 42% of the pediatric transfers in the state
- 10 times the number of neonatal transfers
- 25% higher acuity than other hospitals who treat children



Since 1993 California has lost nearly 25% of its licensed pediatric acute care beds.

<sup>15</sup> California EMSA document #194, March 2010

The current data captures licensed pediatric acute care beds representing the entire spectrum of inpatient pediatric bed capacity. This includes pediatric critical beds and bed capacity on subspecialty units such as bone marrow transplant, solid organ transplant, oncology and dialysis. Pediatric referral centers with their subspecialty units and subsequent patient care intensity are best positioned to become exclusive pediatric and neonatal critical centers during a disaster. This requires community hospitals to position themselves to competently care for less critical infants and children who will need to be transferred to the community to expand pediatric referral center critical care inpatient capacity.



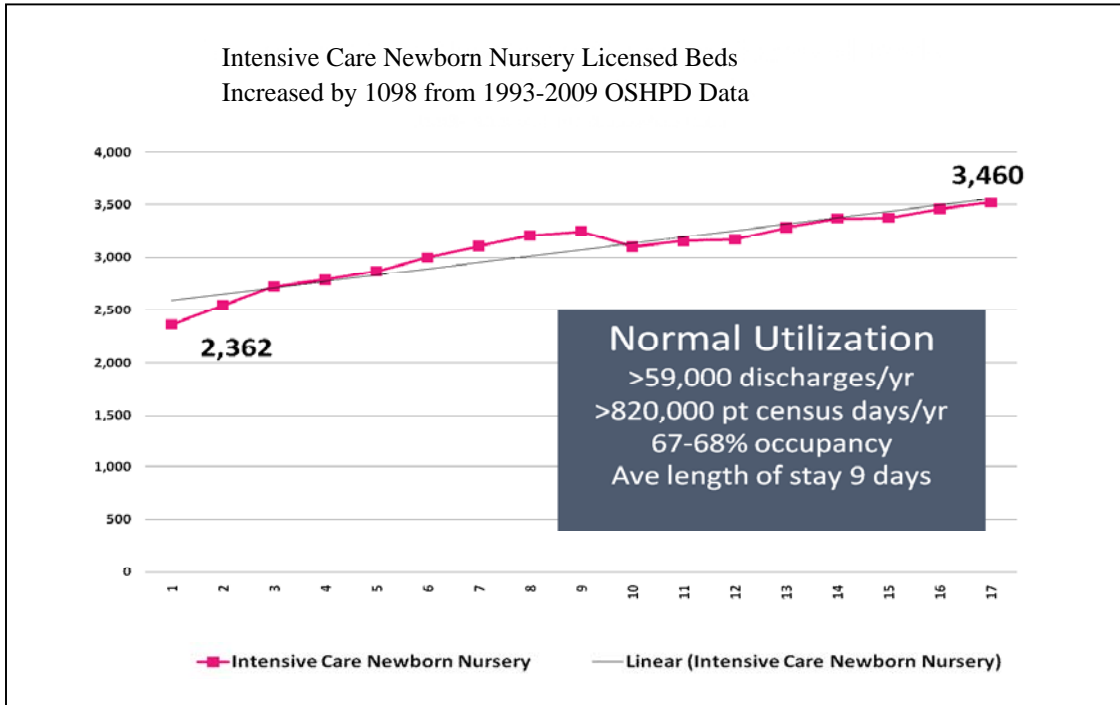
According to OSHPD data, the statewide average length of stay for licensed pediatric beds is approximately 3.5 days and have a greater than 50% occupancy rate. In a report from NACHRI (National Association of Children’s Hospitals and Related Organizations), stated that occupancy rates at pediatric referral centers frequently run between 70-85%.<sup>16</sup>

In Contra Costa County between 2000 and 2008, three community hospitals closed their pediatric units, reducing the countywide pediatric bed capacity by almost 40%. This practice is common for community hospitals with timely access to pediatric referral centers under normal conditions. Unfortunately this practice has the unintended

<sup>16</sup> NACHRI, “Trends in Children’s Hospital Utilization, FY 2004-2008”, [www.childrenshospital.net](http://www.childrenshospital.net)



consequence of systematically eroding pediatric and neonatal inpatient capabilities and surge capacity in a disaster.



In contrast, neonatal bed capacity has steadily increased in California, creating different challenges for communities who may need to send or receive numbers of medically complex and fragile neonates.

This is why it is important for Contra Costa and all communities to improve and maximize their capabilities to respond in events where neonates and children of all ages are likely to be affected.

## Disaster Planning for Contra Costa Hospitals

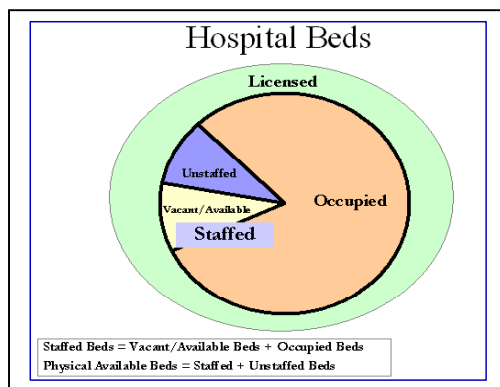
### Building Infrastructure to Support Pediatric and Neonatal Inpatient Surge

**1. Determine what you already have in place:** Review the 2009 EMS for Children survey on the Contra Costa EMS website at [www.cccems.org](http://www.cccems.org) to become familiar with the state of emergency pediatric care in Contra Costa. In addition use the Guidelines for Care of Children in the Emergency Department Checklist, at the end of this document, and the 2009 joint policy statement “Guidelines for Care of Children in the Emergency Department,” which can be found online at: <http://aappolicy.aappublications.org/cgi/reprint/pediatrics;124/4/1233.pdf> to assess current capabilities.



**2. Complete the Children's LA Disaster logistics tool called PEDSS (Pediatric Emergency Decision Support System):** It is public domain and you will need the zip codes for all the areas your hospital services. It is built out for earthquakes and being refined for other types of responses. The tool is very hospital centric, in other words it gives you information based on the local hospital's pediatric demographics. The tool helps to determine equipment and resources you will need specific to infants and children. There is a users manual on the CHLA website. The web link is <http://pedss.isi.edu/pedss/>. If the website gives you any trouble, go back at another time to complete the logistics tool.

**3. Identify or assign a Hospital EMSC Physician and Nurse Champions to support these efforts.** A recent study concluded that the single most important action to assure improved emergency preparedness is the identification and empowerment of champions in neonatal and pediatric care. The list of who those people are in your facility is attached. Contact them to help and then include your newborn nursery, pediatric, NICU managers and ED educators as well.



**4. Determine with appropriate hospital leadership how your facility will be using 5% flex to accommodate the influx of neonatal/pediatric patients during a medical surge.** Hospitals are allowed by CDPH to use 5% of their total licensed beds (known as Flex Beds) to accommodate patients of all types without special permissions, provided Title 22 standards of care are met for competency, equipment and staffing for the patients involved is met. If the number of patients cannot be

managed using 5% flex, altered standards of care may be required, generating the need for additional permissions, interruptions in normal hospital operations (e.g. elective surgeries cancelled) and approval from CDPH Licensing and Accreditation prior to implementation. Hospitals who do not adhere to these strict requirements may be subject to fines and penalties.

The Contra Costa Medical Surge Model for pediatric and neonatal care allows hospitals to work toward a minimal level of inpatient pediatric/neonatal capacity that is both sustainable and realistic. Fundamental to this approach is the understanding that all health care providers have received training in pediatric care as part of their path to licensure. In addition, it is not unusual to find staff working in non-pediatric settings within the hospital who have significant experience in pediatrics. What follows is a description of the different pathways hospitals can use to expand neonatal or pediatric medical surge capacity. It utilizes a cafeteria plan approach for hospitals to respond.





### **Hospitals with Emergency Departments**

All hospitals in Contra Costa County have 9-1-1-approved emergency departments, and emergency department boarding is the most common approach used in normal and surge conditions. Pediatric patients have been reported to require boarding for up to 3-5 days in emergency departments under surge conditions. All emergency department personnel are competent in the care of pediatric patients and emergency departments are equipped with appropriate equipment to care for children. However, emergency department providers may lack confidence or experience in the care of the critically ill child who comes to the ED much less often. In any pediatric event of scale, equipment, personnel and ED pediatric boarding capacity could be overwhelmed. Therefore, alternatives should be considered and planned to supplement this strategy.

### **Hospitals with Pediatric Inpatient Care Units**

Hospitals with inpatient pediatric units during surge are best able to manage more complex pediatric patients that may not be suitable for settings that are less familiar with this population. Equipment, staff and competency are part of the normal workflow. However, in surge it may be necessary to utilize these staff to train and supervise the care of nursing staff not experienced in pediatrics in order to accommodate numbers of children for extended periods of time. This allows hospitals to expand bed capacity in ways not previously anticipated yet continue to give reliable, safe patient care. Hospitals with these resources may be able to expand well beyond the 5% flex bed goal in these conditions.

### **Hospitals with Well Baby, Special Care Nursery or NICU**

For hospitals with these resources, inpatient neonatal or pediatric capacity should include a plan to use a hospital's licensed 5% flex bed capacity to care for children up to 1-3 years of age. Equipment issues, including appropriate cribs would need to be addressed, however, all hospitals have vendors and supplies for appropriate pediatric equipment for their emergency departments. Additional just-in-time training to support staff competency could be rapidly achieved in this workforce and supplemented with pediatricians, mid-level pediatric practitioners or nurses with strong pediatric experience from the emergency department or pediatric unit or ambulatory care clinics as needed. The ESCAPE (Enhanced Surge Capacity and Partnership Effort) Project, using pediatric/neonatal ICU consultation via telehealth, has demonstrated in Critical Access Hospitals, that neonatologists, pediatricians and nursing staff are effective in managing acutely ill and selected critically ill pediatric and neonates.

### **Hospitals without NICU, OB or Inpatient Pediatrics**

In these facilities, it is recommended that pediatric medical surge plans utilize their 5% flex capacity to take adult-size children from age 12 to 18. In this scenario, equipment needs are minimized due to the patients' adult size and adolescent-patient care competency is not that different from the young adults staff already interacts with. Competency requirements and specialized staffing needs would be reduced while still accommodating pediatric patients.

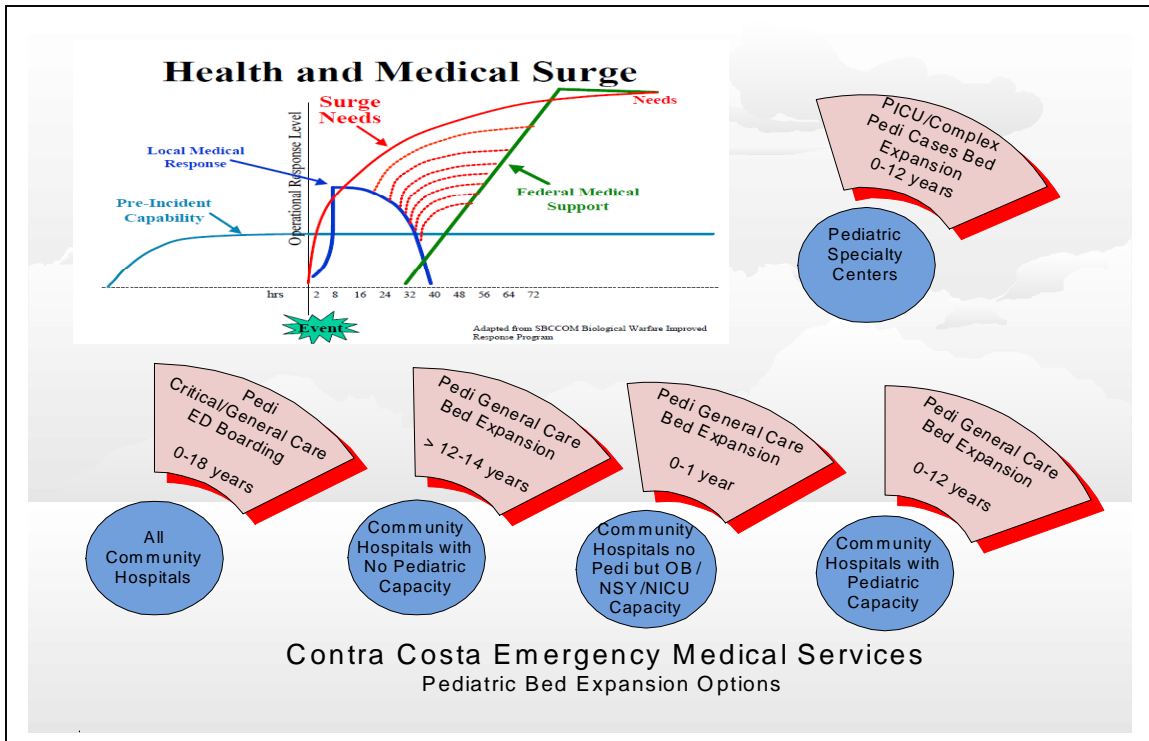
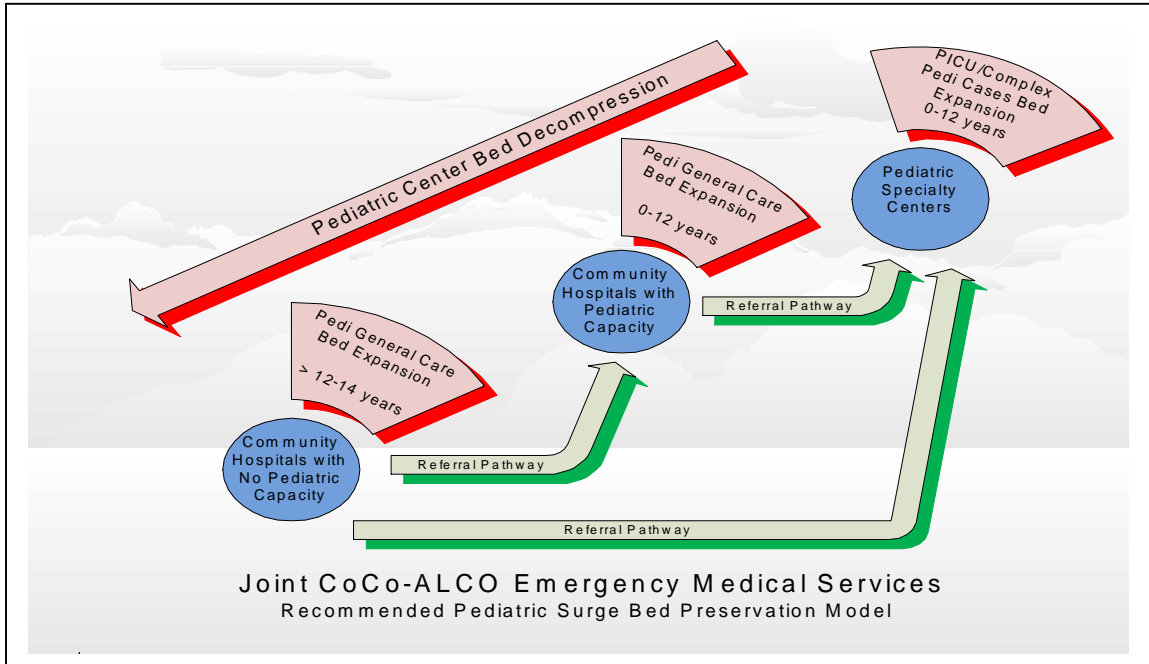


### Medical Surge County Capacity using 5% Flex Bed Capability

In Contra Costa our expanded bed capacity could increase 100% using the 5% flex model. Each hospital should identify the 5% flex approach that is within their capabilities. Hospitals would likely be called on to do more in catastrophic events however building in a 5% flex capacity dramatically increases the county’s capacity to handle the “in-between” known to be required in disaster response based on H1N1 experience. Knowing how far the organization can stretch without disrupting operations is key.

Contra Costa Bed Capacity for Neonates			
Hospital	Current Licensed Nursery	Current Licensed NICU	Increase using 5% Flex Beds
CCRMC	6	6	8
DSP	0	0	0
JMMC-WC	23	25	17
JMMC-C	0	0	0
Kaiser-WC	40	25	16-23
Kaiser-A	26	6	7
Kaiser-R	0	0	0
SDMC	20	4	7
SRRMC	10	2	6-8
<b>Total</b>	<b>125</b>	<b>68</b>	<b>61-70</b>

Contra Costa Bed Capacity for Pediatrics			
Hospital	Licensed Pediatric Beds	Current Pediatric Bed Licensed + Flex	Potential Surge Capacity (5% flex)
CCRMC	0	0	8
DSP	0	0	6
JMMC-WC	3	17	17
JMMC-C	0	0	12
Kaiser-WC	12	12-16	16-23
Kaiser -A	0	0	7
Kaiser-R	0	0	2
SDMC	0	7	7
SRVMC	0	8	6-8
<b>Total</b>	<b>15</b>	<b>44-48</b>	<b>81-90</b>





**5. Just-in-time training:** The CHLA Disaster Center Website at <http://www.chladisastercenter.org/site/c.ntJYJ6MLIsE/b.3569231/k.BD34/Home.htm> has a number of free and fee-based training resources. The list of online free disaster training materials that are web-accessible is attached as an addendum.

- Fee-based educational materials are a resource, however, make it is important to explore what is already available at your facility before considering these materials.
- Courses such as PALS, PEARS, ENPC, STABLE, NRP, APLS reflect standards of care, and selected personnel likely to respond in pediatric and neonatal medical surge should be required to take these courses.
- Slide sets, videos and materials from these same courses (e.g. PALS) can also be used as part of just-in-time training, short in-services and competency exercises that can be incorporated into normal workflow.
- Hospital educators should be consulted to determine in-house resources for pediatrics, newborn nursery and emergency department orientation and training. These resources should be considered for just-in-time training.
- Identify the policies, procedures, resources and orientation materials for infants and children. Evaluate for gaps in pediatric policy and procedure. Consider adopting the pediatric or neonatal policies or procedures used at the pediatric referral center used by your facility.
- Evaluate the nurse and/or physician in-house e-learning platforms that are used to satisfy regulatory requirements. Many of these have supplemental online training for continuing education including pediatric and neonatal topics that could be used for just-in-time training.
- Get emergency department, pediatric and neonatal physicians actively involved in the training and preparedness.
- Create experiences where physicians and nurses exercise and train together.
- Use simulation whenever those resources are available.
- Put a reliable schedule of training events together to help build momentum.
- Include “hands on” components to your training to help improve retention and performance.
- Include support for pediatrics and neonates training in your HPP requests.
- Support local and regional planning efforts in the area of pediatric and neonatal disaster preparedness and medical surge.

Building an infrastructure of pediatric and neonatal emergency and surge preparedness is more about understanding and enhancing what is already in place than creating something new. The goal is to use current resources in a new way.

## **6. Staffing for Pediatric/Neonatal Bed Expansion and Disaster Preparedness**

Providing competent staff during a crisis is feasible with planning and an effective preparedness program. All health providers have received education and experience in the care of children and infants as part of their basic training and licensure. However, unless those providers choose a career with this population there is the perception that the provider is not capable of caring for these patients competently. This is simply not the



case. Every health care provider is capable, especially if they are given the right tools and activities to support them in this care.

***“Confidence comes from doing. The brain functions better when it is familiar with a problem. We feel more in control because we are in control.”<sup>17</sup>***

When developing a program to support medical surge in any high-risk low-frequency population it is necessary to develop a “system of response” to maximize resources. Preparedness programs for these special populations are more efficient when developed and implemented through partnerships and collaborations. Contra Costa EMS encourages stakeholders to collaborate and share training resources whenever possible to enhance our community-wide pediatric and neonatal disaster preparedness capabilities.

Emergency preparedness for children and infants frequently stops at the emergency department level if a hospital does not have inpatient pediatric and neonatal services. Contra Costa EMS recommends that all hospitals include plans to support pediatric/neonatal inpatient expansion and disaster preparedness by making a minimum commitment within their capabilities to support staffing for 5% flex.

Emergency department personnel can be a tremendous asset in supporting these efforts, but it is likely that there are numerous health care providers including physicians, nurses, pharmacists, radiologists and respiratory therapists who have various levels of experience with children and or neonates. Facilities that are knowledgeable of their staff and health providers’ capabilities will be better able to meet the challenges of infants and children during disaster. The following are a series of recommendations to consider when staffing for pediatric/neonatal bed expansion:

- Survey all professional staff for pediatric and neonatal expertise and capabilities.
- Utilize current inpatient staff with pediatric/neonatal experience and training as first line providers.
- Identify float pool and registry nurses with pediatric/neonatal experience and training.
- Consider utilizing medical-surgical and/or emergency department nurses with pediatric/neonatal experience and training.
- PACU nurses with experience working with pediatric patients requiring minor surgery.
- Provide inpatient medical oversight with increase utilization of pediatric hospitalists, ED attendings with strong pediatric experience, Pediatric mid-level providers (PAs, PNP, FNPs), Pediatric Advance Practice Nurses (Clinical Nurse Specialists and Educators).
- Consider increasing local pediatric inpatient expertise during surge through Locum Tenens.

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<sup>17</sup> Ripley, A., “The Unthinkable: Who Survives When Disaster Strikes and Why”



- Create a process of rapid credentialing for pediatric and neonatal health care providers to support pediatric/neonatal surge. One mechanism to support this effort is to encourage all health care providers to join the Contra Costa Medical Reserve Corps. Information on how to join is at [www.cccems.org](http://www.cccems.org).
- Partner with your regional pediatric referral center in sharing policies and procedures, orientation, training and disaster preparedness exercises.
- Support incorporating telehealth into your medical provider infrastructure to support pediatric and neonatal subspecialty consultation between emergency department physicians, hospitalists, surgeons and critical care practitioners.
- Allow 24/7 family visitation to assist staff in caring for pediatric patients activities of daily living and medication administration.
- Consider creating a trained pool of nurses up to 25% of the hospital's current RN staff to become competent in pediatric care utilizing the following strategies:
  - PALS/PEARS certified.
  - Rotations in inpatient, outpatient or ED settings at intervals where pediatric patients are routinely seen.
  - Competency-based limited clinical rotations at pediatric facilities to establish and maintain competency.
  - Establish online in-house pediatric continuing education curriculums to support competency and just-in-time training.
  - Creation of a recognized and internally credentialed "group" of pediatric-competent nurse and physician providers to respond in the event of pediatric surge. This group would provide the clinical leadership during pediatric surge events.
- Use curriculum materials from PEARs and PALS as part of smaller in-services and training using pediatric experts in your facility or in the community (8-16 hrs).
  - Focus pediatric and/or neonatal training on the following areas:
    - Overview of developmental and physiological differences.
    - Fluids and medication safety.
    - Respiratory Assessment and Management.
    - Early Recognition of the Pre-arrest State (most important!).
  - Supplement with simulation training whenever available.
  - Incorporate a "hands on" component to all training to reinforce learning.

- 7. Equipment/Pharmacy/Respiratory Services:** Contra Costa EMS recommends that hospitals maintain minimal equipment and support service levels to support pediatric/neonatal surge using 5% flex.
- Since all emergency departments should be compliant with the state<sup>18</sup> and national standards for pediatric emergency equipment,<sup>19</sup> hospitals should have

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<sup>18</sup> California EMSC #198 (Mar 24, 2010) "EMSC Pediatric Disaster Preparedness Guidelines: Hospitals"

<sup>19</sup> 2009 Joint Policy Statement "Guidelines for Care of Children in the Emergency Department"

<http://aappolicy.aappublications.org/cgi/reprint/pediatrics;124/4/1233.pdf>



- vendors in place to support acquiring additional appropriate-sized equipment in the event of medical surge.
- Best practice guidelines recommend that your hospital keep 5 cribs, port-a-cribs, or playpens in storage.
  - Plan to stock 72-hour to 96-hour supply of equipment, nutrition and pharmaceuticals for staff, patients and their families.
  - All hospitals should have the capability to perform compounding of medications for pediatric and neonatal administration.
  - Hospitals who do not have compounding capability are encouraged to have their pharmacies obtain, develop or adopt compounding policies and procedures in consultation with their pediatric regional center for those medications most likely to be needed to care for children under normal and surge conditions.
  - Hospitals, in consultation with their pediatric champions and other pediatric/neonatal experts should identify appropriate additional equipment, resources and services to effectively support pediatric/neonatal surge including the following:
    - Handheld smart-phone applications for bedside decision support should be encouraged during normal operations to enhance the timely availability of pediatric and neonatal references to support clinical decision-making. These resources support familiarity with neonatal and pediatric physiology, medications and equipment.
    - Automating pre-calculated weight-based medication cards through patient information systems supporting medication utilization e.g. pharmacy, drug safety checks, etc.
    - Adopting standardized unit dosing and posting these references to providers in key location for commonly prescribed pediatric medications enhances medication safety.
    - Adopting “double-check policies” for key medications or products that are commonly associated with errors, e.g. heparin, narcotics, TPN, chemo, blood products, etc.
    - Pediatric and neonatal medication and equipment size decision support software and resources.
  - For those hospitals without inpatient pediatric or neonatal services, equipment resource issues are likely be minimal if major bed expansion efforts focus on providing care to primarily pediatric patients >12 yrs old and/or pediatric patients that are > 50 kg (basically adult size). However all hospitals should consider the following minimal resources to support inpatient staff in the event of surge.
    - Pediatric pre-calculated emergency dosing cards at each bedside based on patient weight.
    - Length based weight system for emergency preparedness (e.g. Broselow).
    - Accessible easy to use pediatric references on units for staff to use.



- Pediatric/neonatal code carts or code box on med/surg units housing pediatric patients.
- Pediatric or neonatal “go kits” for each bedside to support care in the event of evacuation.

**8. Patient Tracking and Reunification:** The tracking and reunification of infants and children during a disaster is one of the most important responsibilities for facilities, and has significant challenges that have been described in the disaster literature and after-action reports. During Katrina, there were cases where it took over 6 months to reunify children with their appropriate caregivers. Children are also at risk for child predators during these events. This calls for all health care providers to be aware and vigilant. All facilities should establish a reliable mechanism to safely identify and track neonates and children and to assure systems are in place to reunite unaccompanied children with their families.

- All neonates and children are to have appropriate identification so that personnel can quickly identify patients.
- Hospital are encouraged to use the ReddiNet patient tracking features (typically used for MCI) whenever possible.
- No child or neonate should be left unattended at any time.
- Appropriate family members should be incorporated in processes to assure adequate supervision.
- Tracking mechanisms should be designed to be accessible to staff, and incorporated into disaster exercise training and staff orientation.
- Hospitals should partner with local Red Cross chapters to support tracking and reunification system development for children and families.
- Hospitals should identify and train appropriate staff including hospital security in their tracking and reunification systems.

**9. Transporting and Providing Security for Children and Neonates During Disaster:** During a disaster all hospitals should be prepared to provide extended care for neonates and children. As part of this care, hospitals will need to transport infants and children within the hospital or to other facilities. Hospitals are encouraged to make pre-arranged agreements with ambulance companies and receiving hospitals. Consider the inter-facility transfer agreement template from Washington Health Care Association Website at [www.whca.org/docs/interfacility\\_transfer\\_agreement.pdf](http://www.whca.org/docs/interfacility_transfer_agreement.pdf).

The logistics of transporting numbers of hospitalized children are likely to require the mobilization of regional assets. Hospitals are encouraged to strongly support and participate in the development of regional models for the evacuation of neonates and children to determine the location of the nearest sites that could provide appropriate care for:





- NICU patients
- PICU patients
- Special Needs Children
- Children and adolescents requiring psychiatric care
- Technology dependent infants and children
- Children with complex or chronic medical needs, e.g. diabetes, cancer, dialysis

Nearest care sites that are further away will add to transport logistics and time for the patients involved. If the capacity at the nearest site is insufficient, the next closest care site should be identified. Since neonatal and pediatric resources are “regional assets” it is very likely that regional resources within and outside of the Bay Area may need to be utilized to meet any substantial need. Road accessibility and traffic are other complicating factors that can substantially affect planning for patient transport to more definitive care centers. These factors need to be considered when requesting resources and support for these activities.

Vehicle Type	Capacity (Patients)	Loading Time (minutes)	Comments
Bus	34 ambulatory patients	1	Children should be accompanied with parent or chaperone
Wheel chair Van	3 wheelchair patients	5	Children should be accompanied with parent or chaperone
BLS Ambulance	2	10	Bedridden patients requiring constant medical attention at the BLS level during transport
ALS Ambulance	1	20	Bedridden patients requiring constant medical attention at the ALS level during transport

The Agency for HealthCare Research and Quality has a number of tools, including a mass evacuation transportation model and Hospital Surge Model to develop specific strategies to treat an influx of patients affected by these specific incidents. These tools can estimate, by day, the severity of injury and the number and flow of casualties needing medical attention for specific scenarios selected by users. The tool is available at <http://hospitalsurgemodel.org/>. The Hospital Surge Model was developed by AHRQ in collaboration with HHS’ Office of the Assistant Secretary for Preparedness and Response. More than 60 other AHRQ Emergency Preparedness tools and resources are available at <http://www.ahrq.gov/prep/>.

The following are a number of recommendations compiled from best practice and lessons learned documents that may guide facilities in their planning for this population.<sup>20 21 22</sup>

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<sup>20</sup> CBPP and NYC DOHMH Pediatric Advisory Group, 3<sup>rd</sup> edition (Aug, 2008), “Children in Disasters: Hospital Guidelines for Pediatric Preparedness.”



<b>Transporting Children/Neonates</b>	
<b>Stable Children/Neonates</b>	<b>Unstable Children/Neonates</b>
<b>Pediatric and Neonatal Safety and Security is Critical</b>	
<p>Never leave any child unattended &amp; plan to notify family ASAP.</p> <p>If applicable or necessary have ready access to all pertinent transfer consent forms.</p> <p>Include identifying a pediatric safe area for children arriving at the hospital who do not need treatment.</p> <p>Provide a secure location and staffing of the safe area with qualified childcare providers, social workers and psychologists.</p>	
<p>Identify infants and children in multiple ways, e.g. standard ID bands/ ID stickers on skin with transparent dressing, clothing, equipment, diapers and consider direct marking of patients as needed.</p>	
<p>Provide chaperones and additional safety personnel during transportation.</p> <p>Parents or other adult caregivers stay with their children.</p> <p>If no adult caregiver available, assign appropriate personnel to accompany and supervise children at all times with one-to-one supervision if ambulatory and transported individually to another location.</p>	
<p>Stable children and neonates should be transported by personnel capable of performing appropriate medical care en route, e.g. formulas, enteral products, medications, IVs, oxygen.</p>	<p>In addition to the usual transport personnel additional staff skilled in pediatric/neonatal airway and resuscitation may be required. It is recommended that these personnel be identified prior to any event and be made aware of their responsibilities in these events.</p>
<p>Move all available supplies and medications with patient. Receiving site may or may not have all required supplies or medications immediately available.</p>	
<p>Transport equipment should include the availability of airway and resuscitation supplies for all age groups.</p>	<p>Use portable compressed air and oxygen cylinders, regulators and self-inflating bag-valve mask devices.</p>
<p>Stable ambulatory children may be transported to a pediatric safe area supervised by staff that are experienced or trained in observing groups of children.</p>	<p>Thermoregulation: Take appropriate measures to assure that neonates, infants and at risk children do not become hypothermic. Use additional blankets/hats, chemical-warming mattresses, kangaroo care by family members.</p>
<p>Adult stretchers may be appropriate for children &gt; 8 years. Modify to assure patient safety if used for smaller children, e.g. padding.</p> <p>Children &lt; 6years on stretchers require one-to-one supervision.</p>	
<p>Plan to need additional personnel to safely transport non-ambulatory patients, infants and small children requiring cribs or modified stretchers.</p>	
<p>Use SBAR communication during patient handoff (Situation; Background; Assessment; Recommendation)</p>	
<p>During patient handoff the health care provider transferring care should conduct a review of the patient's equipment and medications.</p> <p>This review should include "hands on" demonstration whenever needed.</p>	

<sup>21</sup> Illinois Emergency Medical Services for Children, (Feb, 2009) "Neonatal Intensive Care Unit (NICU) Evacuation Guidelines.

<sup>22</sup> Baldwin, S. et. al, "Moving Hospitalized Children All Over the Southeast: Interstate Transfer of Pediatric Patients During Hurricane Katrina" [www.pediatrics.org/cgi/content/full/117/5/S2/S416](http://www.pediatrics.org/cgi/content/full/117/5/S2/S416)



<b>Resources to Support Pediatric Surge and Disaster Preparedness</b>	
<b>Pediatric Disaster Resource and Training Center</b>	<p><b>Children’s Hospital Los Angeles Comprehensive National Disaster website</b> offering a wide variety of resources to address training and preparedness tools, gaming, podcasts and pediatric disaster preparedness planning calculators for risk assessment and disaster planning.  <a href="http://www.chladisastercenter.org/site/c.ntJYJ6MLIsE/b.3569231/k.BD34/Home.htm">http://www.chladisastercenter.org/site/c.ntJYJ6MLIsE/b.3569231/k.BD34/Home.htm</a></p>
<b>Podcasts</b>	<p><b>Pediatric Asthma emergencies: University of Maryland</b>  <a href="http://www.umm.edu/video_podcasts/mht/pediatric_emergencies_asthma_rafei.htm">http://www.umm.edu/video_podcasts/mht/pediatric_emergencies_asthma_rafei.htm</a>  <b>Cincinnati Children's-The Pediatric EMS Video podcast</b>  <a href="http://itunes.apple.com/us/podcast/cincinnati-childrens-the-pediatric/id318671500">http://itunes.apple.com/us/podcast/cincinnati-childrens-the-pediatric/id318671500</a></p>
<b>Utube videos</b>	<p><b>Decanulation special needs female:</b>  <a href="http://www.youtube.com/watch?v=cxSYrxgIk_4&amp;feature=related">http://www.youtube.com/watch?v=cxSYrxgIk_4&amp;feature=related</a>  <b>Child breathing with laryngomalacia and tracheomalacia</b>  <a href="http://www.youtube.com/watch?v=eKHD_hEfwU0&amp;feature=related">http://www.youtube.com/watch?v=eKHD_hEfwU0&amp;feature=related</a>  <b>Newborn in respiratory distress</b>  <a href="http://www.youtube.com/watch?v=SgtYR6CyxQ&amp;feature=related">http://www.youtube.com/watch?v=SgtYR6CyxQ&amp;feature=related</a>  <b>Pertussis Cough Video</b>  <a href="http://www.youtube.com/watch?v=wuvn-vp5InE&amp;feature=related">http://www.youtube.com/watch?v=wuvn-vp5InE&amp;feature=related</a>  <a href="http://www.youtube.com/watch?v=KZV4IAHbC48&amp;NR=1">http://www.youtube.com/watch?v=KZV4IAHbC48&amp;NR=1</a>  <b>Distressed breathing chest movements</b>  <a href="http://www.youtube.com/watch?v=Hv68EQ3tCBI&amp;feature=related">http://www.youtube.com/watch?v=Hv68EQ3tCBI&amp;feature=related</a>  <b>Baby with asthma</b>  <a href="http://www.youtube.com/watch?v=EJpxZAdBjMk&amp;feature=related">http://www.youtube.com/watch?v=EJpxZAdBjMk&amp;feature=related</a>  <b>Medicating Children</b>  <a href="http://www.youtube.com/watch?v=Ek9rxvSZawM&amp;feature=related">http://www.youtube.com/watch?v=Ek9rxvSZawM&amp;feature=related</a>  <b>Examples of children having seizures</b>  <a href="http://www.youtube.com/watch?v=KStgBGvDOIc">http://www.youtube.com/watch?v=KStgBGvDOIc</a>  <b>Absence Seizures</b>  <a href="http://www.youtube.com/watch?v=xE6N0Da8Ce0&amp;feature=fvw">http://www.youtube.com/watch?v=xE6N0Da8Ce0&amp;feature=fvw</a>  <a href="http://www.youtube.com/watch?v=H3iLQI6wt94&amp;feature=related">http://www.youtube.com/watch?v=H3iLQI6wt94&amp;feature=related</a>  <a href="http://www.youtube.com/watch?v=z9V2sNmIoJk&amp;feature=related">http://www.youtube.com/watch?v=z9V2sNmIoJk&amp;feature=related</a>  <b>Partial Complex Seizures</b>  <a href="http://www.youtube.com/watch?v=JPUp5LwtQ_k&amp;feature=related">http://www.youtube.com/watch?v=JPUp5LwtQ_k&amp;feature=related</a>  <a href="http://www.youtube.com/watch?v=714_JhYo1Fo&amp;feature=related">http://www.youtube.com/watch?v=714_JhYo1Fo&amp;feature=related</a>  <a href="http://www.youtube.com/watch?v=IFwMXOocm4g&amp;feature=related">http://www.youtube.com/watch?v=IFwMXOocm4g&amp;feature=related</a>  <a href="http://www.youtube.com/watch?v=i6iAmnBIjk0&amp;feature=related">http://www.youtube.com/watch?v=i6iAmnBIjk0&amp;feature=related</a>  <b>Simple partial seizures</b>  <a href="http://www.youtube.com/watch?v=rtjPs_B99Bo&amp;feature=related">http://www.youtube.com/watch?v=rtjPs_B99Bo&amp;feature=related</a>  <b>Tonic Clonic Seizures in 4 year old</b>  <a href="http://www.youtube.com/watch?v=FSkwXUi6ie0&amp;NR=1">http://www.youtube.com/watch?v=FSkwXUi6ie0&amp;NR=1</a></p>



<p><b>Online Courses and Toolkits</b></p>	<p><b>PEDIATRIC DISASTER PREPAREDNESS EDUCATIONAL TOOLBOX ONLINE COURSES:</b> The following courses are designed to help improve disaster response in the State of Tennessee. The courses are for families and for healthcare and other professionals who may be expected to respond in the event of large-scale disasters. Each course has a pediatric focus in keeping with the mission of TN EMSC, however much of the information applies equally well in non-pediatric situations.</p> <p><b>Online Courses for Healthcare Professionals:</b> Topics covered include Special Needs, Disaster Preparedness for Schools, Preparing for Explosion and Blast Injuries, Responding to Bioterrorism, Responding to Chemical Incidents, Responding to radiation disasters.  <a href="http://www.tnems.org/Online%20Courses">http://www.tnems.org/Online%20Courses</a></p>
<p><b>Pediatric Safety</b></p>	<p><b>THINGS THAT WORK: HOT TOPICS IN PEDIATRIC PATIENT SAFETY</b></p> <p>In 2004, the American Academy of Pediatrics brought together a Patient Safety Advisory Group to consider how the Academy could provide leadership and support to make care safer for children and families.</p> <p>One of the suggestions was a listserv to enable those involved in patient safety to learn from one another. Another idea was a series of conference calls, "Things That Work," to share best practices with colleagues. The Advisory Group chose implementation of a safety bundle, safety walk rounds, and medication reconciliation as the first three topics for these calls. Participants were able to access the presenter's PowerPoint presentations, ask questions during the call, and continue the discussion with colleagues following each call via the moderated listserv. To sign up for the listserv, contact Pat Wajda at <a href="mailto:pwajda@aap.org">pwajda@aap.org</a>.</p> <p>This is the beginning of a series of activities that the AAP hopes will involve all the systems in which we care for children including inpatient, intensive care unit, emergency department, ambulatory setting, home health, schools, and daycare.</p> <p>Above at <a href="http://www.aap.org/visit/thingsthatworkcall.htm">http://www.aap.org/visit/thingsthatworkcall.htm</a></p>
<p><b>Best Practices from Other States</b></p>	<p>Training resources, guidance and materials From Texas Disaster Preparedness: Topics include Feeding of infants and children and child and adolescent psychological support for disaster aftermath. <a href="http://www.dshs.state.tx.us/preparedness/e-prep_pros.shtm">http://www.dshs.state.tx.us/preparedness/e-prep_pros.shtm</a></p>
<p><b>American Academy of Pediatrics Disaster Website</b></p>	<p>Robust modular series by national experts on topics directed at training pediatric leaders in disaster planning, preparedness and management. Topics include: pediatric surge planning and responding to disasters involving pediatric trauma, toxic exposures, infectious disease and managing pediatric consequences common to disasters such as diarrhea and dehydration and emotional impacts of disaster on children and their families.  <a href="http://www.aap.org/disasters/education.cfm">http://www.aap.org/disasters/education.cfm</a></p>



<p><b>Best Practice Documents, Guidelines and Toolkits</b></p>	<p><b>California EMSC:</b> EMSA #197: EMSC Pediatric Disaster Preparedness Guidelines for LEMSAs <a href="http://www.emsa.ca.gov/pubs/docs/EMSA197.doc">http://www.emsa.ca.gov/pubs/docs/EMSA197.doc</a> EMSA #198: EMSC Pediatric Disaster Preparedness Guidelines for Hospitals <a href="http://www.emsa.ca.gov/pubs/docs/EMSA198.doc">http://www.emsa.ca.gov/pubs/docs/EMSA198.doc</a></p> <p><b>Pediatric Disaster Coalition/Facility MOU (Texas EMS for Children)</b>  <a href="http://www.dshs.state.tx.us/emtraumasystems/PediatricDisasterCoalitionMOU_Nov08.pdf">http://www.dshs.state.tx.us/emtraumasystems/PediatricDisasterCoalitionMOU_Nov08.pdf</a></p> <p><b>White Paper: Disaster Response for Pediatric Hospitals and Specialty Patients</b>  <a href="http://www.dshs.state.tx.us/emtraumasystems/PediatricTransportWhitePaperfinal.pdf">http://www.dshs.state.tx.us/emtraumasystems/PediatricTransportWhitePaperfinal.pdf</a></p> <p><b>New York Healthcare Prepares: Focus on Pediatric Preparedness</b>          Wide variety of best practice documents from pediatric hospital preparedness to tabletop exercises. Some of the most comprehensive and definitive work, on Pediatric Disaster Preparedness, in the United States.  <a href="http://www.nyc.gov/html/doh/html/bhpp/bhpp-focus-ped.shtml#6">http://www.nyc.gov/html/doh/html/bhpp/bhpp-focus-ped.shtml#6</a></p>
<p><b>Telemedicine</b></p>	<p><b>UC Davis: ESCAPE Project-Enhancing Surge Capacity and Partnership Effort</b>  <a href="http://www.ucdmc.ucdavis.edu/escape/escape-telemedicine.html">http://www.ucdmc.ucdavis.edu/escape/escape-telemedicine.html</a></p>
<p><b>Decision Support Software and Applications</b></p>	<p><b>iTunes:</b> PediSTAT, Pedidoser, PediSafe, 5 minute pediatric consultant, PALS Advisor</p> <p><b>PEMSoft:</b> <a href="http://www.pemsoft.com/ModCoreFrontEnd/index.asp?PageID=114">http://www.pemsoft.com/ModCoreFrontEnd/index.asp?PageID=114</a></p> <p><b>Brosleow color coding Hospital system:</b>  <a href="http://www.colorcodingkids.com/about_color_system.html">http://www.colorcodingkids.com/about_color_system.html</a></p> <p><b>Pediatric PDA and iphone apps:</b> comprehensive list of new pediatric handheld applications. <a href="http://www.pda4peds.com/new/">http://www.pda4peds.com/new/</a></p> <p><b>Children’s National Medical Center Pediatrics on hand held devices:</b> website with wide variety of information on handheld decision support:  <a href="http://www.childrensnational.org/pdas/About/comments.aspx">http://www.childrensnational.org/pdas/About/comments.aspx</a></p>
<p><b>Pediatric Severity Scoring Systems and Triage Tools/Training</b></p>	<p><b>Jumpstart Triage</b> Dr Romig’s website with downloadable training materials at no cost: <a href="http://www.jumpstarttriage.com/JumpSTART_and_MCI_Triage.php">http://www.jumpstarttriage.com/JumpSTART_and_MCI_Triage.php</a></p> <p><b>Sacco Triage Method:</b> <a href="http://www.sharphinkers.com/STM_Site/stm_home.htm">http://www.sharphinkers.com/STM_Site/stm_home.htm</a></p> <p><b>SALT Mass Casualty Triage and pediatrics PowerPoint:</b>  <a href="http://www.jumpstarttriage.com/uploads/Pediatric_Multicasualty_Incident_Triage.ppt">www.jumpstarttriage.com/uploads/Pediatric_Multicasualty_Incident_Triage.ppt</a></p> <p><b>Emergency Severity Index Version 4:</b> Predictive ED Patient Severity Index now including pediatrics. <a href="http://www.ahrq.gov/research/esi/">http://www.ahrq.gov/research/esi/</a></p> <p><b>PEWS: Pediatric Early Warning System:</b>  <a href="http://www.innovations.ahrq.gov/content.aspx?id=2336">http://www.innovations.ahrq.gov/content.aspx?id=2336</a></p>



<b>Pediatric Disaster Gaming</b>	<b>SurgeWorld: Gaming teaching pediatric triage</b> <a href="http://www.chladisastercenter.org/site/c.ntJYJ6MLIsE/b.3569231/k.BD34/Home.htm">http://www.chladisastercenter.org/site/c.ntJYJ6MLIsE/b.3569231/k.BD34/Home.htm</a>
<b>Off the Shelf Training for Pediatric Competency</b>	<p><b>Pediatric Advanced Life Support (PALS) and Pediatric Emergency Assessment and Recognition (PEARS)</b> classroom and online training (fee based): AHA website</p> <p><b>Advanced Pediatric Life Support (APLS)</b> classroom and online training (fee based): <a href="http://www.aplsonline.com/">http://www.aplsonline.com/</a></p> <p><b>Emergency Nurses Pediatric Course (ENPC)</b> classroom and fee based:  <a href="http://www.ena.org/coursesandeducation/CATNII-ENPC-TNCC/enpc/Pages/Default.aspx">http://www.ena.org/coursesandeducation/CATNII-ENPC-TNCC/enpc/Pages/Default.aspx</a></p> <p><b>Pediatric Fundamental Critical Care Support (PFCCS):</b> standardized curriculum directed at community hospitals to build pediatric medical competency. Fee based courses.  <a href="http://www.sccm.org/FCCS_and_Training_Courses/PFCCS/Pages/default.aspx">http://www.sccm.org/FCCS_and_Training_Courses/PFCCS/Pages/default.aspx</a></p> <p><b>Learn PICU: Free slide sets for pediatric emergency topics</b>  <a href="http://www.learnicu.org/Clinical_Practice/Fundamentals/RICU/Pages/PICUModule.s.asp">http://www.learnicu.org/Clinical_Practice/Fundamentals/RICU/Pages/PICUModule.s.asp</a></p> <p><b>University of New Mexico pediatric disaster preparedness podcasts and video training:</b> <a href="http://hsc.unm.edu/emered/PED/education/onlineEd.shtml">http://hsc.unm.edu/emered/PED/education/onlineEd.shtml</a></p> <p><b>Children’s National Medical Center pediatric disaster preparedness online education free:</b>  <a href="http://uat.dccchildrens.com/chexwizarding/pediatricdisasterwbtprogram/index.html">http://uat.dccchildrens.com/chexwizarding/pediatricdisasterwbtprogram/index.html</a></p> <p><b>Department of Health and Human Services;</b> Pediatric web casts, videos, training on variety of pediatric disaster and patient care topics. <a href="http://www.mchcom.com/">http://www.mchcom.com/</a></p>

This document has been prepared in collaboration with the Contra Costa EMS for Children Advisory Group and the California Neonatal/Pediatric Disaster Preparedness Coalition.

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For more information on Pediatric and Neonatal Disaster Preparedness visit [www.cccems.org](http://www.cccems.org), or to <https://sites.google.com/site/pedineonetwork/>