

# Recognising the deteriorating child: The key to improving survival

- 7 year old girl with right hip / leg pain, fever, lethargy, vomiting
- 2 day history, gradually worsening
- Diagnosis of osteomyelitis, ? septic arthritis
- Admitted, bed blocked in ED
- Narcotic pain relief, 2 fluid boluses for tachycardia and hypotension
- Reviewed multiple times overnight and repeated documentation of “looks well”

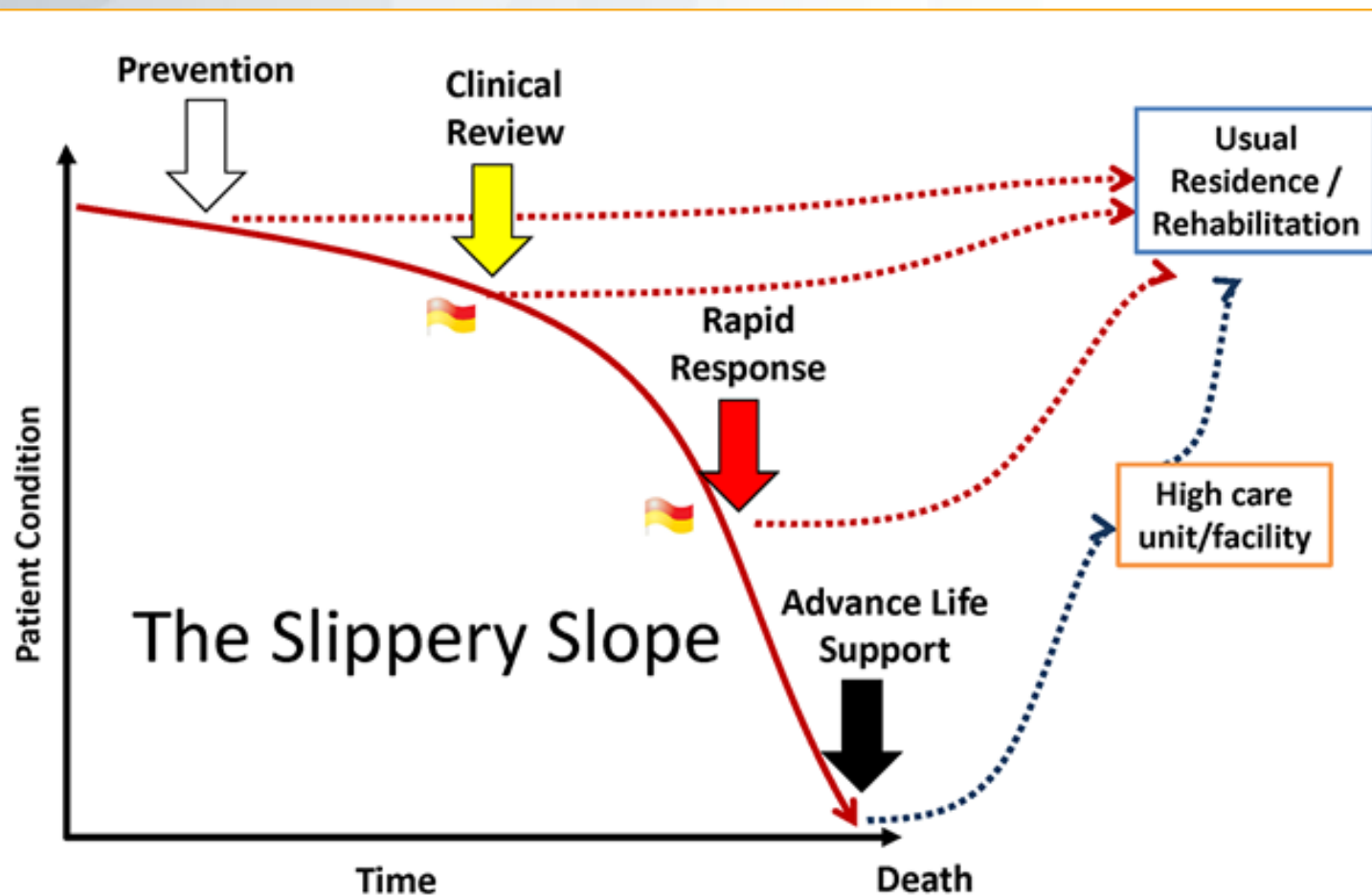



- Escalation of care at AM ward round
- Decompensated septic shock
- Arrested on induction of anaesthesia
- Onto ECMO
- Survival
- Bilateral BKA for GAS necrotising fasciitis

# Objectives

- Need to intervene early
- Recognition of deterioration as the central link in the “Chain of Prevention”
- Prevention of death AND morbidity
- Challenges specific to children
- Translation into practice



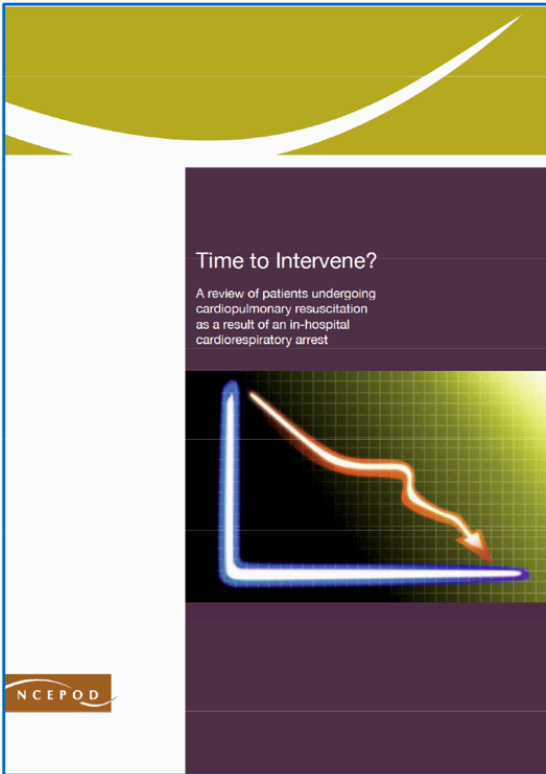


 'Between the Flags' intervention on the 'Slippery Slope' of patient deterioration.

# Recognition of Deterioration

- National Standard 9 – ACSQHC 2012
- The Evidence
  - Adult and paediatric
  - EWS, MET
  - Prevention cardiac arrest rather than manage it
  - Improved outcomes in arrests
    - Identification in peri arrest period
    - Preparation of team and resources
    - Commencement during hypotensive bradycardia vs asystole





**Time to Intervene?**

A review of patients undergoing cardiopulmonary resuscitation as a result of an in-hospital cardiorespiratory arrest

NCEPOD

# Recognising & responding to deterioration

## Simple, yet surprisingly complex

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# “Chain of Prevention”



# Education

- Recognition of an acutely unwell / deteriorating child:
  - Standard healthcare professional education fails to adequately address this competency
  - Paediatric specific challenge
    - Difference in age translation of resuscitation skills vs recognition ability
  - Challenge of providing access to educational experience

# Monitoring and Recognition





## *Recognition and Management of the Deteriorating Patient*

### *A case study from an overseas coroner's inquest*

JD, a four-year-old boy with a past history of colostomy in the neonatal period for bowel perforation, attended a tertiary Children's Hospital for elective colostomy reversal. The surgery and subsequent recovery from anaesthesia

were uneventful, and the child returned to his surgical ward for routine post-operative care. Significantly, staff illness had resulted in only two registered nurses available to care for 24 patients overnight.

Figure. 3: Observation chart

DO NOT WRITE IN THIS BINDING MARGIN

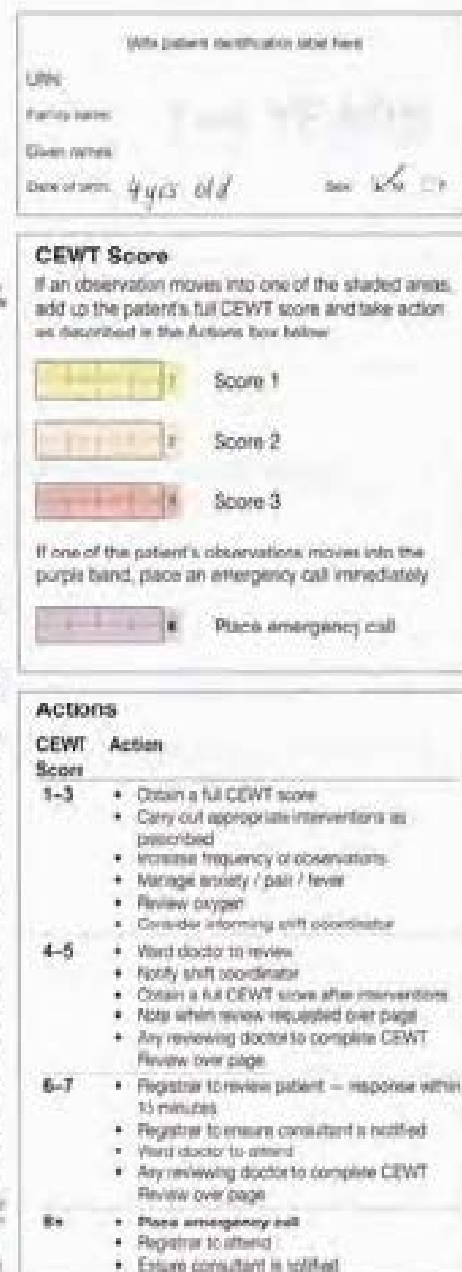
05/2006 - TRIAL FORM

<p><b>Date:</b></p> <p><b>What Pain Assessment tool is being used?</b>  <i>If an alternate pain scale is used to the one indicated, please specify in the Comments column.</i></p> <p> <input type="checkbox"/> FLACC             <input checked="" type="checkbox"/> Wong &amp; Baker Faces             <input type="checkbox"/> Numerical  <input type="checkbox"/> Other (please specify):         </p>										<p>(Affix patient identification label here)</p> <p><b>URN:</b></p> <p><b>Family name:</b></p> <p><b>Given names:</b></p> <p><b>Date of birth:</b> 4 yr old      <b>Sex:</b> <input checked="" type="checkbox"/> M <input type="checkbox"/> F</p>									
Time	Temp (°C)	Pulse	Resp	BP	O <sub>2</sub> L/min	S.O. <sub>2</sub> %	Syringe Volume (mLs)	Infusion Rate mL/hr	NCA/PCA Demands		Intravenous Bolus			Epidural Bromage Scale			Pain Score	Sedation Score	Comments / MAP
1600	37.2	114	23	94/55	1	98	28	1									0	S2	
1700		130	24	93/58	1	98	27	1									0	S1	
1800		132	22	90/65	1	97	26	1			1810	1	45	4C			4	S1	
1900	36.6	141	28		1	95	24.2	2									2	S1	
2100		153	32		1	96	22	1			2100	1	48	4C			4	S1	
2300		162	41		1+2	91+95	20	2									2	S3	
0200		181	44	85/66	2	96	18	2			0215	1	48	4C			6	S1	
0400		184	53		6	98	15.4	2+0									0	S4	
0600		CODE BLUE - SEE RESUS FORM																	

Figure. 4: Observations plotted on Children's Early Warning Tool



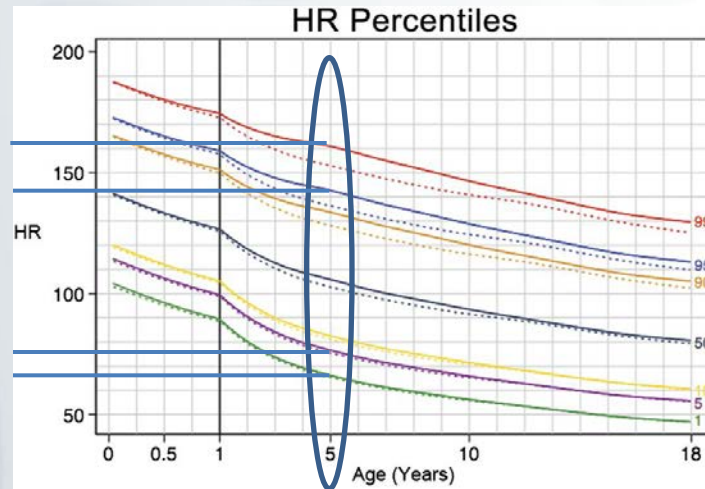
**DO NOT WRITE IN THE BINDING MARGIN**



# Percentile curves for HR and RR in hospitalized children.

Cohort of 14014 hospitalised children (non ICU).

Across 2 hospitals:  
*Cincinnati Children's & CHOP*

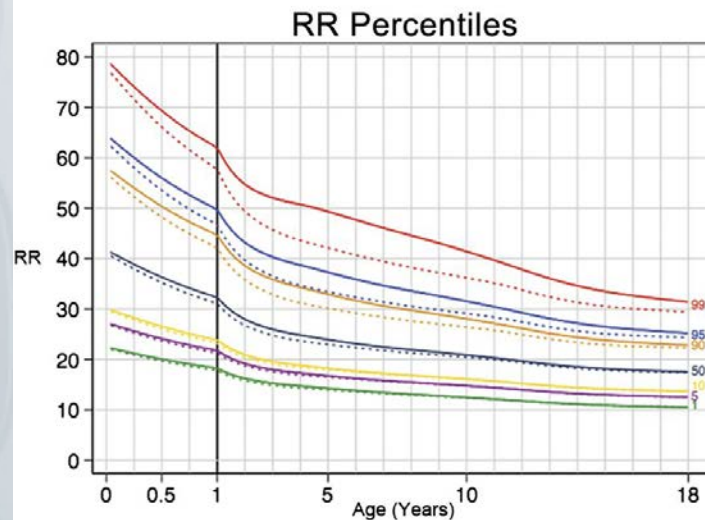


99<sup>th</sup> Centile (purple zone)

95<sup>th</sup> Centile (orange zone)

5<sup>th</sup> Centile (orange zone)

1<sup>st</sup> Centile (purple zone)

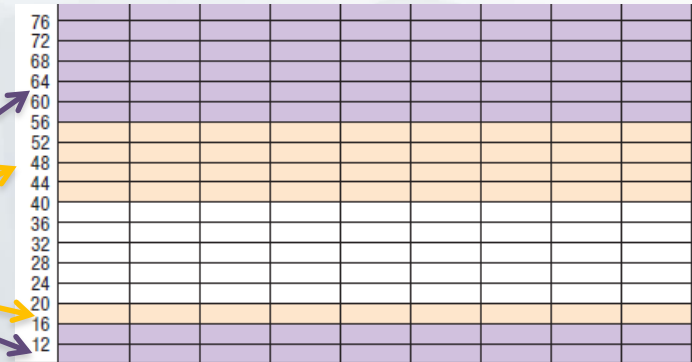
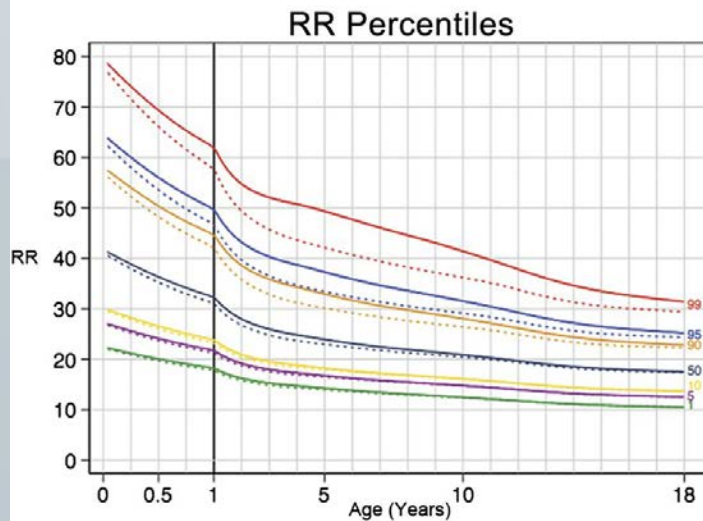
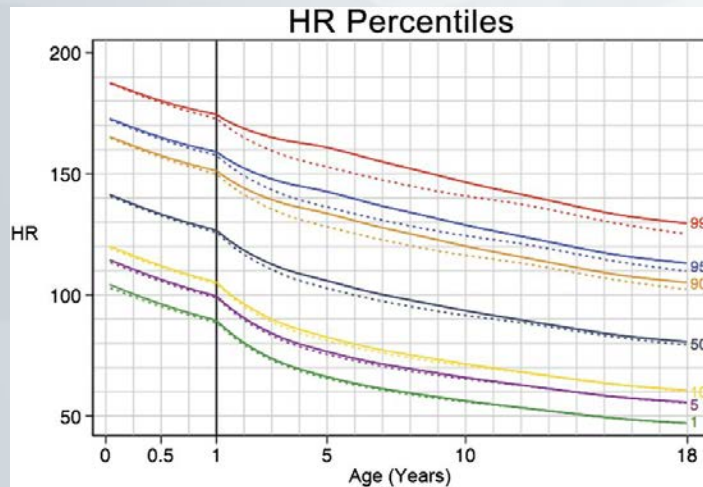


Bonafide C P et al. Pediatrics 2013;131:e1150-e1157

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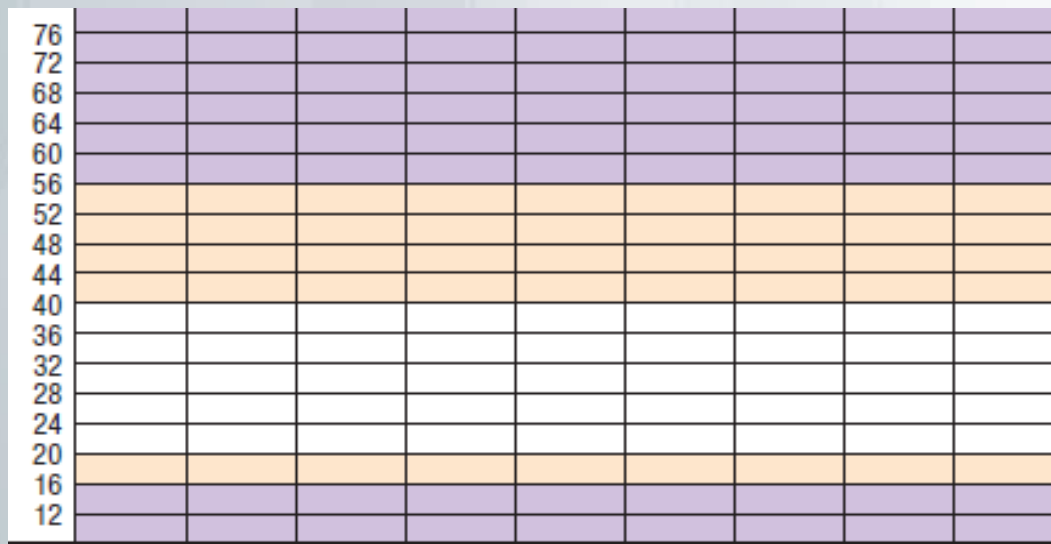
# Percentile curves for HR and RR in hospitalized children



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# What is a Track and Trigger Chart?

Mandates a response once the patients observations hit a designated zone.



Mandated Emergency call

Request medical review  
(30 mins)

	20	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000	1005	1010	1015	1020	1025	1030	1035	1040	1045	1050	1055	1060	1065	1070	1075	1080	1085	1090	1095	1100	1105	1110	1115	1120	1125	1130	1135	1140	1145	1150	1155	1160	1165	1170	1175	1180	1185	1190	1195	1200	1205	1210	1215	1220	1225	1230	1235	1240	1245	1250	1255	1260	1265	1270	1275	1280	1285	1290	1295	1300	1305	1310	1315	1320	1325	1330	1335	1340	1345	1350	1355	1360	1365	1370	1375	1380	1385	1390	1395	1400	1405	1410	1415	1420	1425	1430	1435	1440	1445	1450	1455	1460	1465	1470	1475	1480	1485	1490	1495	1500	1505	1510	1515	1520	1525	1530	1535	1540	1545	1550	1555	1560	1565	1570	1575	1580	1585	1590	1595	1600	1605	1610	1615	1620	1625	1630	1635	1640	1645	1650	1655	1660	1665	1670	1675	1680	1685	1690	1695	1700	1705	1710	1715	1720	1725	1730	1735	1740	1745	1750	1755	1760	1765	1770	1775	1780	1785	1790	1795	1800	1805	1810	1815	1820	1825	1830	1835	1840	1845	1850	1855	1860	1865	1870	1875	1880	1885	1890	1895	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100	2105	2110	2115	2120	2125	2130	2135	2140	2145	2150	2155	2160	2165	2170	2175	2180	2185	2190	2195	2200	2205	2210	2215	2220	2225	2230	2235	2240	2245	2250	2255	2260	2265	2270	2275	2280	2285	2290	2295	2300	2305	2310	2315	2320	2325	2330	2335	2340	2345	2350	2355	2360	2365	2370	2375	2380	2385	2390	2395	2400	2405	2410	2415	2420	2425	2430	2435	2440	2445	2450	2455	2460	2465	2470	2475	2480	2485	2490	2495	2500	2505	2510	2515	2520	2525	2530	2535	2540	2545	2550	2555	2560	2565	2570	2575	2580	2585	2590	2595	2600	2605	2610	2615	2620	2625	2630	2635	2640	2645	2650	2655	2660	2665	2670	2675	2680	2685	2690	2695	2700	2705	2710	2715	2720	2725	2730	2735	2740	2745	2750	2755	2760	2765	2770	2775	2780	2785	2790	2795	2800	2805	2810	2815	2820	2825	2830	2835	2840	2845	2850	2855	2860	2865	2870	2875	2880	2885	2890	2895	2900	2905	2910	2915	2920	2925	2930	2935	2940	2945	2950	2955	2960	2965	2970	2975	2980	2985	2990	2995	3000	3005	3010	3015	3020	3025	3030	3035	3040	3045	3050	3055	3060	3065	3070	3075	3080	3085	3090	3095	3100	3105	3110	3115	3120	3125	3130	3135	3140	3145	3150	3155	3160	3165	3170	3175	3180	3185	3190	3195	3200	3205	3210	3215	3220	3225	3230	3235	3240	3245	3250	3255	3260	3265	3270	3275	3280	3285	3290	3295	3300	3305	3310	3315	3320	3325	3330	3335	3340	3345	3350	3355	3360	3365	3370	3375	3380	3385	3390	3395	3400	3405	3410	3415	3420	3425	3430	3435	3440	3445	3450	3455	3460	3465	3470	3475	3480	3485	3490	3495	3500	3505	3510	3515	3520	3525	3530	3535	3540	3545	3550	3555	3560	3565	3570	3575	3580	3585	3590	3595	3600	3605	3610	3615	3620	3625	3630	3635	3640	3645	3650	3655	3660	3665	3670	3675	3680	3685	3690	3695	3700	3705	3710	3715	3720	3725	3730	3735	3740	3745	3750	3755	3760	3765	3770	3775	3780	3785	3790	3795	3800	3805	3810	3815	3820	3825	3830	3835	3840	3845	3850	3855	3860	3865	3870	3875	3880	3885	3890	3895	3900	3905	3910	3915	3920	3925	3930	3935	3940	3945	3950	3955	3960	3965	3970	3975	3980	3985	3990	3995	4000	4005	4010	4015	4020	4025	4030	4035	4040	4045	4050	4055	4060	4065	4070	4075	4080	4085	4090	4095	4100	4105	4110	4115	4120	4125	4130	4135	4140	4145	4150	4155	4160	4165	4170	4175	4180	4185	4190	4195	4200	4205	4210	4215	4220	4225	4230	4235	4240	4245	4250	4255	4260	4265	4270	4275	4280	4285	4290	4295	4300	4305	4310	4315	4320	4325	4330	4335	4340	4345	4350	4355	4360	4365	4370	4375	4380	4385	4390	4395	4400	4405	4410	4415	4420	4425	4430	4435	4440	4445	4450	4455	4460	4465	4470	4475	4480	4485	4490	4495	4500	4505	4510	4515	4520	4525	4530	4535	4540	4545	4550	4555	4560	4565	4570	4575	4580	4585	4590	4595	4600	4605	4610	4615	4620	4625	4630	4635	4640	4645	4650	4655	4660	4665	4670	4675	4680	4685	4690	4695	4700	4705	4710	4715	4720	4725	4730	4735	4740	4745	4750	4755	4760	4765	4770	4775	4780	4785	4790	4795	4800	4805	4810	4815	4820	4825	4830	4835	4840	4845	4850	4855	4860	4865	4870	4875	4880	4885	4890	4895	4900	4905	4910	4915	4920	4925	4930	4935	4940	4945	4950	4955	4960	4965	4970	4975	4980	4985	4990	4995	5000	5005	5010	5015	5020	5025	5030	5035	5040	5045	5050	5055	5060	5065	5070	5075	5080	5085	5090	5095	5100	5105	5110	5115	5120	5125	5130	5135	5140	5145	5150	5155	5160	5165	5170	5175	5180	5185	5190	5195	5200	5205	5210	5215	5220	5225	5230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## UR:

Level of Consciousness		Alert	Verbal	Pain	Unresponsive
(wake patient before scoring)					





# Call for Help and Response



**apls**

Advanced Paediatric  
Life Support

**Melbourne  
Children's**  
Excellence in  
clinical care,  
research and  
education



**Murdoch  
Children's  
Research  
Institute**



## Summary

- Realising the benefits of early recognition of (paediatric) deterioration requires
  - Educated workforce
  - Supported by validated monitoring tools
  - Force function to trigger escalation of care
  - Systems in place to deliver escalated care



*"It's your ribs. I'm afraid they're delicious."* **CIN** COLLECTION