

SWACIC 10 year report: 2001 - 2010



A summary report of data from the
South West Audit of Critically Ill Children
from 2001-2010.

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1. EXECUTIVE SUMMARY

- The South West Critically Ill Children's network involves a systematic approach to critically ill children throughout the region, which endeavours to deliver the best possible outcome for this vulnerable group of patients. It is analogous to a hub and spoke arrangement, in which the regional Paediatric Intensive Care Unit in Bristol represents the hub and a network of general intensive care units, high dependency units and paediatric wards in hospitals across the region represent the spokes. Good quality data is essential to inform decisions concerning service delivery, and the South West Audit of Critically Ill Children (SWACIC) is unique within the UK in collecting data continuously over such a long period. On that basis, changes in the frequency of presenting conditions, service provision, and even differences in activity trends between hospitals can be demonstrated and hopefully better understood.
- Over the 10-year period, some hospitals (Gloucester, Bath, North Devon & Torbay) have shown a significant increase in the number of critically ill paediatric admissions, whilst others (Exeter & Truro) have seen a relative decline in numbers over the same period.
- Larger hospitals tend to have a relatively higher percentage of admissions reaching critical illness criteria compared to smaller district general hospitals, with the lowest percentage rates of critical illness amongst paediatric admissions being in the 2 day units at Cheltenham and Weston, closely followed by Yeovil District Hospital.
- Critical illness admissions show a seasonal variation with greater numbers of admissions between November and January, predominantly due to the rise in respiratory critical illness admissions. Respiratory diagnoses are the commonest cause of critical illness in children in the region. The number of respiratory admissions has seen a rise of approximately 40% over the 10-year period, most noticeably from 2008 onwards. Some of this later increase may be related to pandemic influenza although relative frequencies of the commonest respiratory conditions have not altered significantly over the 10 years.
- Although neurology critical illness admissions have remained static overall, there has been a marked increase in the number of cases of drug poisoning, which corroborates the findings of a rapid increase in the rates of deliberate self-harm in the region.
- As paediatric high dependency units have opened across the region the number of admissions to these units has approximately doubled over the 10-year period. Almost all admissions are internal from the same hospital with a trend to an increasing proportion being admitted directly from emergency departments. The average length of stay in paediatric high dependency units is between 1 and 2 days. However a doubling of total admissions to PHDUs has only resulted in an increase of total bed days of approximately 67%. Differences in commissioning arrangements between PCTs has led to some inequity of paediatric high dependency provision across the South West, most noticeably between the peninsula and the rest of the region.
- Following a fall in the number of critical illness episodes on paediatric wards in the mid 2000s, the number increased again in 2009 and 2010. This may relate to increases in admissions of critically ill children to hospitals without PHDUs but also may reflect that critically ill children in hospitals with PHDUs are having to be cared for on the wards when PHDUs with relatively small bed bases reach capacity during the busiest winter months.

- Overall numbers of paediatric admissions to General Intensive Care Units have fallen by approximately 40% over the 10-year period, the majority of the decline being noted in the Peninsula. The only exception to this is the Royal Devon and Exeter Hospital, where paediatric scoliosis cases continue to be admitted electively post-operatively. The fall in the the overall number of admissions to GICUs appears to relate to a marked drop in Level 1 (High Dependency) admissions with the numbers of those requiring ventilation showing less of a decline, and those needing both ventilation and inotropic support remaining relatively steady. This is despite the reductions in meningococcal sepsis and other infectious disease admissions. In addition to fewer admissions to GICU, there has been a reduction in the average length of stay on GICU to approximately 1 day.
- Over the 10 years, there has been a general trend to an increasing proportion of older children and young people reaching critical illness criteria in Frenchay. This would appear to relate to an increase in orthopaedic workload, particularly scoliosis surgery. Despite having a separate paediatric high dependency unit, significant level 1 (high dependency) care is provided on the Peri-Anaesthetic Care Unit (PACU), with only approximately 50% of admissions requiring invasive ventilation.
- Contrary to the original operational policy of PACU of supporting children with intensive care requirements for upto 24 hours, the average length of ventilation for ventilated children remains significantly greater than this. Many of these cases are children with head injuries and this may reflect a change in practice in Frenchay regarding the treatment and care of these children. Alternatively it may reflect bed pressures for the PICU at BRHC, with transfer being delayed awaiting bed availability there. This warrants further investigation.
- Over the 10 years of this report , the admission rate of the PICU at Bristol Royal Hospital for Children has remained very steady at around 700 admissions per year. The median length of stay has remained very consistent at 2 to 3 days. The number of transfers to PICU performed by the retrieval team from Bristol has remained steady at approximately 200 per year. The number of refused retrievals has remained relatively high during most of the period of this report, but a change in working practices on PICU in 2010 has led to a dramatic reduction in the number of refusals.
- The prevalence of admission to PICU for children in the South West, remains the lowest of any region in England, and has remained relatively static at approximately 95 admissions per 100,000 children per year. The PICANet risk-adjusted Standardised Mortality Rate for the PICU in Bristol has consistently been below 1, and in certain years it has been the lowest of any of the medium or large units in the UK.
- Although the vast majority of children requiring intensive care are transferred from District General Hospitals in the South West by the South West Acute Paediatric Transport Service based out of the PICU at Bristol Royal Hospital for Children (excluding those with time-critical transfers e.g. head injuries, severe burns, abdominal emergencies), a greater number of inter-hospital transfers of high dependency children from District General Hospitals are performed by local medical and nursing staff. These staff do not necessarily have the appropriate training or experience in paediatric transport medicine, and are usually taken from the numbers of staff allocated to individual wards or units, leaving these services short-staffed in their absence. These issues constitute an on-going clinical governance risk.

2. INTRODUCTION AND METHODOLOGY

National standards give clear guidance on where and how critically ill children should be appropriately managed (“A Bridge to the Future”¹ and “A Framework for the Future”², NHS executive 1997; Standards for the Care of Critically Ill Children 4th Ed 2010³, also known as the “PICS Standards”). The purpose of the South West Audit of Critically Ill Children is to ensure that the entire pathway of care from arrival at the local hospital to eventual outcome at the tertiary paediatric intensive care unit is properly audited. Such data collection is mandatory and should inform strategic decision making on the optimal configuration of children’s services both locally and across the region, as per the PICS Standards 2010 (Standard 77 pg. 28).

This audit was historically supported and funded by the South West Regional Children’s Planning Group. It now reports to the South West Specialist Commissioning Group. The audit process has been developed in collaboration with clinicians throughout the region, and the team comprises a designated lead clinician and nurse in each hospital, and a full-time regional audit co-ordinator.

The audit provides information for both providers of care and commissioners and its aims are to:

1. Give an overview of the provision of care available to critically ill children.
2. Establish how many critically-ill children are admitted to general ICU, HDU and paediatric wards.
3. Report on diagnostic case-mix, length of stay and outcome of children admitted to each of these areas.
4. Establish the numbers of referrals and transfers of critically ill children occurring between hospitals.
5. Provide individual hospitals with reports and feedback relating to their own activity.
6. Identify issues requiring action by commissioners and/or Trusts.

In the South West region, data has now been collected on all children admitted to general intensive care and paediatric high dependency units, and on children who meet pre-defined criteria of critical illness admitted to the paediatric wards, since November 2000. This report summarises data collection for the period 1st January 2001 to December 31st 2010.

The ***inclusion criteria*** for audit entry are as follows:

- All children admitted to an intensive care or a designated paediatric high dependency unit
- All critically ill children admitted to a paediatric ward who meet pre-defined diagnostic, intervention or nursing criteria - these criteria have been agreed upon by paediatricians throughout the region. [PICS Standards](#) were revised in 2010 to ensure safe and effective services and to drive improvements in quality of care. (see [Appendix C](#)).
- No upper age limit except that children must be under the care of a hospital paediatrician
- No lower age limit except children must have been discharged from neonatal care

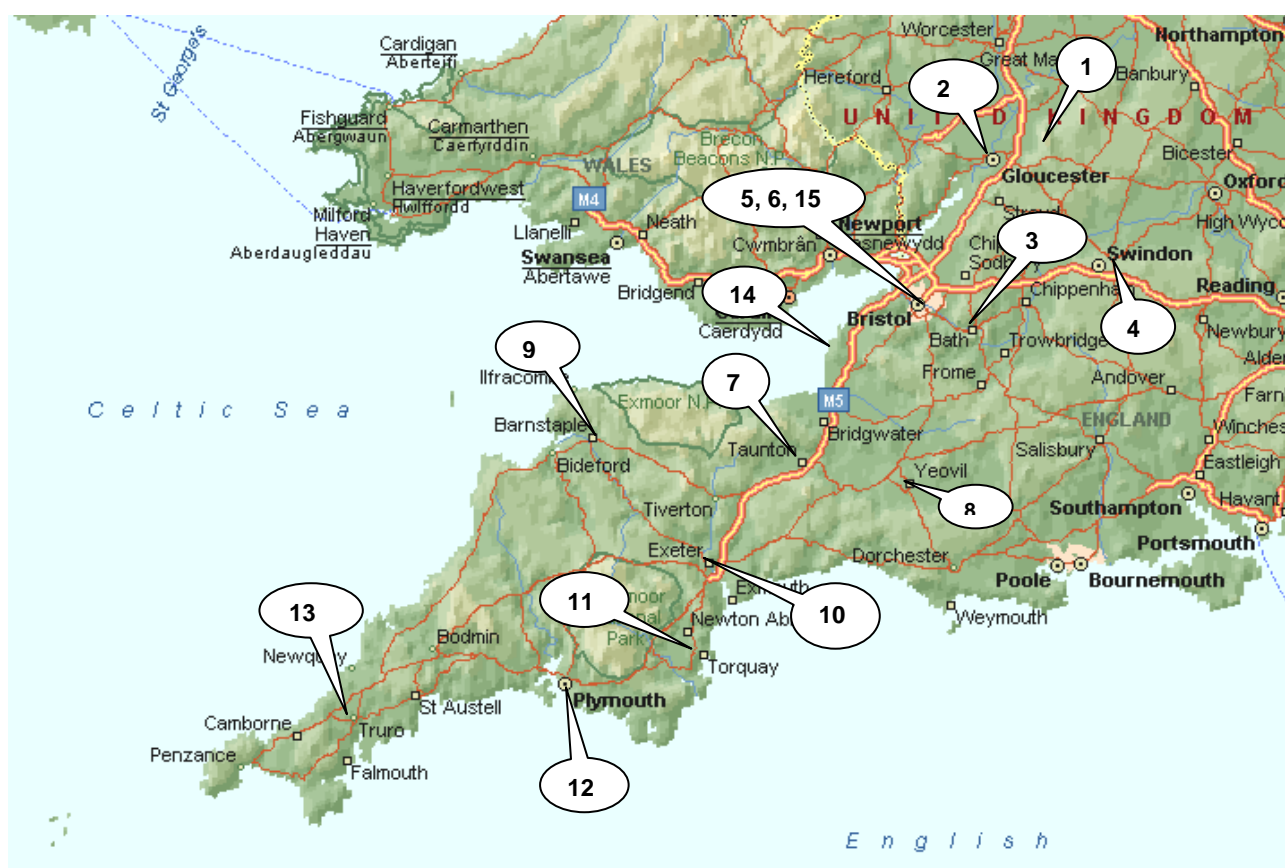
Data protection issues: Forms are assigned a unique identifier by the local audit nurse, who then returns them to the Regional Audit Co-ordinator. They are then assigned a study number and entered on a secure database. The Caldicott Guardian at each participating NHS trust has been informed of the audit process and the arrangements for data protection. Following a recent review of practice by the Audit Commission, all data must be supplied to SWACIC in a secure manner, consistent with the Data Protection Act. Data can either be provided on paper and sent by Registered Mail / Recorded Delivery or electronically by secure email to the Audit Co-ordinator.

3. REGIONAL SETTING

The South West region (not including Dorset and South Wiltshire, i.e. not the current SHA boundaries) encompasses 14 district general hospitals, 1 specialist neuro-surgical and burns unit (Frenchay), and 1 tertiary children's hospital with a paediatric intensive care unit (Bristol Royal Hospital for Children).

The under 15 year old population of the South West region (not including Dorset and South Wiltshire) as of mid-2001 was approximately 742,600. At mid-2010, the same estimated population was approximately 730,700.⁴ Although there appears to have been an overall decrease, the proportion of younger children under 5 years, has increased. Complete data available from [Government statistics](#).

The geographical distribution of the hospitals in the South West means that most of them are more than 40 miles from the tertiary PICU, the furthest district general hospital (Royal Cornwall) being 172 miles away from Bristol Royal Hospital for Children.

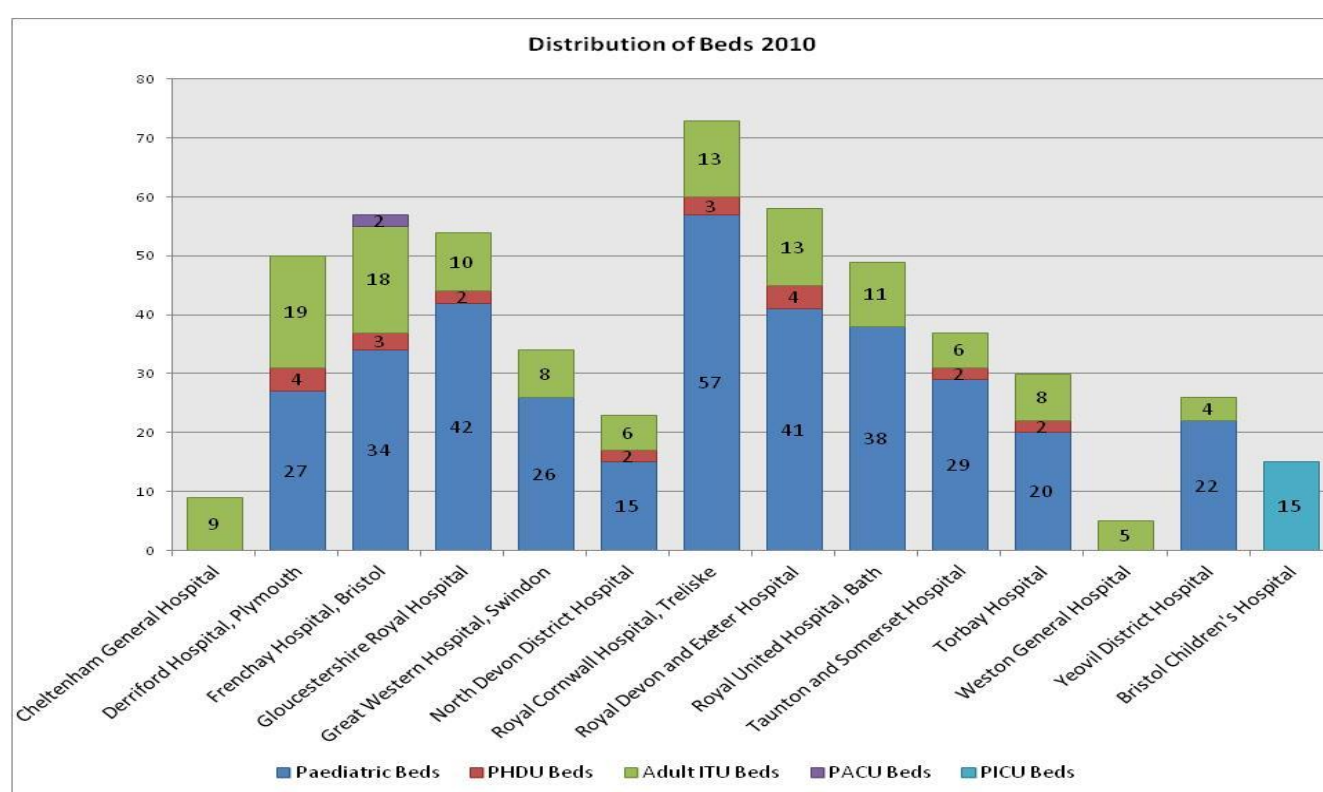


- | | | |
|----------------------------|--------------------------------------|--|
| 1 = Cheltenham General | 6 = Southmead | 11 = Torbay |
| 2 = Gloucester Royal | 7 = Taunton and Somerset | 12 = Derriford, Plymouth |
| 3 = Royal United, Bath | 8 = Yeovil District | 13 = Royal Cornwall, Truro |
| 4 = Great Western, Swindon | 9 = North Devon District, Barnstaple | 14 = Weston General |
| 5 = Frenchay | 10 = Royal Devon and Exeter | 15 = Bristol Royal Hospital for Children |

3a. DISTRIBUTION OF BEDS

At the beginning of the study Frenchay, Exeter, Plymouth and Royal Cornwall hospitals had already developed paediatric high dependency units. Over the subsequent years, units were developed in Gloucester, Taunton, Torbay and most recently North Devon. There are only 3 remaining district general hospitals with inpatient paediatrics that do not have designated provision for paediatric high dependency care in the South West region: Swindon, Bath and Yeovil. Bristol Royal Hospital for Children also does not have a paediatric high dependency unit or facility, other than use of the Paediatric Intensive Care Unit.

Each of the hospitals differs in the variety and number of paediatric beds they provide and the size of the population that they serve. In the majority of the hospitals, Level 2 children are admitted to their own hospital general intensive care unit for stabilisation prior to transfer or retrieval to the tertiary PICU.

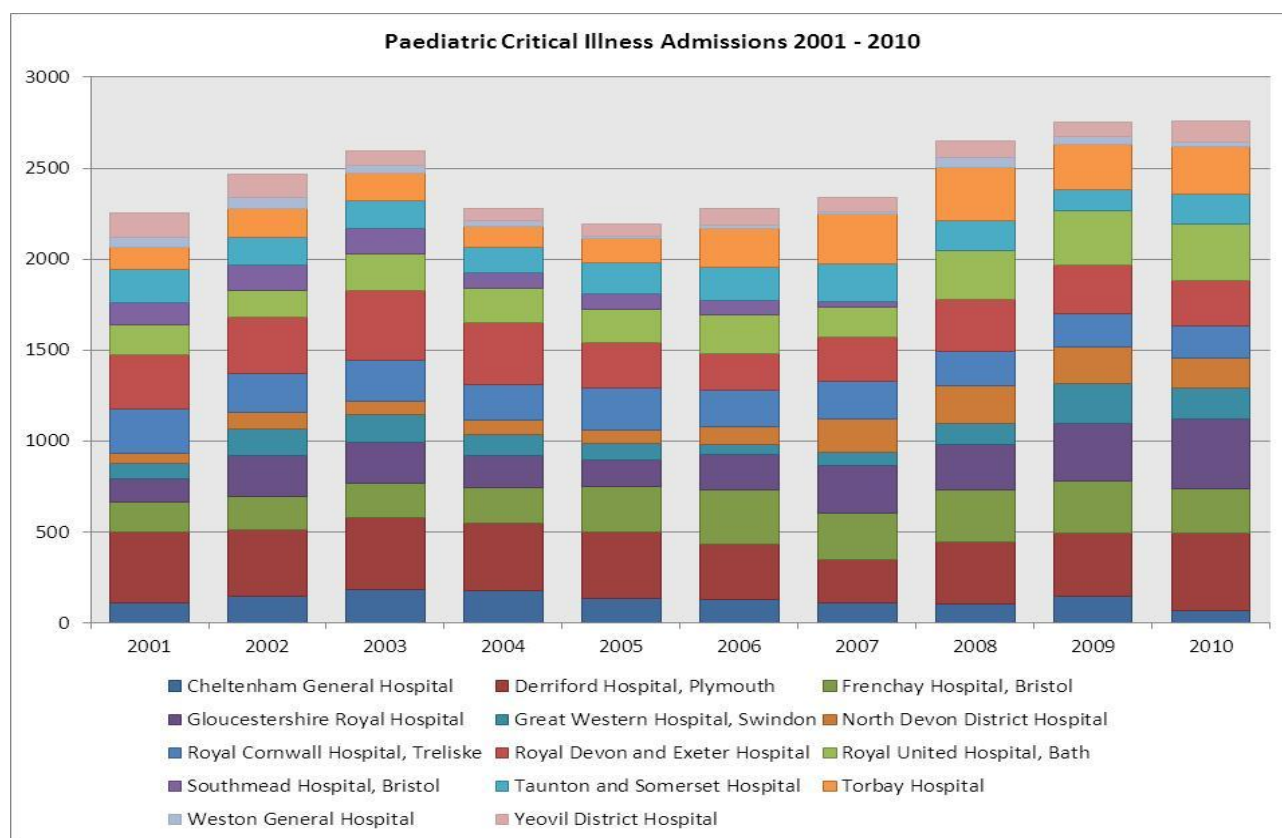


- Despite national standards demanding that all hospitals admitting children should provide designated Paediatric High Dependency facilities, there is still an unbalanced provision of Paediatric High Dependency Unit (PHDU) beds across the region.
- There are currently 22 designated Paediatric High Dependency beds in the South West. With the exception of Frenchay Hospital, whose High Dependency beds are commissioned by the South West Specialist Commissioning Group, and Torbay Hospital, which receives no additional funding for its Paediatric High Dependency, all other Paediatric High Dependency Units (PHDUs) in the region are commissioned and funded by local Primary Care Trusts (PCTs). This has led to differences in provision across the region, with the Peninsula being relatively well-resourced compared to the rest of the South West.

- 3 Hospitals that have inpatient beds (Great Western Hospital, Swindon, Royal United Hospital, Bath and Yeovil District Hospital) do not have designated Paediatric High Dependency beds. However, provision for the delivery of CPAP and other higher dependency interventions is made, often utilising theatres and General Intensive Care.
- Derriford Hospital, Plymouth has had a significant reduction in inpatient beds from 44 to 27. Since 2007. Derriford have experienced a 44% increase in admissions fulfilling SWACIC criteria.
- Weston General Hospital Seashore Centre, has a 10-bed day-unit and an outpatient unit, and is open 9am to 8pm Monday to Friday. Children are frequently transferred to Bristol Royal Hospital for Children (BRHC) Emergency Department for further assessment and inpatient care.
- Cheltenham General Hospital has transferred all inpatient beds to Gloucester Royal Infirmary as of 2010. Battledown ward in Cheltenham now provides a medical and day case surgical service for children and is open between 09:00am - 5:00pm on Tuesdays and alternate Mondays and Wednesdays.
- Paediatric Wards at Southmead Hospital closed in April 2007 and moved to the Bristol Royal Hospital for Children to become Ward 38.
- Bristol Royal Hospital for Children (BRHC) does not have a designated PHDU; a pilot data collection from March-October 2011 highlighted between 5.4% and 9.1% of children admitted to wards within the hospital each month, at some point reached critical illness status. Because of data collection issues, and compared to published data from elsewhere in the UK, these results are believed to represent a significant under-reporting of the true level of activity within the hospital.
- 14% of admissions to Ward 32 at BRHC during this time had vasoactive drugs in progress. Long-term invasively ventilated (LTV) children were cared for Wards 33 & 38 and children requiring non-invasive ventilation (CPAP/NIV/Vapotherm) were cared for in most ward areas, with many nursed on Wards 32, 33, 37 and 38. This does not account for those children within Paediatric Intensive Care or the busiest winter months.
- Emergency Departments do not collect data; these children will only be reported to the study if they continue to have high dependency or critical illness needs on the ward, PHDU or General ICU.

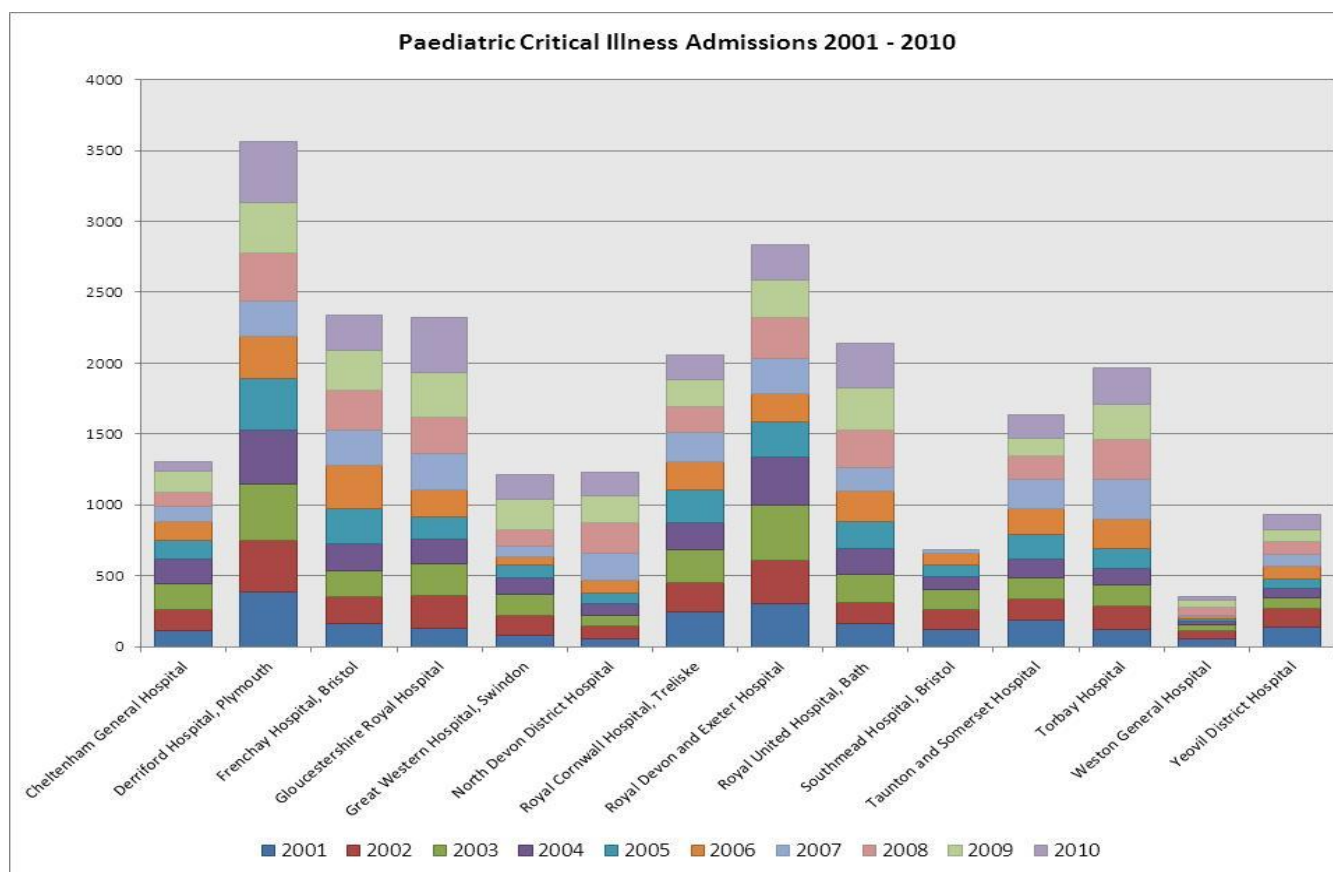
4. ADMISSIONS

The majority of hospitals have seen an overall rise in admissions over the ten year period except those with reduced inpatient services (Southmead, Cheltenham and Weston).



- After dropping back slightly in the mid 2000s, admissions of critically ill children to hospitals outside of the tertiary centre at Bristol Royal Hospital for Children have consistently been above 2500 per annum for the last 3 years of the decade. The overall increase from 2001 to 2010 has been 22%.
- The general trend over the latter five years of this ten-year period is that of increased total admissions reaching SWACIC critical care criteria. Some of this can be explained by the increase in specific diagnostic categories and primary diagnoses. The table below shows individual hospitals' figures. It may also be related to the rising population of children under 5 years of age, who are at greater risk of critical illness compared to older children.
- Derriford Hospital, Plymouth, and the Royal Devon & Exeter Hospital have the largest total numbers of critically ill paediatric admissions over the 10-year period. However Gloucestershire Royal Hospital and the Royal United Hospital in Bath have both overtaken Exeter in the numbers of admissions per year in the last 2 years of this report.

Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Cheltenham General Hospital	112	148	181	175	134	132	109	102	145	67	1305
Derriford Hospital, Plymouth	387	362	400	377	365	301	242	346	351	429	3560
Frenchay Hospital, Bristol	164	185	189	189	248	301	253	281	283	242	2335
Gloucestershire Royal Hospital	131	227	224	180	151	191	260	251	321	384	2320
Great Western Hospital, Swindon	81	143	149	115	90	58	74	114	219	168	1211
North Devon District Hospital	57	92	74	81	71	96	186	213	196	167	1233
Royal Cornwall Hospital, Treliske	242	211	229	194	231	199	202	186	186	175	2055
Royal Devon and Exeter Hospital	300	311	383	342	249	202	247	285	266	252	2837
Royal United Hospital, Bath	165	148	197	184	188	213	166	269	297	309	2136
Southmead Hospital, Bristol	121	140	145	86	84	80	25				681
Taunton and Somerset Hospital	184	150	147	140	167	185	208	167	119	166	1633
Torbay Hospital	121	162	152	120	135	211	275	287	248	259	1970
Weston General Hospital	52	57	46	26	15	18	10	57	44	28	353
Yeovil District Hospital	137	130	76	67	66	93	81	92	80	112	934
Grand Total	2254	2466	2592	2276	2194	2280	2338	2650	2755	2758	24563

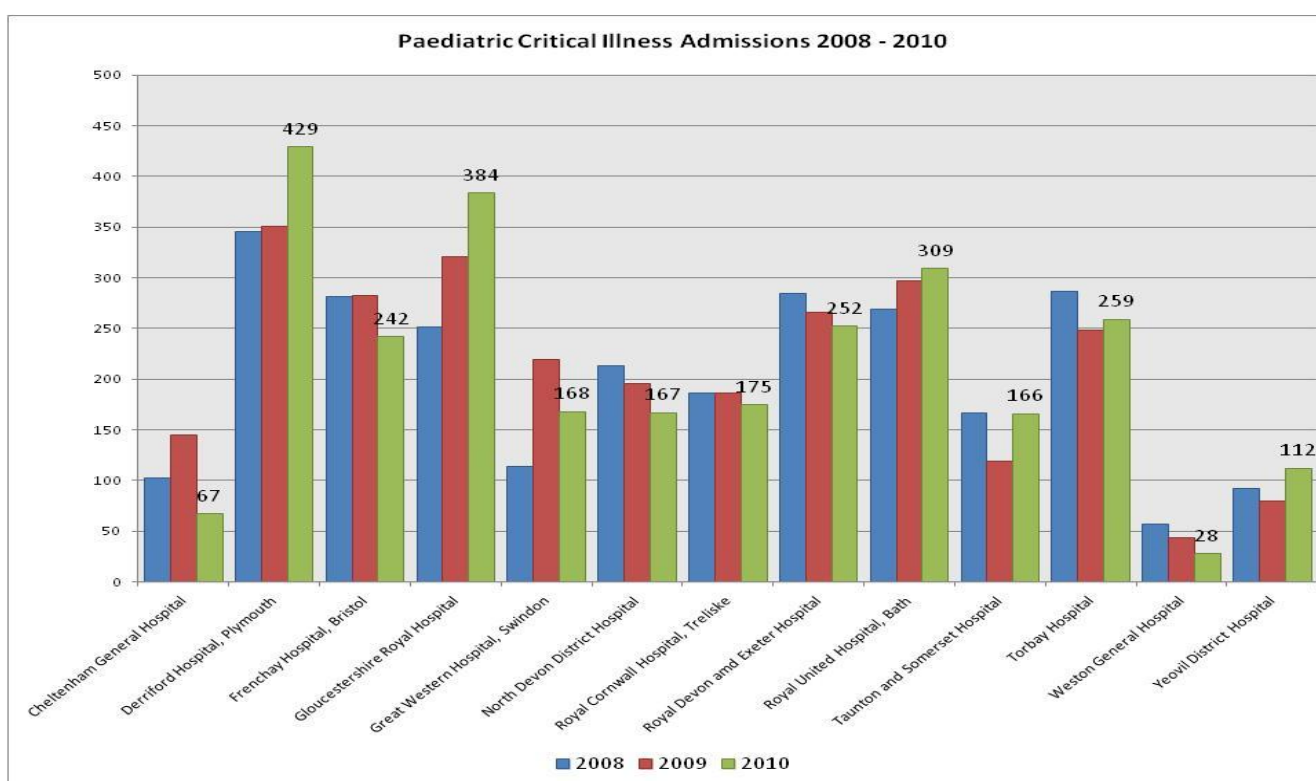


The following table shows critical illness admissions at each hospital as a percentage of all South West children entered into the data collection.

Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Cheltenham General Hospital	5%	6%	7%	8%	6%	6%	5%	4%	5%	2%	5%
Derriford Hospital, Plymouth	17%	15%	15%	17%	17%	13%	10%	13%	13%	16%	14%
Frenchay Hospital, Bristol	7%	8%	7%	8%	11%	13%	11%	11%	10%	9%	10%
Gloucestershire Royal Hospital	6%	9%	9%	8%	7%	8%	11%	9%	12%	14%	9%
Great Western Hospital, Swindon	4%	6%	6%	5%	4%	3%	3%	4%	8%	6%	5%
North Devon District Hospital	3%	4%	3%	4%	3%	4%	8%	8%	7%	6%	5%
Royal Cornwall Hospital, Treliske	11%	9%	9%	9%	11%	9%	9%	7%	7%	6%	8%
Royal Devon and Exeter Hospital	13%	13%	15%	15%	11%	9%	11%	11%	10%	9%	12%
Royal United Hospital, Bath	7%	6%	8%	8%	9%	9%	7%	10%	11%	11%	9%
Southmead Hospital, Bristol	5%	6%	6%	4%	4%	4%	1%	0%	0%	0%	3%
Taunton and Somerset Hospital	8%	6%	6%	6%	8%	8%	9%	6%	4%	6%	7%
Torbay Hospital	5%	7%	6%	5%	6%	9%	12%	11%	9%	9%	8%
Weston General Hospital	2%	2%	2%	1%	1%	1%	0%	2%	2%	1%	1%
Yeovil District Hospital	6%	5%	3%	3%	3%	4%	3%	3%	3%	4%	4%

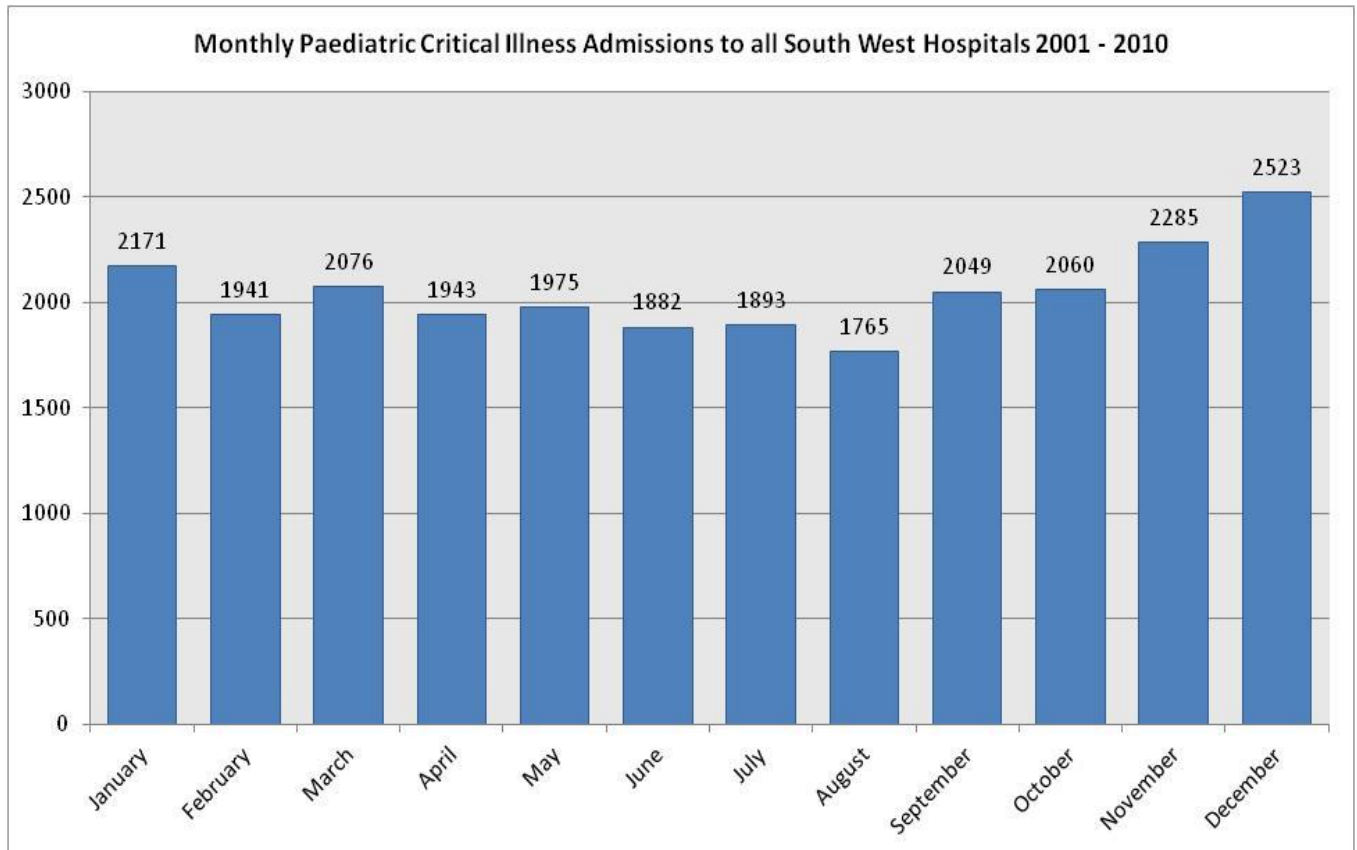
There are significant differences between hospitals in the percentages of admissions reaching critical illness criteria, the busier and larger hospitals tending to have a greater percentage while the lowest percentages are in the 2 day-case centres in Cheltenham and Weston followed by Yeovil District Hospital. Interestingly whilst some hospitals appear to have an increasing percentage over the 10 years (Gloucester, Bath, Torbay), others have had a falling percentage (Exeter and Truro). Reasons for these changes are not clear from our data. Southmead Hospital's Paediatric inpatients closed in 2007. Over the 7 year period, their true percentage is 4.8%.

The following chart displays admission figures since the last report, comparing the last 3 years critical illness admissions in each hospital. Specific hospitals appear to have been affected by greater admissions in 2010.



4a. SEASONAL VARIATION

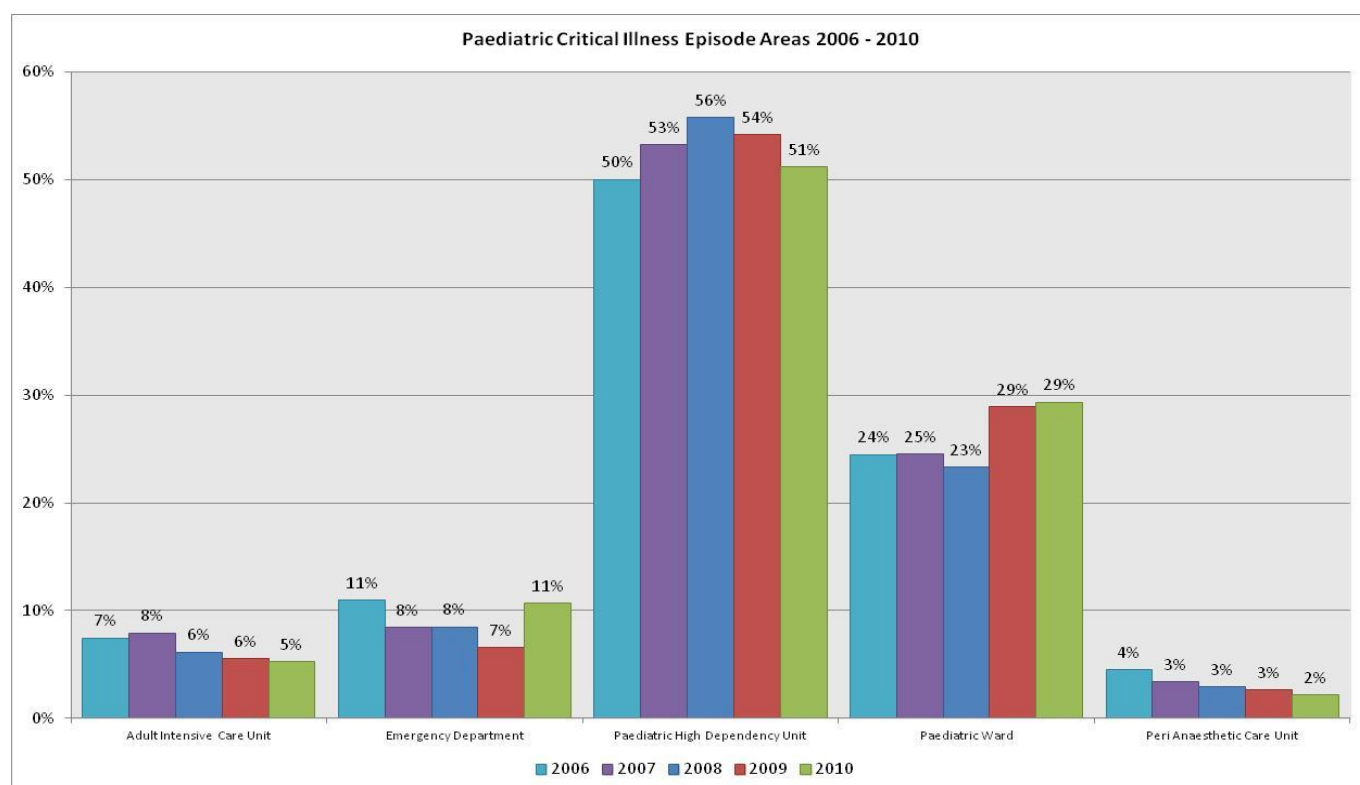
There is an obvious seasonal variation in monthly figures over September, October, November, December and January, due to an increase in respiratory disease. A minor peak in March is also evident and these episodes appear to be Asthma-related.



4b. EPISODES OF CRITICAL ILLNESS WITHIN DIFFERENT AREAS

An admission of a child can generate many episodes of critical illness: e.g. a child may have multiple visits to theatre in one admission, resulting in changes in level of dependency and location of care within any given hospital. If a child deteriorates clinically on the ward, transfers to PHDU and later needs care on ITU, this would generate 3 episodes. This provides us with an overview of provision of care and patient journey.

General intensive care episodes have continued to decrease over the last 5 years. Although PHDU episodes have remained consistently high, ward episodes have risen over the last two years. This would appear to be related to the particularly busy winter seasons in 2009 and 2010. The Emergency Department (ED) figures will not be accurate, because as already stated, not all EDs collect data.



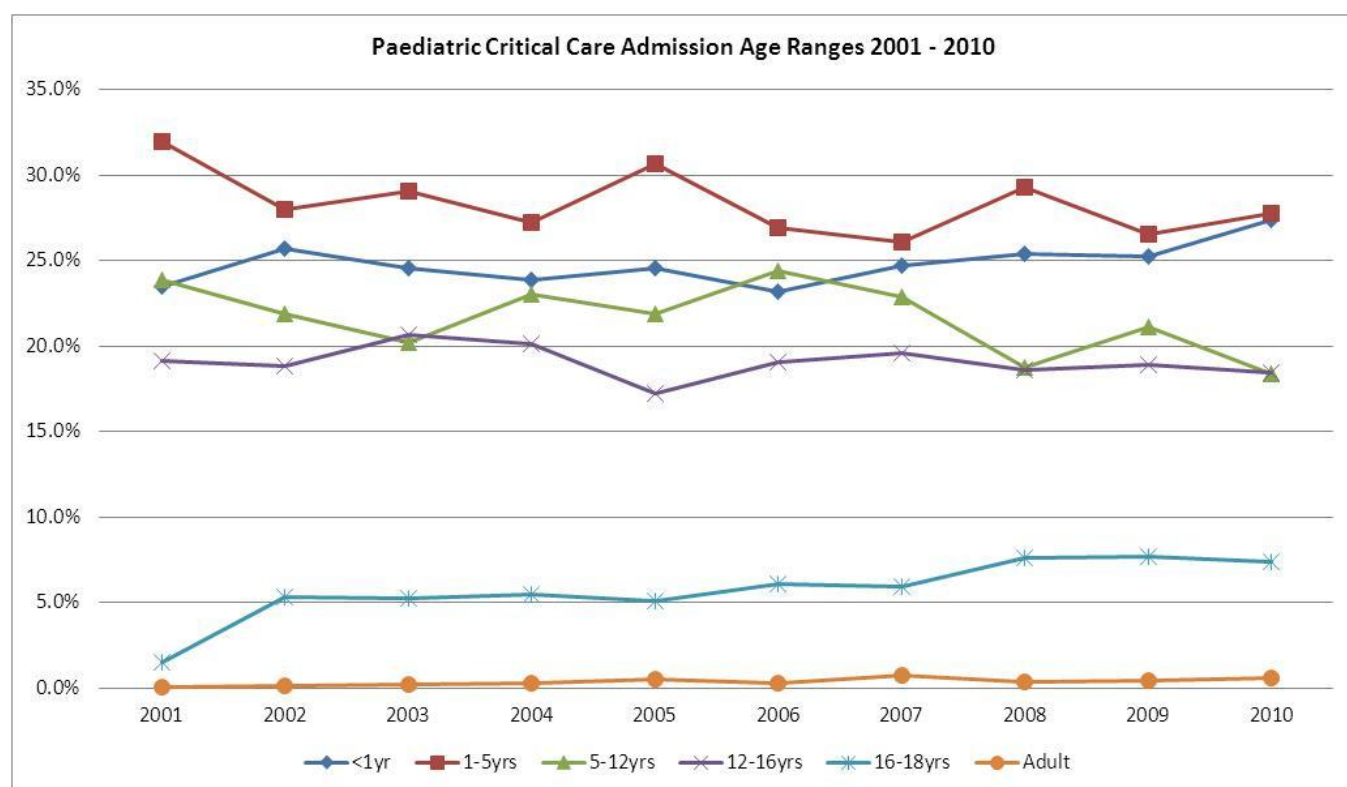
Episode Area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Adult High Dependency Unit	1	2	8	5	4	2	2	1	2	3	30
Adult Intensive Care Unit	308	270	287	195	251	213	227	199	182	175	2307
Adult Ward			1							3	4
Assessment area of paediatric ward	42	35	36	34	51	71	59	58	21	3	410
Emergency Department	499	498	496	424	302	313	242	275	215	357	3621
High Dependency Area of Paediatric Ward			1					2	2		5
Neonatal Intensive Care Unit	10	4	4	5	1	2	7	1	2	4	40
Paediatric High Dependency Unit	866	1038	1231	1200	1289	1431	1528	1810	1778	1708	13879
Paediatric Ward	983	1087	942	742	685	700	703	757	948	979	8526
Peri Anaesthetic Care Unit			11	59	69	128	97	95	86	72	617
Seashore Centre Weston								17	5		22
Theatre/Recovery	6	6	4		3	1	4	4	5	7	40
Paediatric Renal Unit	7										7
Other		1		1				6	2	3	13
Missing								22	32	24	78
Grand Total	2722	2941	3021	2665	2655	2861	2869	3247	3280	3338	29599

4c. ADMISSIONS BY GENDER AND AGE RANGE

Boys remain more likely to become critically ill than girls.

Year	Female	Male	Unknown
2001	44.7%	53.0%	2.3%
2002	42.5%	54.0%	3.5%
2003	45.8%	52.7%	1.5%
2004	45.7%	53.6%	0.7%
2005	45.2%	54.1%	0.7%
2006	45.4%	54.2%	0.4%
2007	43.7%	55.6%	0.7%
2008	47.5%	52.1%	0.4%
2009	45.7%	53.1%	1.2%
2010	45.8%	52.9%	1.3%
Grand Total	45.2%	53.5%	1.3%

The line graph below demonstrates the percentage variation over the ten year of the age ranges, of those children admitted with Critical Illness criteria. The majority of critical illness in the region occurs in younger children under the age of 5 years.

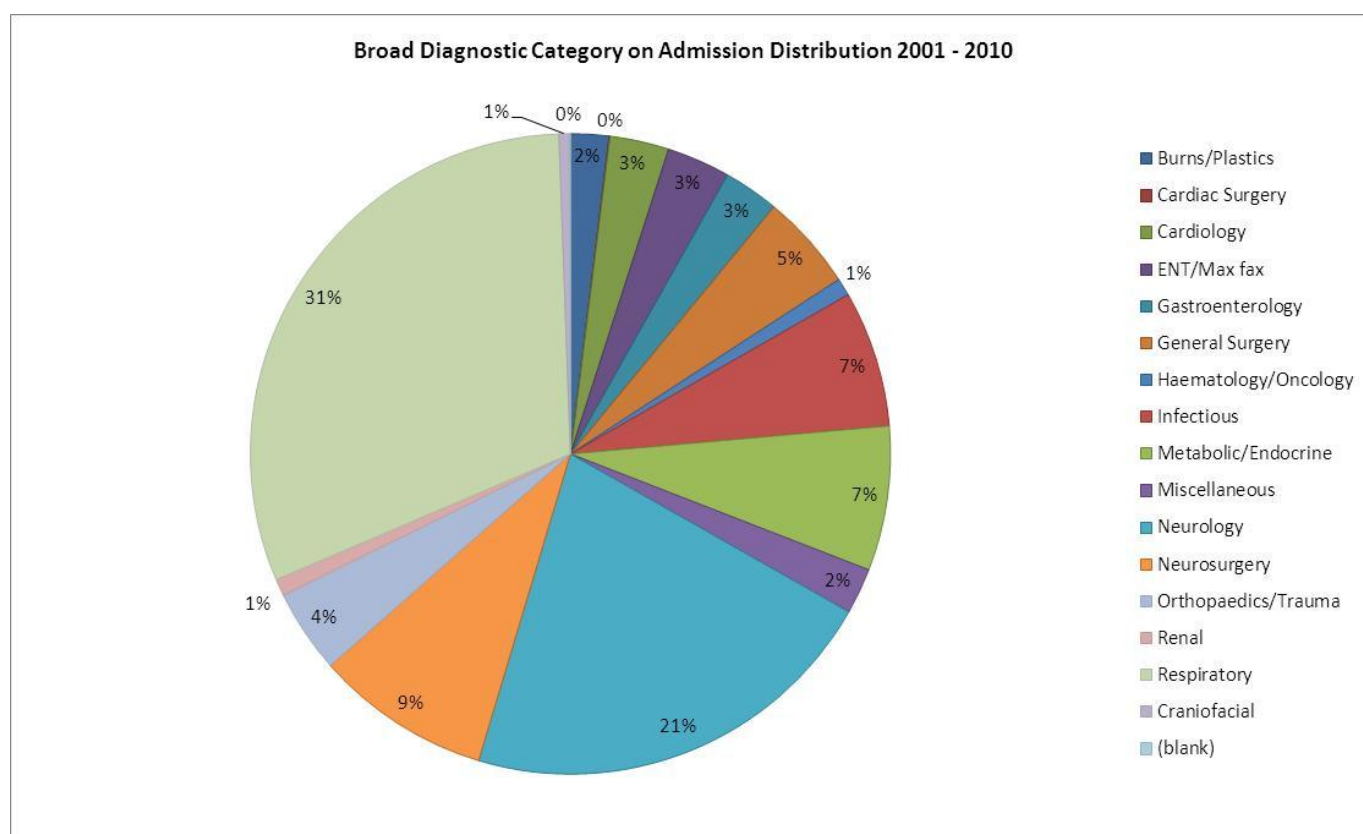


5. BROAD DIAGNOSTIC ADMISSIONS

Broad Diagnostic Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Burns/Plastics	61	56	56	47	35	35	40	43	53	49	475
Cardiac Surgery			1					4	2	2	9
Cardiology	48	88	71	75	52	70	76	71	89	95	735
ENT/Max fax	59	61	95	82	67	72	86	88	94	82	786
Gastroenterology	60	66	92	81	71	74	71	54	69	51	689
General Surgery	110	126	126	106	107	110	127	118	136	128	1194
Haematology/Oncology	21	31	25	21	10	8	11	30	29	32	218
Infectious	217	208	230	157	164	135	95	157	164	165	1692
Metabolic/Endocrine	161	205	174	184	139	202	204	185	169	169	1792
Miscellaneous	62	77	76	57	51	42	48	66	48	41	568
Neurology	475	559	640	521	447	462	468	560	534	596	5262
Neurosurgery	213	229	169	194	224	254	213	244	228	211	2179
Orthopaedics/Trauma	68	71	97	91	91	111	101	121	139	145	1035
Renal	29	33	18	18	17	16	29	17	15	18	210
Respiratory	667	648	712	637	682	633	760	881	984	973	7577
Craniofacial	3	5	8	1	36	55	9	9			126
(blank)		3	2	4	1	1		2	2	1	16
Grand Total	2254	2466	2592	2276	2194	2280	2338	2650	2755	2758	24563

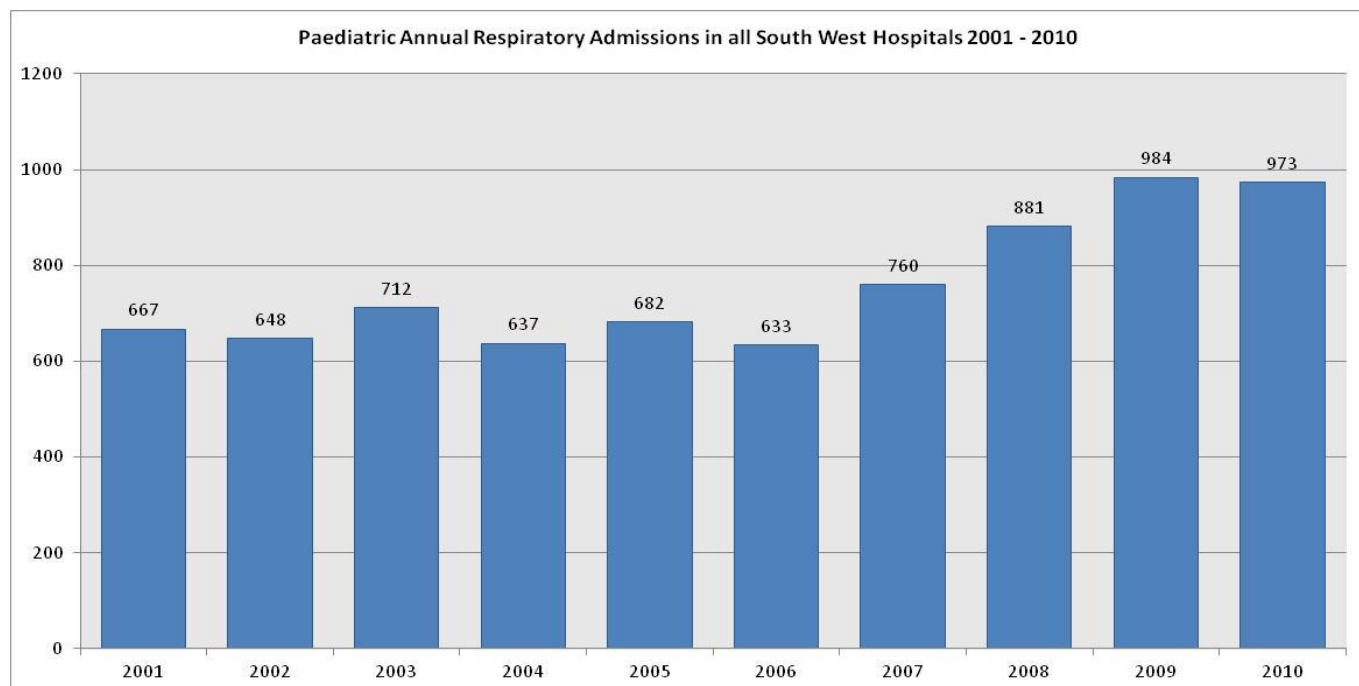
Respiratory and Neurology diagnoses have provided the majority of the regional work load.

The following chart shows these figures as a percentage of all critical illness admissions over the 10 years.

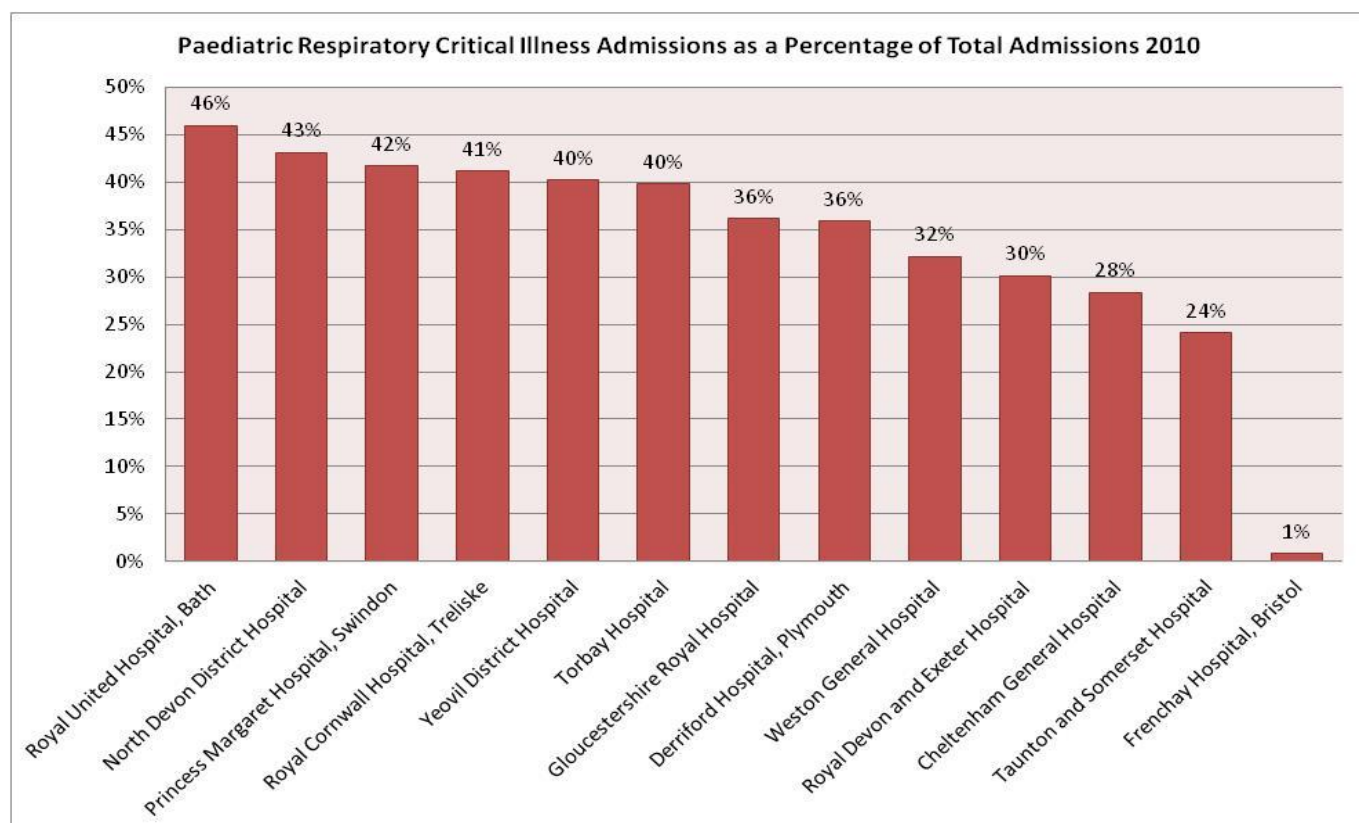


5a. RESPIRATORY ADMISSIONS

There has been an increasing trend in respiratory-related critical illness in the South West region over the last ten years.



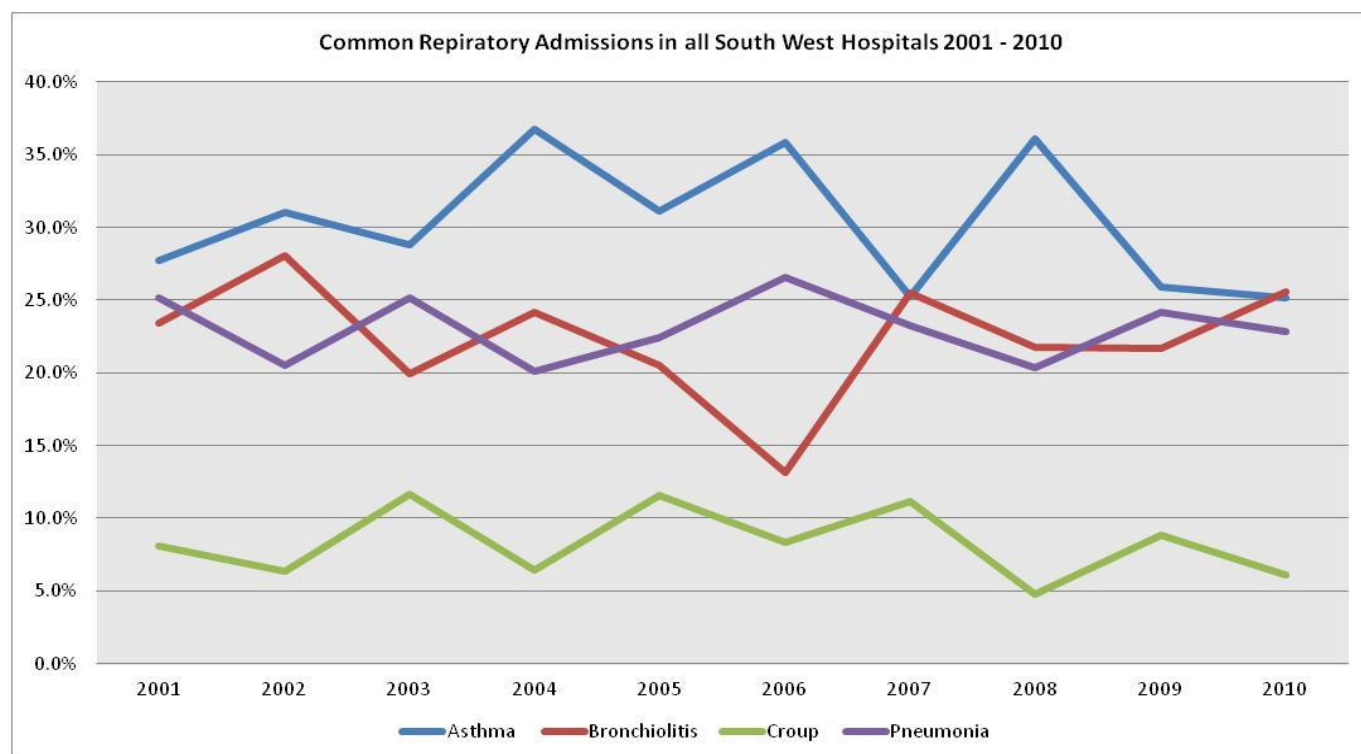
This bar chart demonstrates those hospitals most affected by the increase in children reaching critical illness criteria within the respiratory category in 2010. The Royal United Hospital, Bath appeared to be hit hard by respiratory disease, and also had the most children retrieved by BRHC during this year. Swindon also experienced a very challenging year, also reflected in the amount of children requiring transportation to Bristol. Neither of these hospitals have a PHDU.



TRENDS IN COMMON RESPIRATORY ADMISSIONS

The table below shows the figures pertaining to the most common primary diagnoses of respiratory illness year on year. It is impossible to ascertain how much of the pneumonia category is related to H1N1, as no specific read code was allocated during this period. It has therefore been grouped with 'influenza pneumonia'. The read codes have now been updated; in data from 2012, H1N1 will be isolated as a separate diagnosis/ read code. As with all admissions in the region, not all children are swabbed, or results obtained before data sheets being sent, SWACIC figures will act as a trend rather than exact figure. Bronchiolitis includes both those children tested RSV positive, and those clinically diagnosed. Asthma includes those with a moderate and severe exacerbation.

Year	Asthma	Bronchiolitis	Croup	Pneumonia	Other Respiratory Diagnosis	Total Respiratory Admissions
2001	185	156	54	168	104	667
2002	201	182	41	133	91	648
2003	205	142	83	179	103	712
2004	234	154	41	128	80	637
2005	212	140	79	153	98	682
2006	227	83	53	168	102	633
2007	192	194	85	177	112	760
2008	318	192	42	179	150	881
2009	255	213	87	238	191	984
2010	245	249	59	222	198	973
Total	2274	1705	624	1745	1229	7577



5b. LONG TERM VENTILATION OF CHILDREN IN THE SOUTH WEST REGION

In the South West, the management of children on Long Term Ventilation (LTV) has been relatively centralised (with the exception of Cornwall) for many years. They are seen in a dedicated multi-professional LTV clinic in Bristol.

In 2010, there were 76 children receiving domiciliary ventilation in the region, approximately 1/3 of which are ventilated via tracheostomy. The SWACIC data for respiratory episodes with a co-morbidity of LTV with tracheostomy shows relatively few admissions for this group around the region, but is reliant on the co-morbidity being added to the data sheet. Often these children have more than one co-morbidity; the current database will only allow for one, and this is at the discretion of the nurse completing the form and the data imputer to choose.

However, a recent 8 month data collection (March-October 2011) in Bristol Royal Hospital for Children, isolated 568 bed days allocated to LTV children in ward areas. These were not the busiest of the winter months, and therefore, did not capture all of the 'respiratory season'. The figures also do not include those children on the Paediatric Intensive Care Unit.

The effect of LTV children in the Intensive Care and ward areas in Bristol adds to the wider picture and needs to be considered, as their frequent long stay in preparation for planning community care programmes, effectively reduces the capacity of the unit to emergency admissions and the wards to take discharges from PICU. They certainly increase the overall dependency in ward areas and a potential requirement for increased staffing levels to provide appropriate safe care.

Looking at the increasing prevalence of domiciliary ventilation in the South West, Goodwin et al (2011) ⁴ conclude:

"There has been a 30 fold increase in the number of children in the South West receiving long term ventilation over the past 15 years. Children requiring LTV frequently have co-morbidities, many of which require specific, additional interventions. Very few patients discontinue LTV, and there are increasing numbers transferring to adult services".

RESPIRATORY EPISODES WITH CO-MORBIDITY OF TRACHEOSTOMY OR LTV

Year	Domiciliary ventilation	Tracheostomy
2001		
2002		
2003	1	1
2004	1	
2005	1	
2006	7	3
2007	2	11
2008	3	9
2009	9	8
2010	5	5
Total	29	36

5c. NEUROLOGY ADMISSIONS

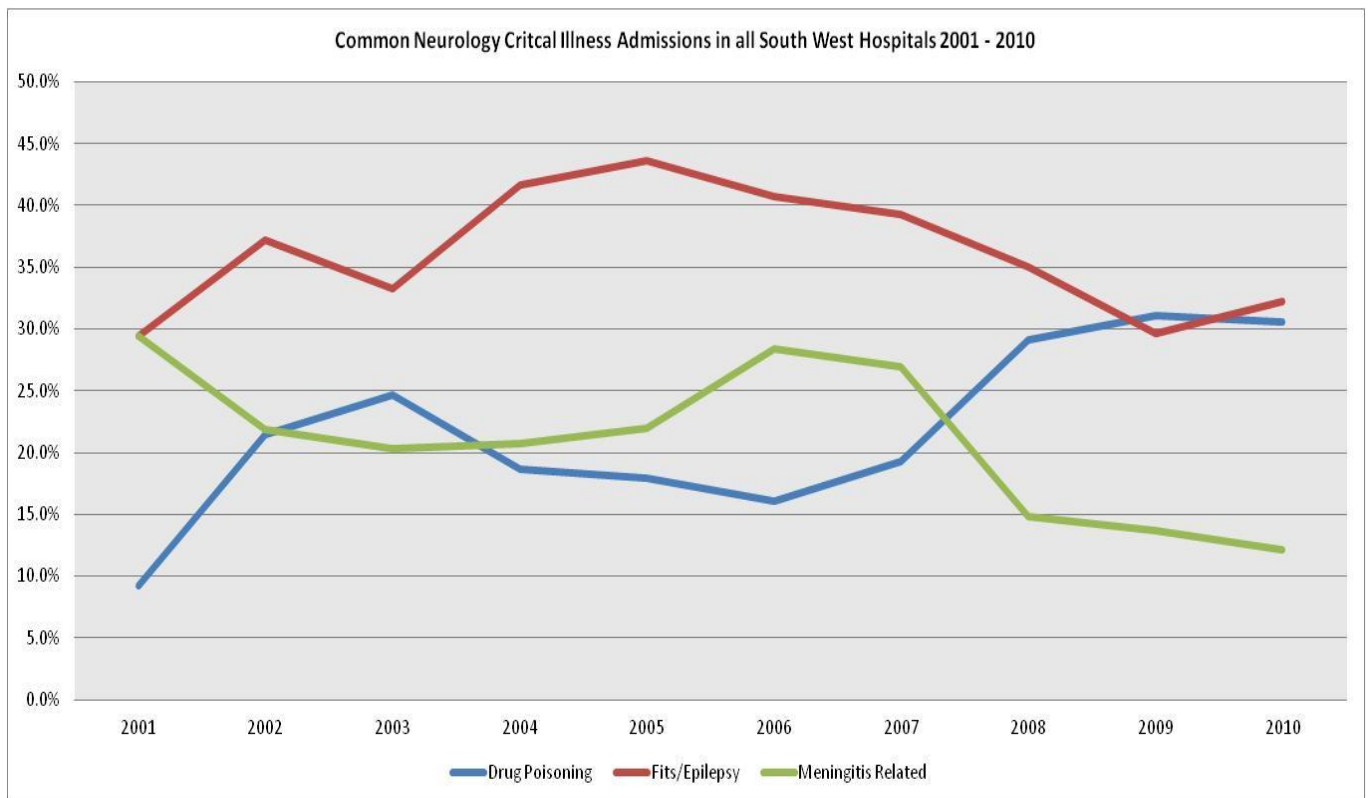
One of the most worrying and dramatic trends of the 10 years of SWACIC data is the increasing prevalence of drug poisoning with the intent of deliberate self-harm. The chart below states numbers solely for drug poisoning as a primary diagnosis. It is difficult to differentiate accidental ingestions from deliberate self-harm prior to 2008 other than by age, as it was not coded as such.

Year	Drug Poisoning	Fits/Epilepsy	Meningitis Related	All other Neurology Diagnoses	Total Neurology Diagnoses
2001	44	140	140	151	475
2002	120	208	122	109	559
2003	158	213	130	139	640
2004	97	217	108	99	521
2005	80	195	98	74	447
2006	74	188	131	69	462
2007	90	184	126	68	468
2008	163	196	83	118	560
2009	166	158	73	137	534
2010	182	192	72	150	596
Grand Total	1174	1891	1083	1114	5262

The majority of incidents cite paracetamol, ibuprofen and prescription medication, although there are more children taking alcohol and illicit drugs in combination. From the graph below it can be seen that the first peak was in 2003. However, since 2007 there has been a year on year increase in episodes of self-harm. Whilst there are some children with repeated behaviours, the majority of the children in this category are new to the SWACIC study. The children are all classified as children who are at 'potential risk' due to poisoning, but do not specify those within treatment range for Parvolex, or if they receive CAHMS support prior to discharge. Whilst the South West is identified as having higher than national average rate of self-harm, some of our hospitals have a larger proportion than others e.g. Torbay.

There is national recognition of the issue. The South West Public Health Observatory has published a briefing paper into [Suicide and Self Harm in the South West \(2011\)](#)³ and there is a recent report addressing the rapid increase in rates of deliberate self-harm (DSH), particularly amongst young people, in the South West of England [Morey et al \(2011\) Deliberate Self-harm in the South West: Setting a Research Agenda.](#)⁴

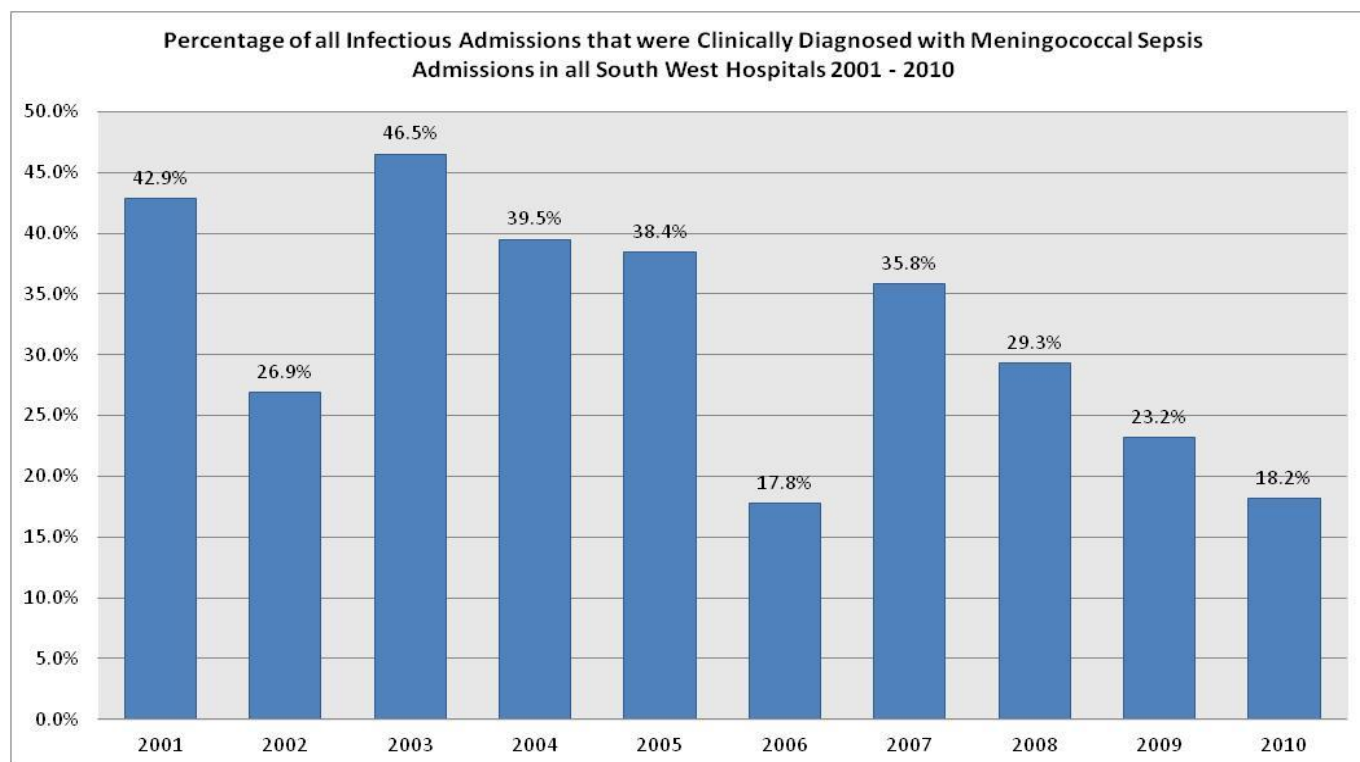
The vast majority of these children are never seen in the paediatric intensive care unit in Bristol, with only 8 being admitted in the last decade. No comparison can be made with the ward areas, as data is not available.



5d. INFECTIOUS ADMISSIONS

Infectious diagnoses as the cause of critical illness have fallen by approximately 35% from the peak at the beginning of the decade. This change has been particularly marked in the number of cases of meningococcal sepsis occurring across the region following the introduction of the Meningococcal C vaccine at the beginning of the decade. The pneumococcal vaccine may also have had some effect. Similarly there has been a fall in the number of cases of meningitis recorded.

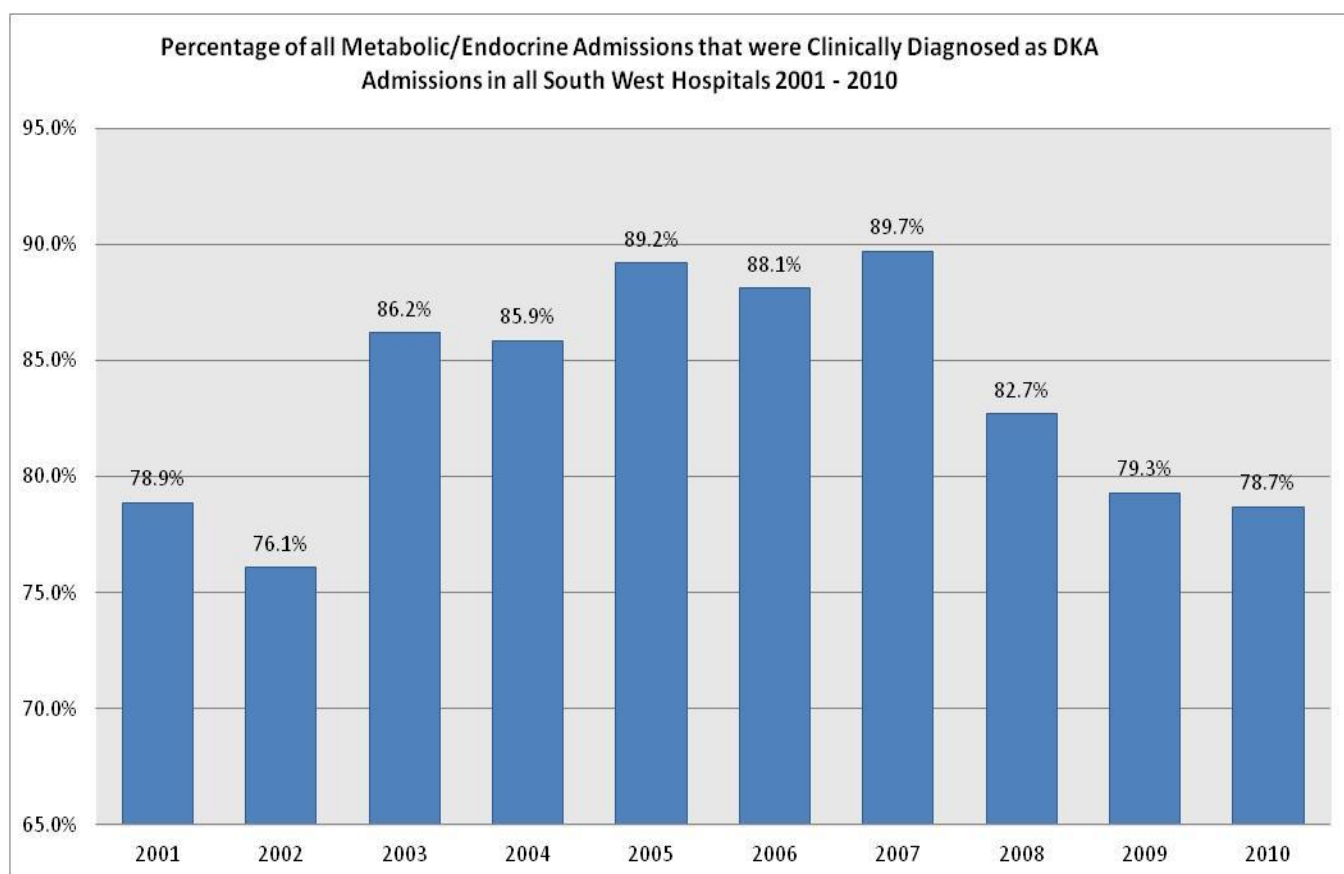
MENINGOCOCCAL SEPSIS



There has been a significant reduction in the number of admissions of children with suspected or proven meningococcal septicaemia over the ten year period in the South West from 107 cases in 2003 to just 30 cases in 2010. This correlates with the introduction of the Meningococcal C Vaccination in Autumn 1999 as part of the infant vaccination schedule. The cause for the dramatic drop to just 24 cases in 2006 remains unclear.

Nationally there are between 2-4 cases per 100,000 annually. The Average GP list is approximately 2500, meaning an individual GP can expect to see one case every 10-20 years.

5e. DIABETIC KETOACIDOSIS ADMISSIONS



Although there appears to be a percentage reduction in the amount of DKA presentations within the metabolic and endocrine diagnostic category, there is little variation over the period when comparing actual figures as opposed to percentages. Annual figures are roughly 150 DKA admissions per year recorded but can vary by +/- 20% (see below). It has not been possible to identify trends for those presenting with DKA for the first time, particularly those with a new diagnosis of Type 1 diabetes. Alterations in a new database would make this possible.

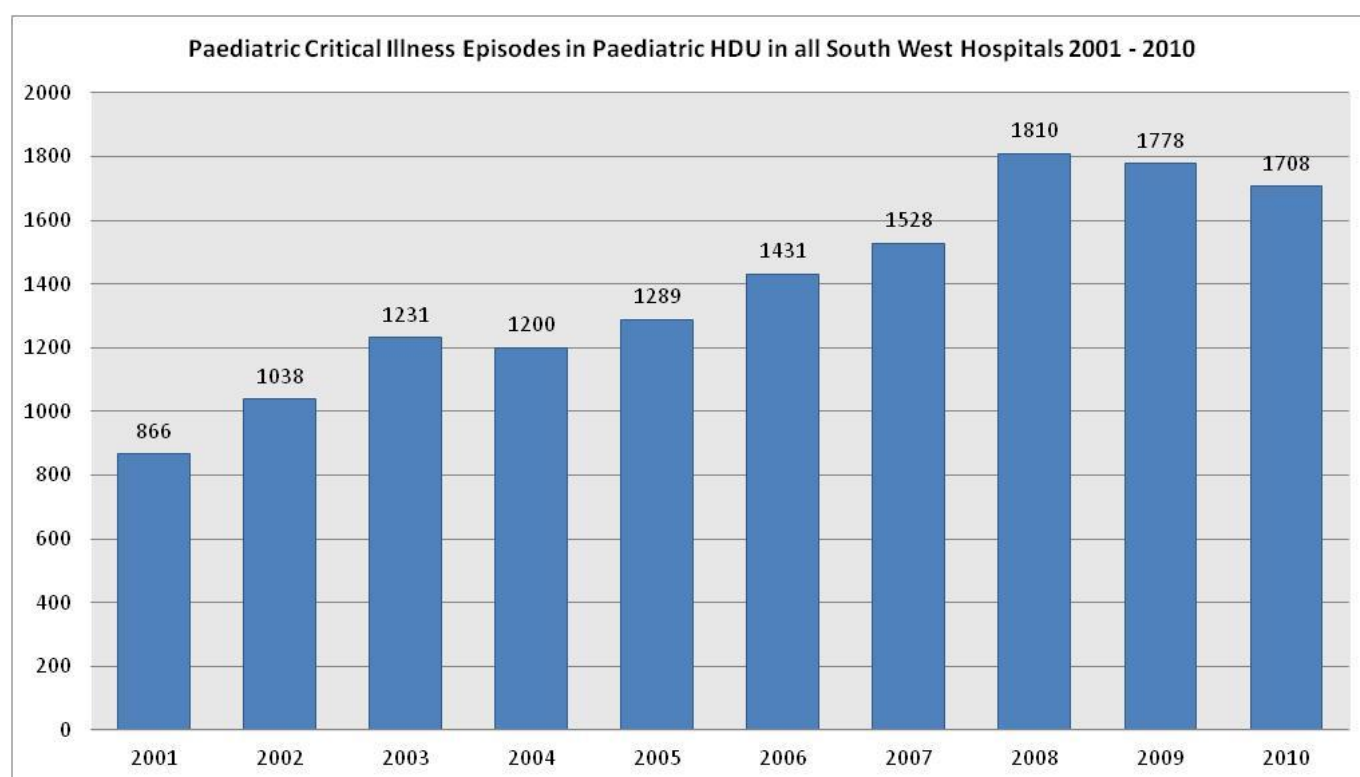
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
DKA cases	127	156	153	158	124	178	183	153	134	133	1499

6. PAEDIATRIC HIGH DEPENDENCY UNIT (PHDU) EPISODES

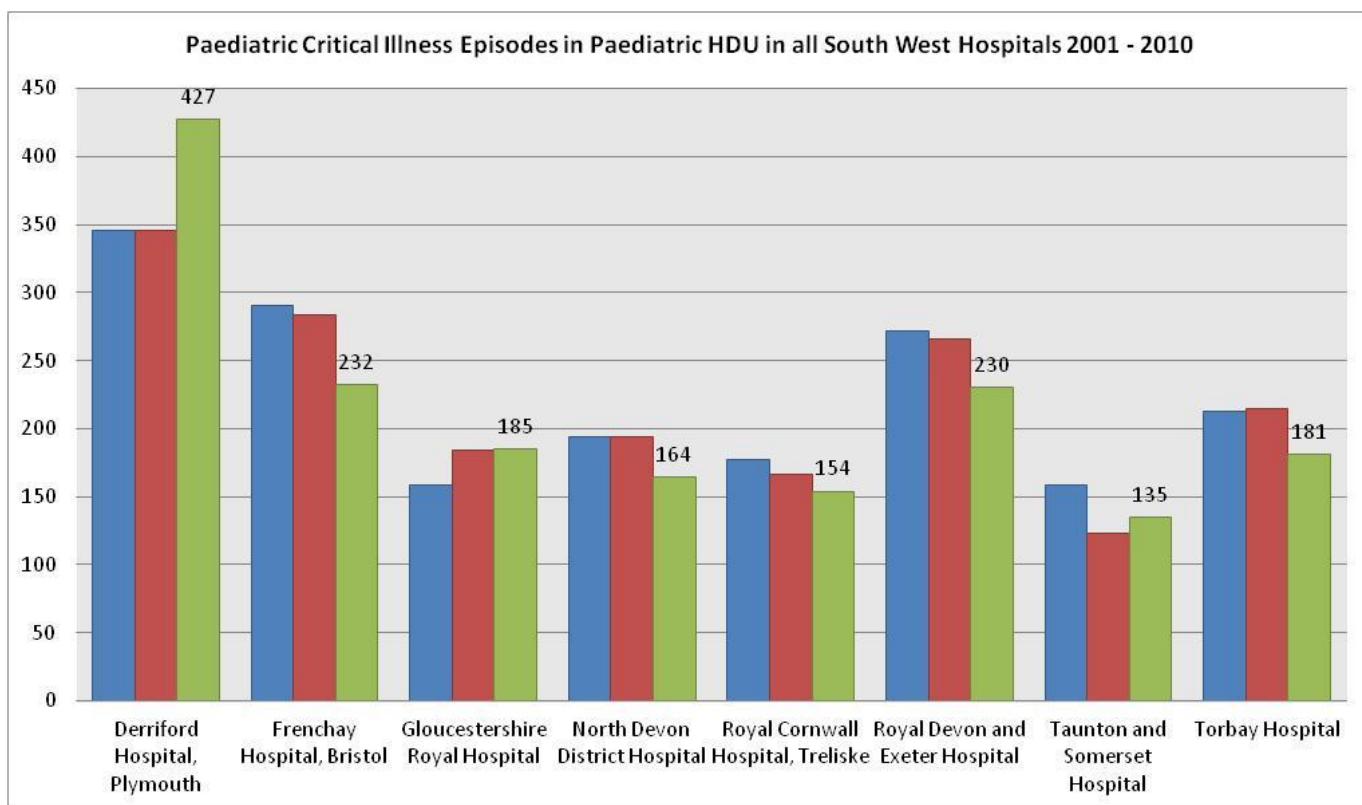
The number of episodes within Paediatric High Dependency Units has increased, with more children going directly there from the Emergency Department, (34% in 2010). Use of paediatric early warning tools, leading to early identification of children at risk may play a part.

The local patterns of admission policy for the Paediatric High Dependency Unit vary. Some hospitals use the PHDU for post-operative tonsillectomy cases, who have been diagnosed with obstructive sleep apnoea. They are then discharged from PHDU to home the next day. Plymouth is an example of this. Frenchay has a tendency to generate multiple episodes for individual children, due to the nature of neurosurgery and burn specialities. During a single admission, a child may have more than one surgical procedure over a period of time resulting in altering levels of dependency and need to transfer between the ward, PHDU and PACU, so whilst the episode numbers are high the overall admission numbers are lower.

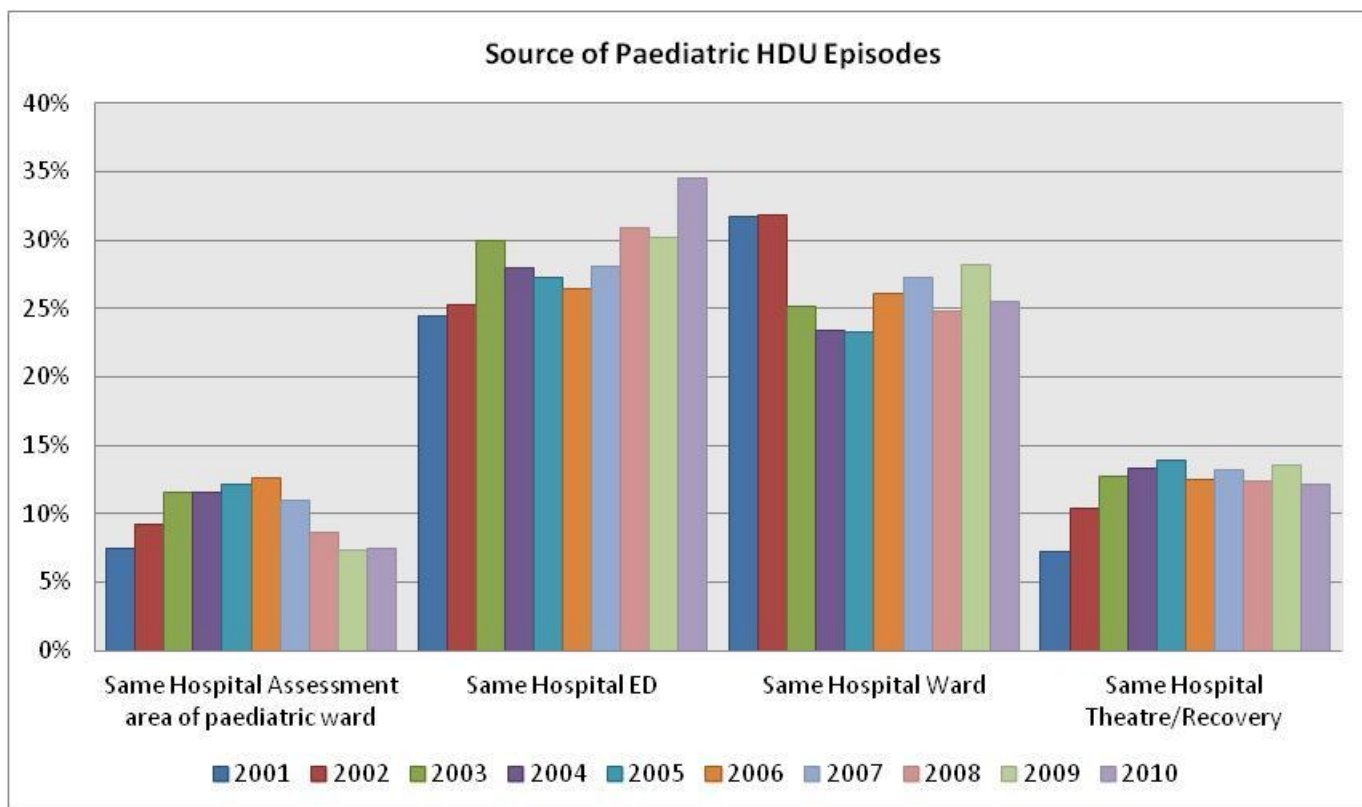
Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Derriford Hospital, Plymouth	327	325	376	346	328	306	242	346	346	427	3369
Frenchay Hospital, Bristol	108	155	159	187	238	280	232	290	284	232	2165
Gloucestershire Royal Hospital	40	158	164	142	126	141	189	159	184	185	1488
North Devon District Hospital							19	194	194	164	571
Royal Cornwall Hospital, Treliske	219	183	202	174	211	181	196	177	166	154	1863
Royal Devon and Exeter Hospital	172	217	264	221	201	196	235	272	266	230	2274
Taunton and Somerset Hospital			66	130	156	184	204	159	123	135	1157
Torbay Hospital					29	143	211	213	215	181	992
Grand Total	866	1038	1231	1200	1289	1431	1528	1810	1778	1708	13879



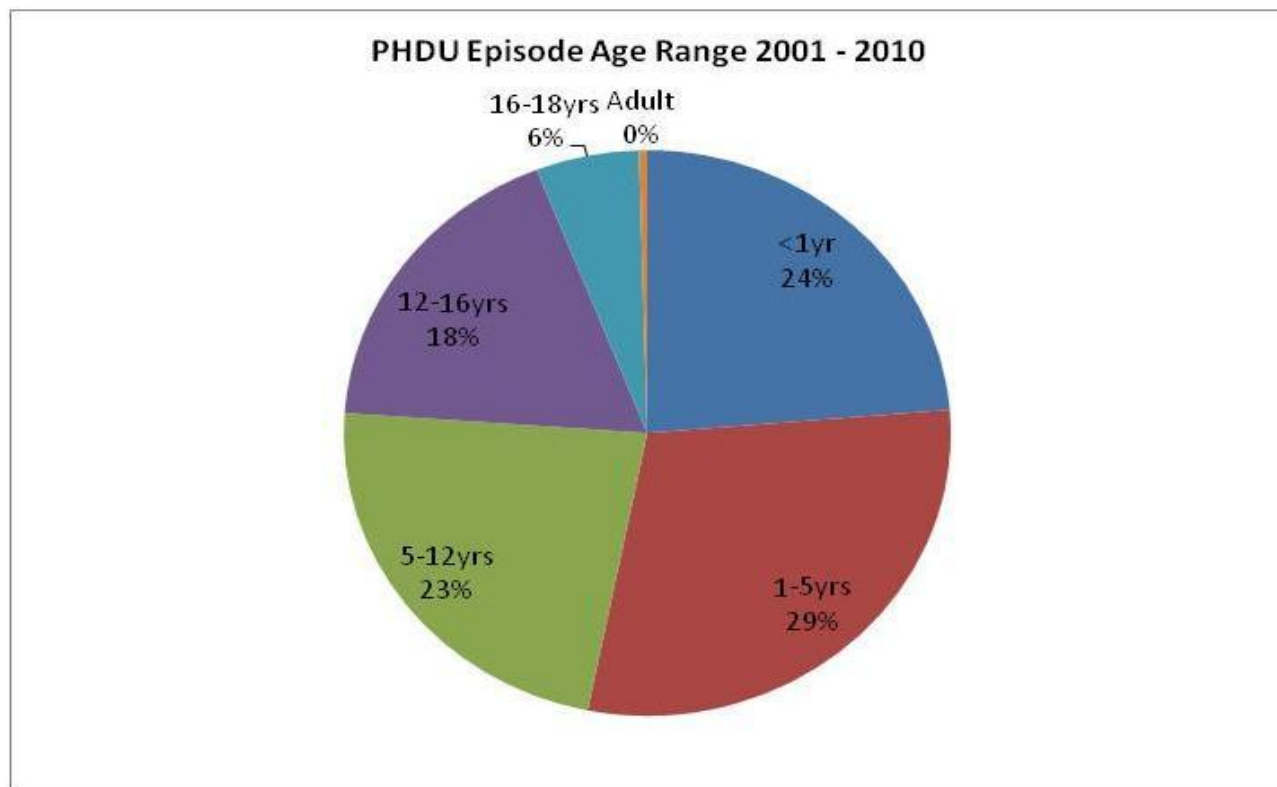
There is variability across the region with regard to episodes within PHDU. The PHDU at Derriford Hospital, Plymouth, accounts for about 30% of all PHDU bed days in the South West region.



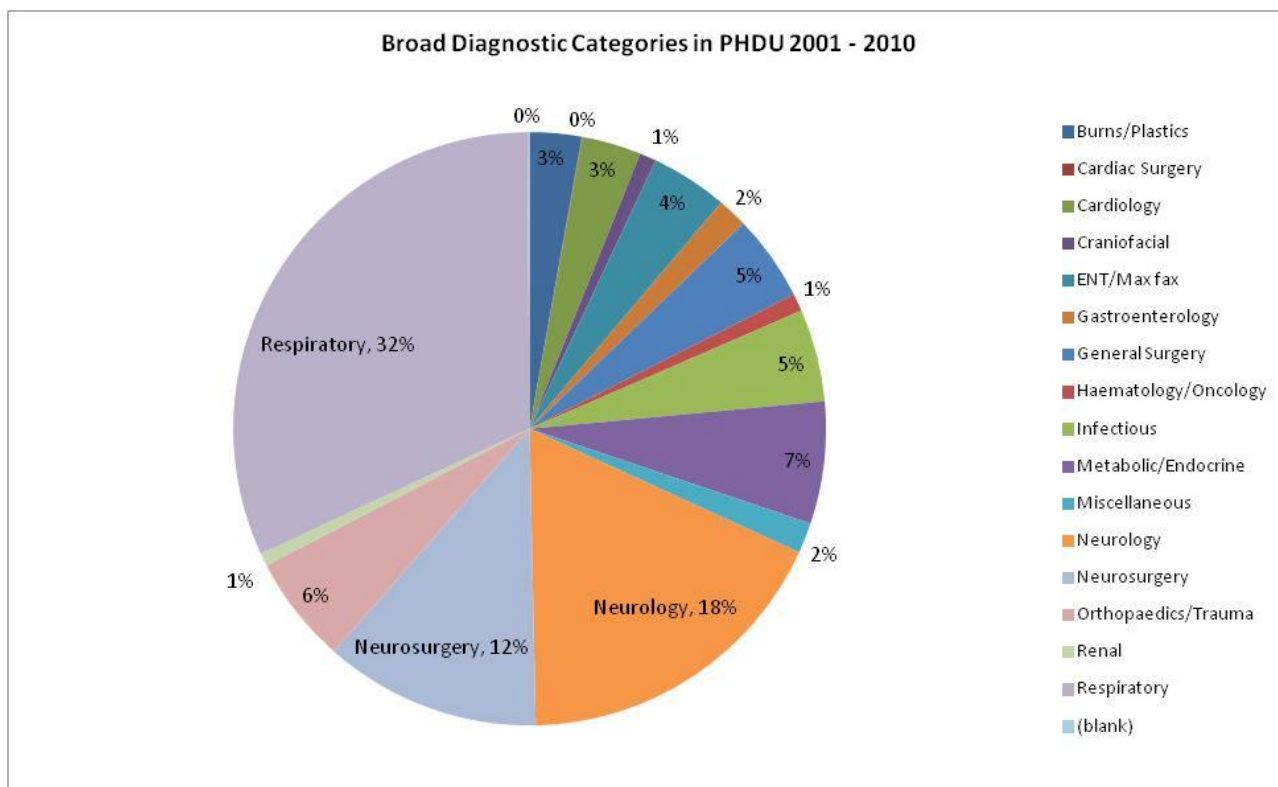
Although theatres consistently provide between 10 and 14% of admissions to PHDU, the majority of patients come in from the Emergency Department and the ward areas.



PHDUs see more children under 5 than general ICUs. Given the rise in the population of children under 5 in the region, this may explain some of the increase in overall number of admissions to PHDU.



Respiratory and neurological diagnoses constitute half of the admissions to paediatric high dependency units, the next most common diagnostic category being neurosurgical, which is almost exclusively seen in Frenchay Hospital.



AVERAGE LENGTH OF STAY ON PHDU

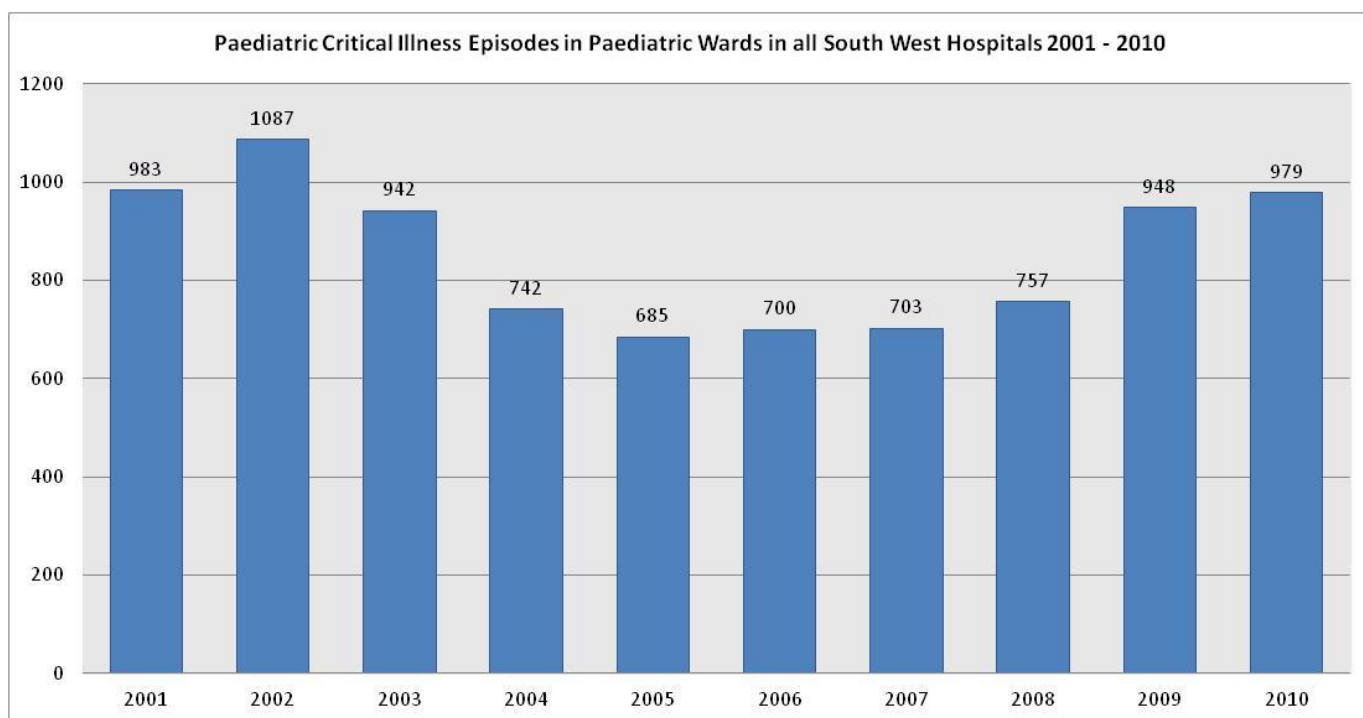
Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Derriford Hospital, Plymouth		1.78	2.57	1.83	1.84	2.05	2.62	2.17	2.13	1.94	2.09
Frenchay Hospital, Bristol	3.62	1.82	1.85	1.62	1.60	1.21	1.79	1.84	1.79	1.70	1.77
Gloucestershire Royal Hospital	1.80	1.29	1.56	1.23	1.11	2.08	2.62	1.55	2.15	1.72	1.74
North Devon District Hospital							2.93	1.34	1.23	1.56	1.42
Royal Cornwall Hospital, Treliske	1.53	1.82	1.60	1.73	1.88	1.93	2.01	1.66	2.16	2.21	1.84
Royal Devon and Exeter Hospital	1.88	1.30	1.05	1.16	1.18	1.42	1.72	1.77	1.83	1.73	1.50
Taunton and Somerset Hospital			2.26	1.55	1.55	1.79	1.78	2.44	1.97	1.51	1.83
Torbay Hospital					1.70	2.07	1.19	1.08	1.72	1.13	1.41
Total	2.10	1.62	1.84	1.56	1.59	1.76	1.97	1.75	1.87	1.73	1.78

BED DAYS ON PHDU

Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Derriford Hospital, Plymouth	693.58	575.58	961.33	628.08	603.29	626.21	632.33	751.21	715.83	812.63	7000.08
Frenchay Hospital, Bristol	390.83	281.46	293.83	302.21	380.21	334.21	414.21	531.25	503.79	387.67	3819.67
Gloucestershire Royal Hospital	72.08	202.33	255.58	171.54	140.42	285.46	492.83	242.00	346.63	286.04	2494.92
North Devon District Hospital							55.75	259.38	235.46	234.13	784.71
Royal Cornwall Hospital, Treliske	331.38	328.25	320.71	300.46	396.29	347.92	391.67	294.38	347.71	300.38	3359.13
Royal Devon and Exeter Hospital	319.75	279.00	275.25	256.67	237.13	277.54	404.08	469.96	484.67	386.42	3390.46
Taunton and Somerset Hospital			149.42	198.63	241.42	326.38	363.50	331.71	238.50	138.88	1988.42
Torbay Hospital					49.33	296.67	251.08	229.08	368.88	202.88	1397.92
Total	1807.63	1666.63	2256.13	1857.58	2048.08	2494.38	3005.46	3108.96	3241.46	2749.00	24235.29

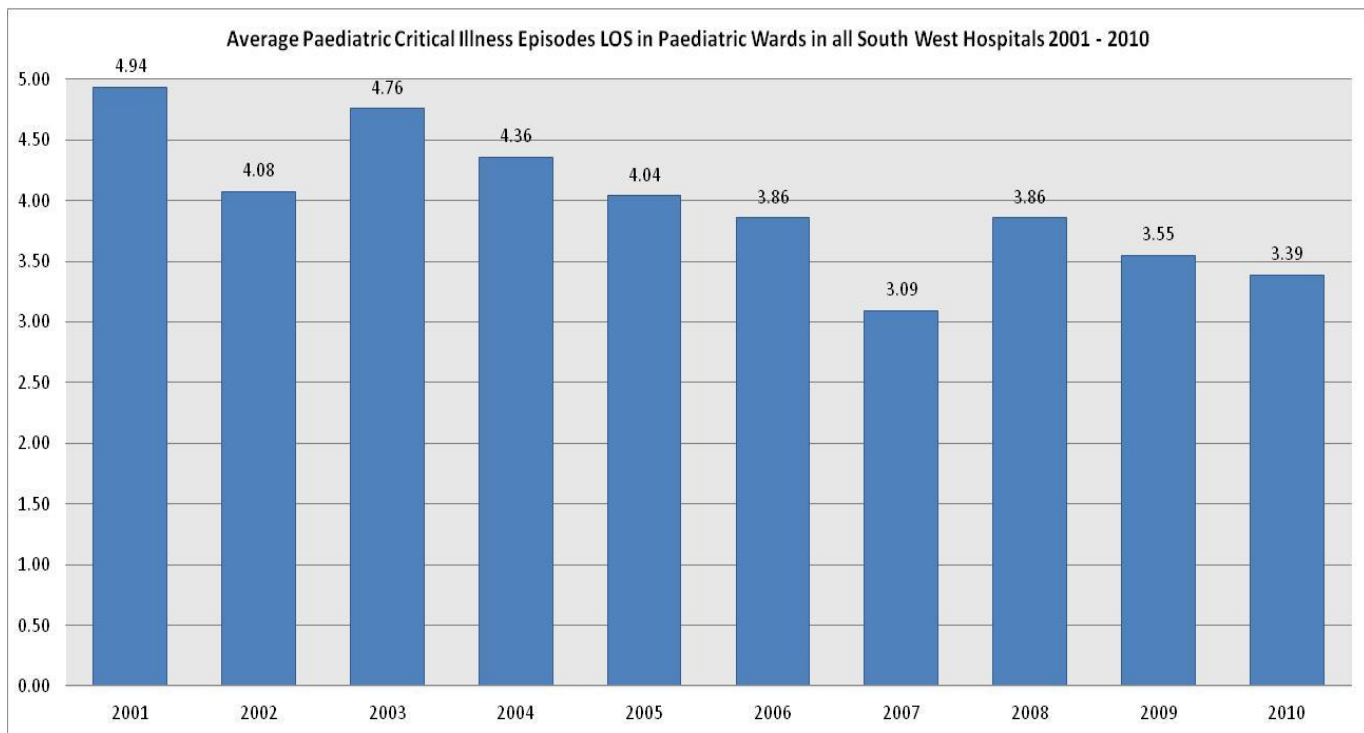
7. PAEDIATRIC WARD EPISODES

Children cared for on paediatric wards reaching critical illness criteria had declined over the majority of the decade, however the increase in overall numbers through 2009/10 has generated a trend upwards with episodes in excess of those in 2003. Some of this increase may relate to the increases in admissions of critically ill children to the 3 hospitals without PHDUs (Bath, Swindon and Yeovil) but is also possibly due to PHDUs in other hospitals reaching capacity in the winter (particularly Gloucester and Torbay, plus to a lesser extent Truro).

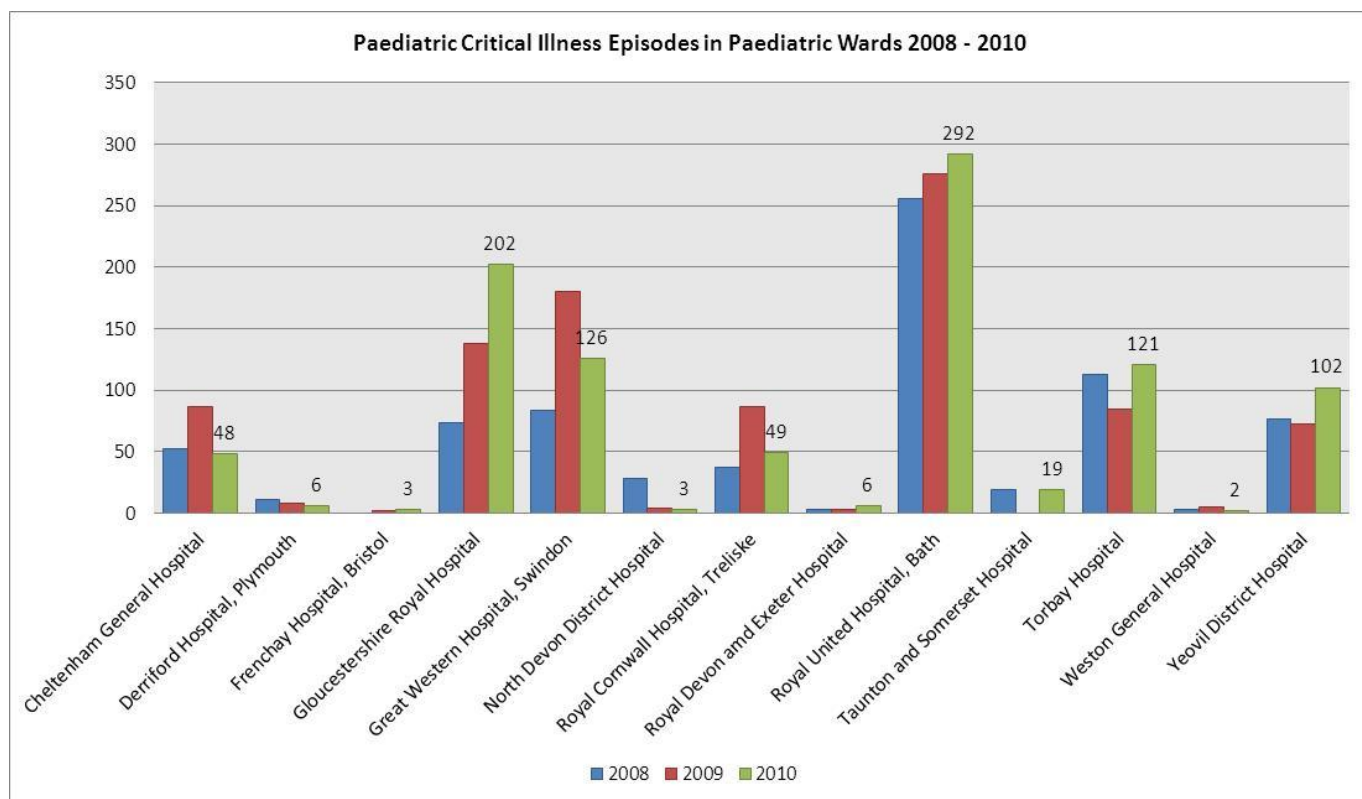


NUMBER OF PAEDIATRIC WARD EPISODES OF CRITICAL ILLNESS ANNUALLY BY HOSPITAL

Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Cheltenham General Hospital	82	133	172	169	129	107	92	52	87	48	1071
Derriford Hospital, Plymouth	52	38	29	33	22	20	12	11	8	6	231
Frenchay Hospital, Bristol	40	19		1	3		1		2	3	69
Gloucestershire Royal Hospital	75	87	51	37	28	50	79	74	138	202	821
Great Western Hospital, Swindon	30	77	89	52	54	38	36	84	180	126	766
North Devon District Hospital	43	83	55	68	63	81	155	28	4	3	583
Royal Cornwall Hospital, Treliske	15	32	3		6	20	39	37	87	49	288
Royal Devon and Exeter Hospital	43	8	8	4	2	1	6	3	3	6	84
Royal United Hospital, Bath	142	118	166	162	171	169	128	256	276	292	1880
Southmead Hospital, Bristol	107	134	128	86	83	80	24				642
Taunton and Somerset Hospital	148	126	67	2	8	3	2	19		19	394
Torbay Hospital	94	114	99	65	58	39	57	113	85	121	845
Weston General Hospital								3	5	2	10
Yeovil District Hospital	112	118	75	63	58	92	72	77	73	102	842
Grand Total	983	1087	942	742	685	700	703	757	948	979	8526

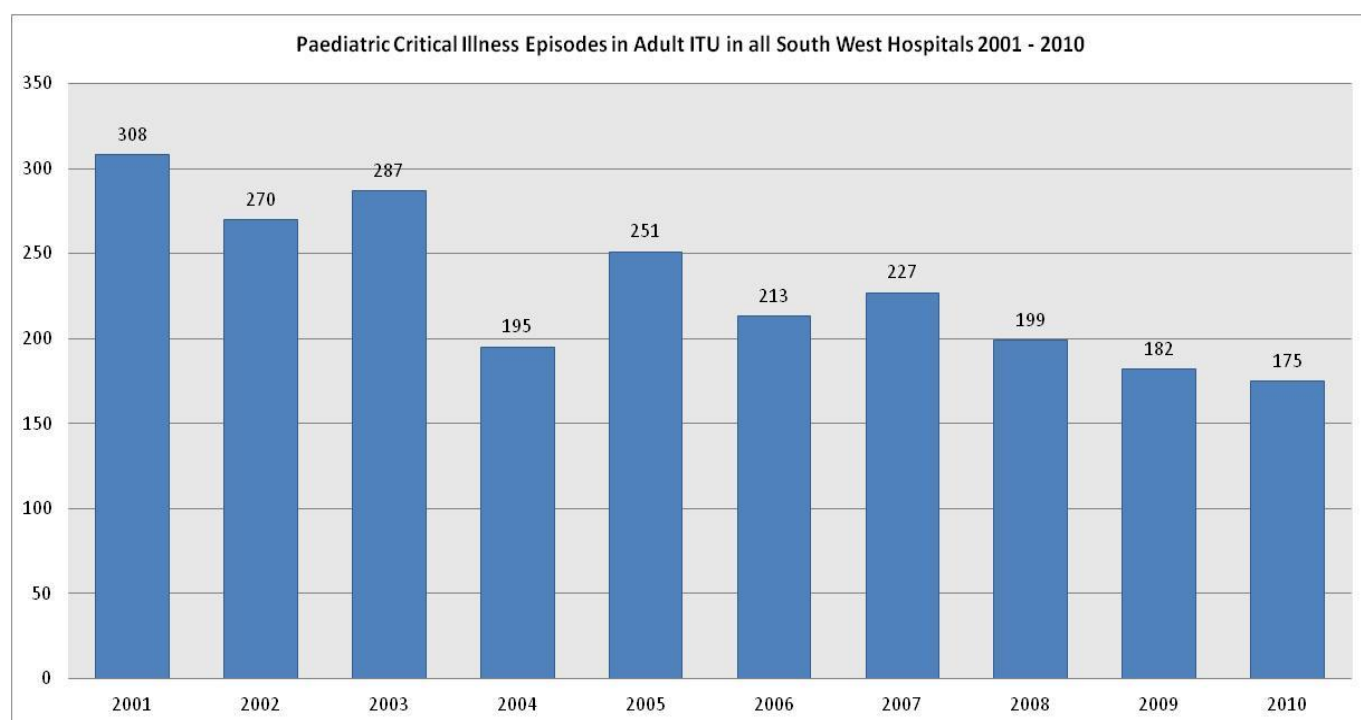


Bath, Yeovil and Swindon have the majority of their paediatric episodes of critical illness from the ward areas. In the absence of PHDU facilities this is not surprising. Gloucester also increased its number of episode in the ward area in 2010, reflecting the local HDU being full and the busy season that they experienced.



8. GENERAL INTENSIVE CARE UNIT EPISODES

Overall admissions of children to the general intensive care units have declined over the 10-year period of this report.



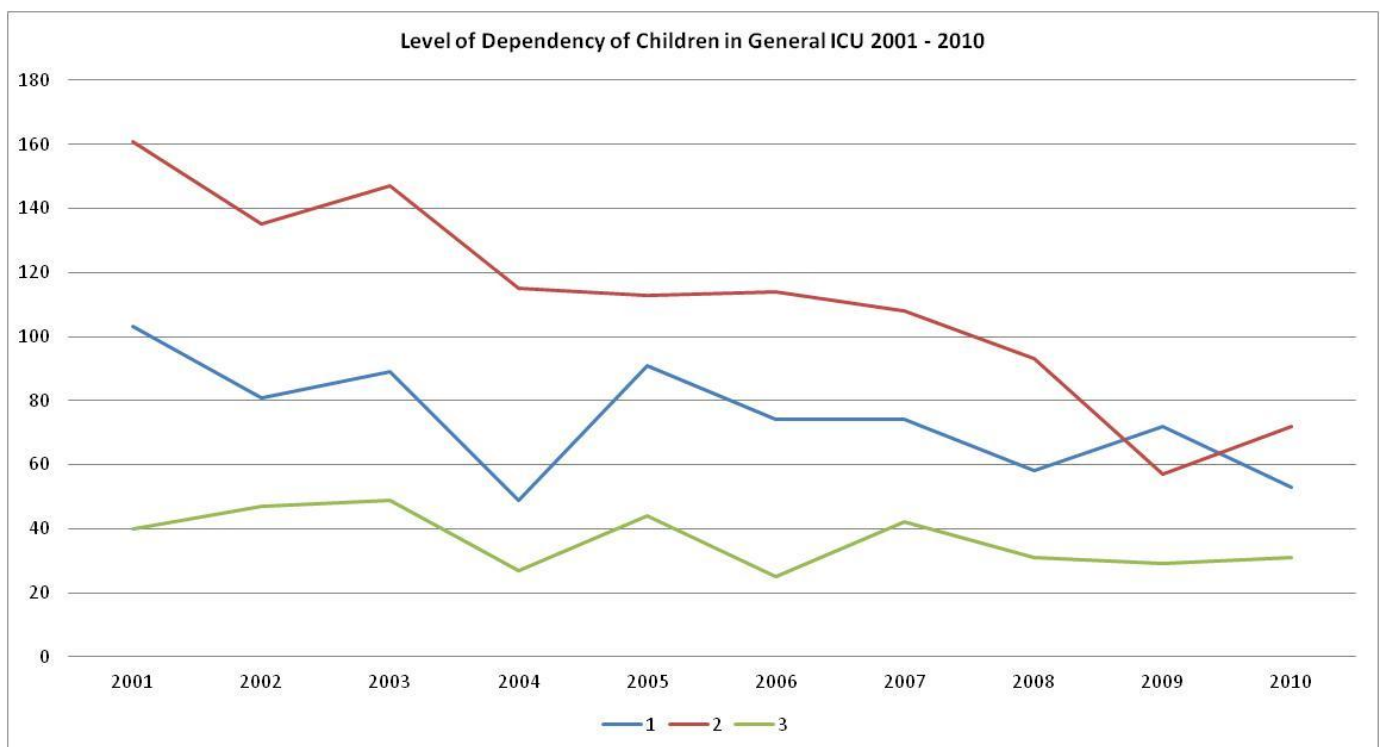
Although the overall figures have reduced, this is not the case for every hospital. Admission rates remain steady in Exeter, in large part due to the elective scoliosis workload, whilst the relatively static figures in Bath and Swindon may reflect the lack of designated paediatric high dependency facilities. There have been no recorded paediatric admissions to the intensive care unit at Bristol Royal Infirmary over this 10-year period.

Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Cheltenham General Hospital	2	4	7	3	10	1	1	2	1	2	33
Derriford Hospital, Plymouth	40	33	38	31	45	21	32	17	21	27	305
Frenchay Hospital, Bristol	38	29	12	1			1				81
Gloucestershire Royal Hospital	21	27	27	19	8	12	9	18	12	11	164
Great Western Hospital, Swindon	22	31	34	19	25	21	26	33	29	30	270
North Devon District Hospital	22	16	19	15	20	16	22	19	3	6	158
Royal Cornwall Hospital, Triliske	51	33	38	22	29	28	35	33	29	18	316
Royal Devon and Exeter Hospital	53	28	30	42	40	45	36	36	37	46	393
Royal United Hospital, Bath	4	12	29	17	7	21	7	14	20	16	147
Southmead Hospital, Bristol	1	1	1		2	2					7
Taunton and Somerset Hospital	27	17	14	6	10	4	12	1	4	8	103
Torbay Hospital	23	35	36	18	49	38	45	20	22	11	297
Weston General Hospital	2							1			3
Yeovil District Hospital	2	4	2	2	6	4	1	5	4		30
Grand Total	308	270	287	195	251	213	227	199	182	175	2307

Prior to the retrieval team's arrival from Bristol, it is also often advised that the intensive care or theatre environment is a more appropriate place for on-going care to be managed, especially in the absence of a PHDU, if travelling distances are longer, or if there is a delay because the team are already out on a call.

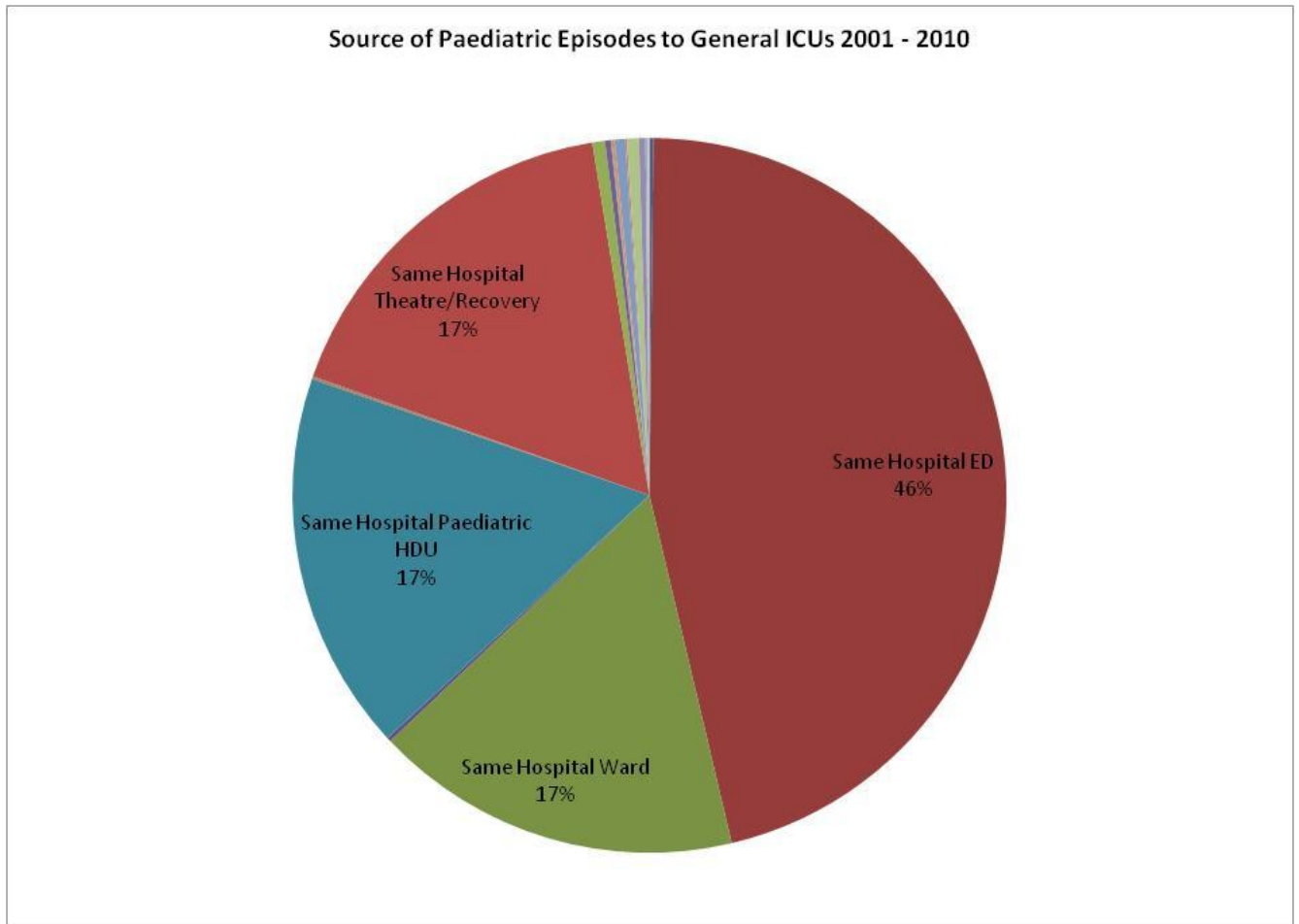
Overall fewer children requiring Level 1 care (i.e. High Dependency) and Level 2 care (i.e. Invasive ventilation) are being admitted to general intensive care units when comparing 2001 with 2010. This reduction in activity is most likely due to the increased management of sick children in designated areas of high dependency around the region.

The amount of paediatric episodes requiring Level 3 care (i.e. Invasive ventilation and inotropic support) has remained relatively static with a range of 32-42 cases per year across the whole region during the 10-year period. Most of these children are admitted from the Emergency Department. This is somewhat counter-intuitive given that many of the Level 3 cases are due to sepsis, and that there has been a considerable decrease in the overall number of children becoming critically ill secondary to infectious disease.



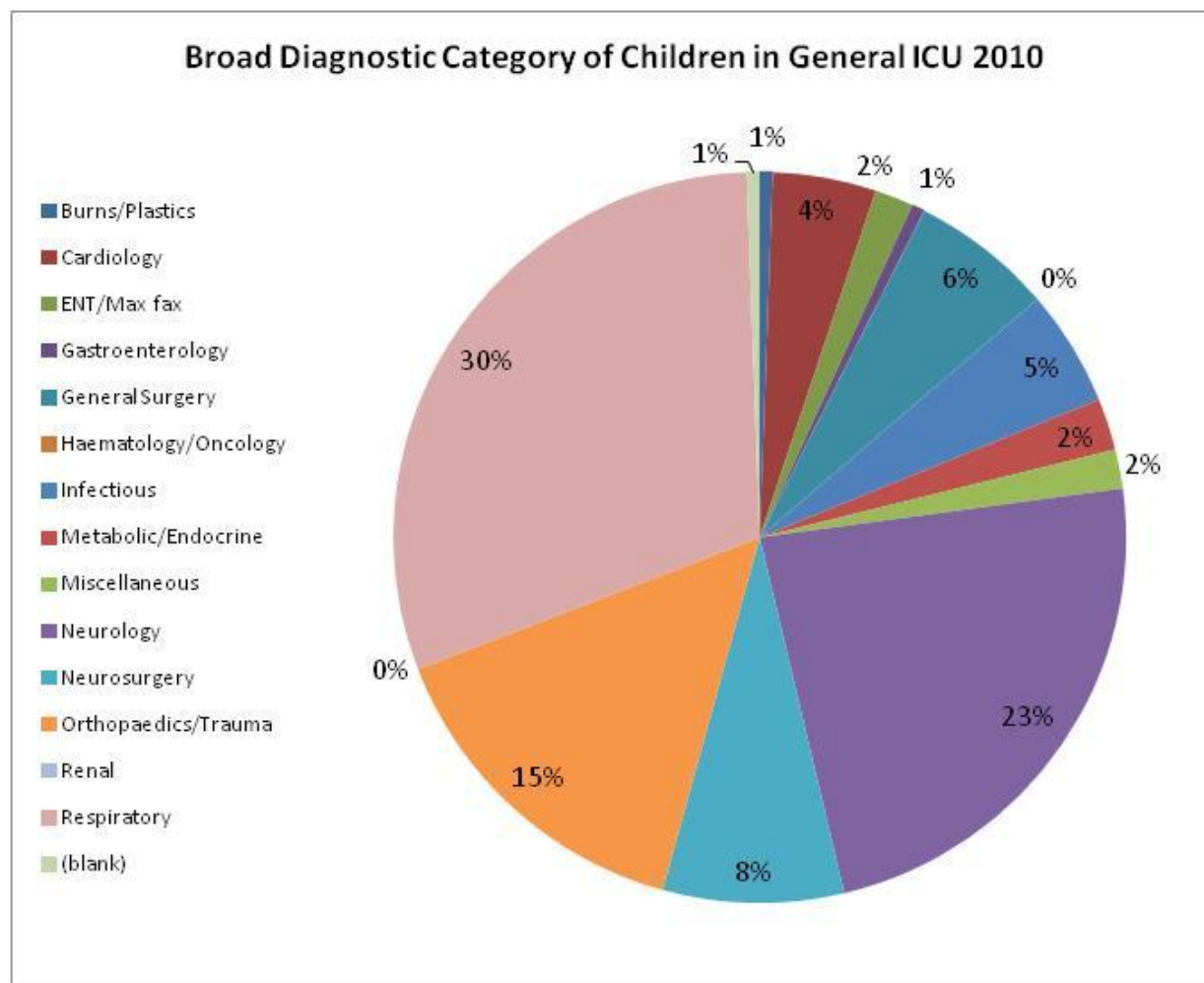
SOURCE OF ADMISSION TO GENERAL ICU

Almost all admissions to General ICUs in the region are from within the same hospital. Approximately half are admitted directly from the Emergency Department, with equal proportions from the wards, high dependency units and theatres. Obviously there will be variations between different hospitals dependent both on facilities and case mix.

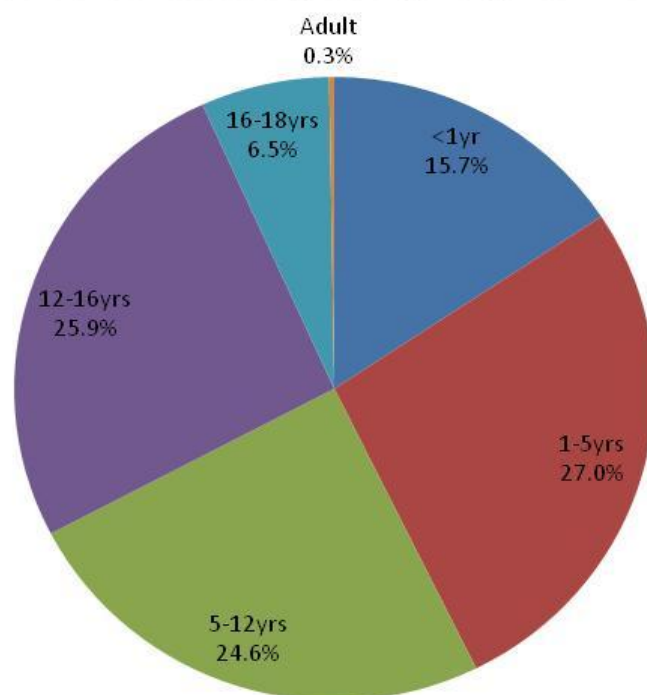


BROAD DIAGNOSTIC AND AGE RANGES IN GENERAL ICU

In regards the conditions leading to admission to General ICU, respiratory and neurology diagnoses remain the most common. However it is noticeable that compared to paediatric high dependency units, there is an increased proportion of Orthopaedics & Trauma cases. Again this may be a reflection of the elective scoliosis surgery performed in the region, and may also explain the greater proportions of older children admitted, as compared to the overall age distribution of critical illness. Unlike the overall picture for critical illness, children under 5 years make up just over 40% of admissions to GICUs, with greater proportions of older children represented.



General ICU Paediatric Episode Age Range 2001 - 2010

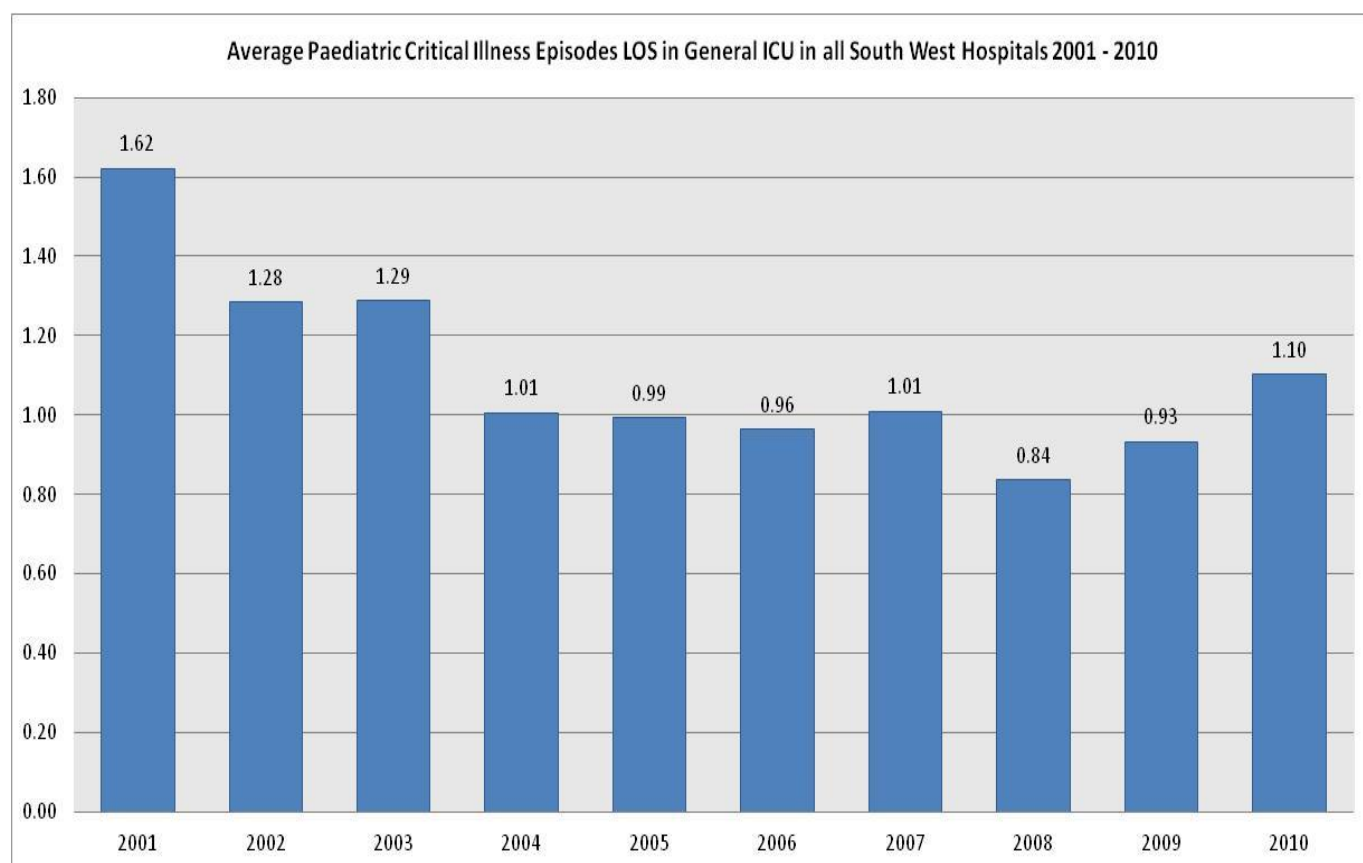


General Intensive Care Units still provide the South West region with invaluable critical care facilities. Children should be referred to PICU from all units as soon as possible, if at time of admission, it is envisaged they will require level 2 care for more than 24 hours, or level 3 care for any period.

AVERAGE LENGTH OF STAY ON GENERAL ICU

In accordance with the “24 hour rule” critically ill children are now spending less time in general intensive care units.

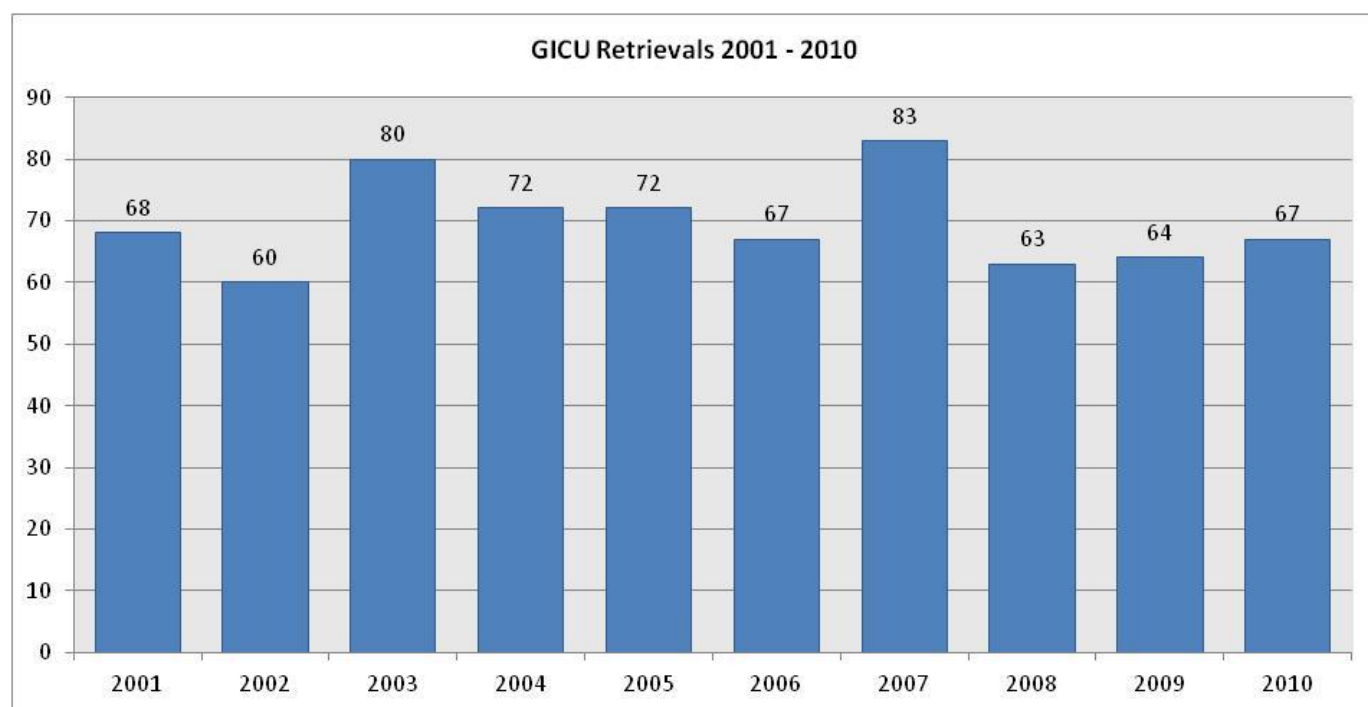
Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Cheltenham General Hospital	0.90	2.24	0.81	4.57	1.39	0.88	0.25	0.77	0.54	0.13	1.48
Derriford Hospital, Plymouth	3.85	2.01	1.95	1.71	1.16	1.37	1.82	0.75	0.50	1.55	1.81
Frenchay Hospital, Bristol	3.39	3.67	3.44	0.83			5.38				3.49
Gloucestershire Royal Hospital	0.42	0.78	1.69	0.97	1.14	0.86	0.50	0.58	1.18	0.53	0.90
Great Western Hospital, Swindon	1.01	0.52	1.02	0.86	0.86	0.90	0.54	0.91	1.66	0.72	0.90
North Devon District Hospital	1.13	0.86	0.57	0.76	1.29	0.71	0.72	0.70	0.51	0.24	0.82
Royal Cornwall Hospital, Treliske	1.08	1.14	1.03	1.23	0.90	0.83	1.15	0.82	0.68	0.51	0.97
Royal Devon and Exeter Hospital	1.10	0.95	1.36	0.72	1.41	0.96	1.29	0.97	1.06	1.24	1.10
Royal United Hospital, Bath	0.32	0.22	0.39	0.48	0.54	0.77	0.58	0.81	0.94	1.03	0.62
Southmead Hospital, Bristol	0.21	0.54	11.04		0.17	0.10					1.76
Taunton and Somerset Hospital	0.87	0.90	0.74	0.39	0.53	0.40	0.90	1.58	0.86	2.83	0.92
Torbay Hospital	0.67	0.73	0.68	0.60	0.63	1.29	0.64	1.03	0.53	1.85	0.78
Weston General Hospital	1.38							0.33			1.03
Yeovil District Hospital	1.17	1.21	10.38	1.67	0.72	0.41	0.46	0.43	0.54		1.40
Total	1.62	1.28	1.29	1.01	0.99	0.96	1.01	0.84	0.93	1.10	1.14



PAEDIATRIC CRITICAL CARE BED DAYS FOR GENERAL ICU

Hospital Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Cheltenham General Hospital	1.79	8.96	5.67	13.71	13.88	0.88	0.25	1.54	0.54	0.13	47.33
Derriford Hospital, Plymouth	154.00	64.46	72.21	53.08	52.13	28.83	58.29	12.79	10.42	37.25	543.46
Frenchay Hospital, Bristol	128.83	106.46	41.29	0.83			5.38				282.79
Gloucestershire Royal Hospital	8.75	21.04	45.75	18.50	9.08	10.33	4.54	10.50	12.96	5.88	147.33
Great Western Hospital, Swindon	22.21	16.21	34.79	16.42	21.42	18.83	14.00	30.13	46.46	19.38	239.83
North Devon District Hospital	24.75	12.92	10.75	11.42	25.71	11.42	15.88	13.29	1.54	1.42	129.08
Royal Cornwall Hospital, Treliske	55.00	37.63	38.08	27.04	26.21	23.29	40.38	26.38	19.04	8.67	301.71
Royal Devon and Exeter Hospital	58.46	26.63	40.83	30.17	56.33	43.04	46.29	34.83	38.04	56.88	431.50
Royal United Hospital, Bath	1.29	2.58	11.21	8.08	3.79	16.25	4.08	11.33	16.04	11.29	85.96
Southmead Hospital, Bristol	0.21	0.54	11.04		0.33	0.21					12.33
Taunton and Somerset Hospital	23.46	15.25	10.42	2.33	5.25	1.58	10.79	1.58	3.46	19.83	93.96
Torbay Hospital	15.46	24.25	24.38	10.13	30.83	48.88	28.75	20.63	10.67	11.08	225.04
Weston General Hospital	2.75							0.33			3.08
Yeovil District Hospital	2.33	4.83	20.75	3.33	4.33	1.63	0.46	2.13	2.17		41.96
Total	499.29	341.75	367.17	195.04	249.29	205.17	229.08	165.46	161.33	171.79	2585.38

NUMBER OF CHILDREN RETRIEVED FROM GENERAL ICU



The number of children retrieved from General ICU has remained relatively stable over the 10-year period. This reflects that the numbers of ventilated children admitted to General ICU has only decreased slightly, whilst the proportion requiring ventilation and inotropes who definitely require transfer to PICU has not changed, despite the overall fall in infectious disease.

9. FRENCHAY HOSPITAL

The South West UK Paediatric Burn Service is based at Frenchay Hospital, part of North Bristol NHS Trust, and treats around 600 children with burn injuries every year and as a Lead Centre accepts referral of complex paediatric burns from the South Central (Hampshire and the Isle of Wight) and South Wales, as well as from the whole of the South West, including Dorset.

The paediatric Neurosurgery Department serves the entire South West peninsula. A comprehensive secondary and tertiary care service is based at Frenchay Hospital accepting both elective and emergency admissions.

These services have beds in the Barbara Russell Children's Unit. The Ward has 34 paediatric beds. Three specialised HDU beds have been operational since 2003 on the Barbara Russell Children's Unit. From 1st October 2004, two Peri-Anaesthetic Care Unit (PACU) beds providing short-term ventilation for paediatric neurosurgical, burns and scoliosis cases were commissioned.

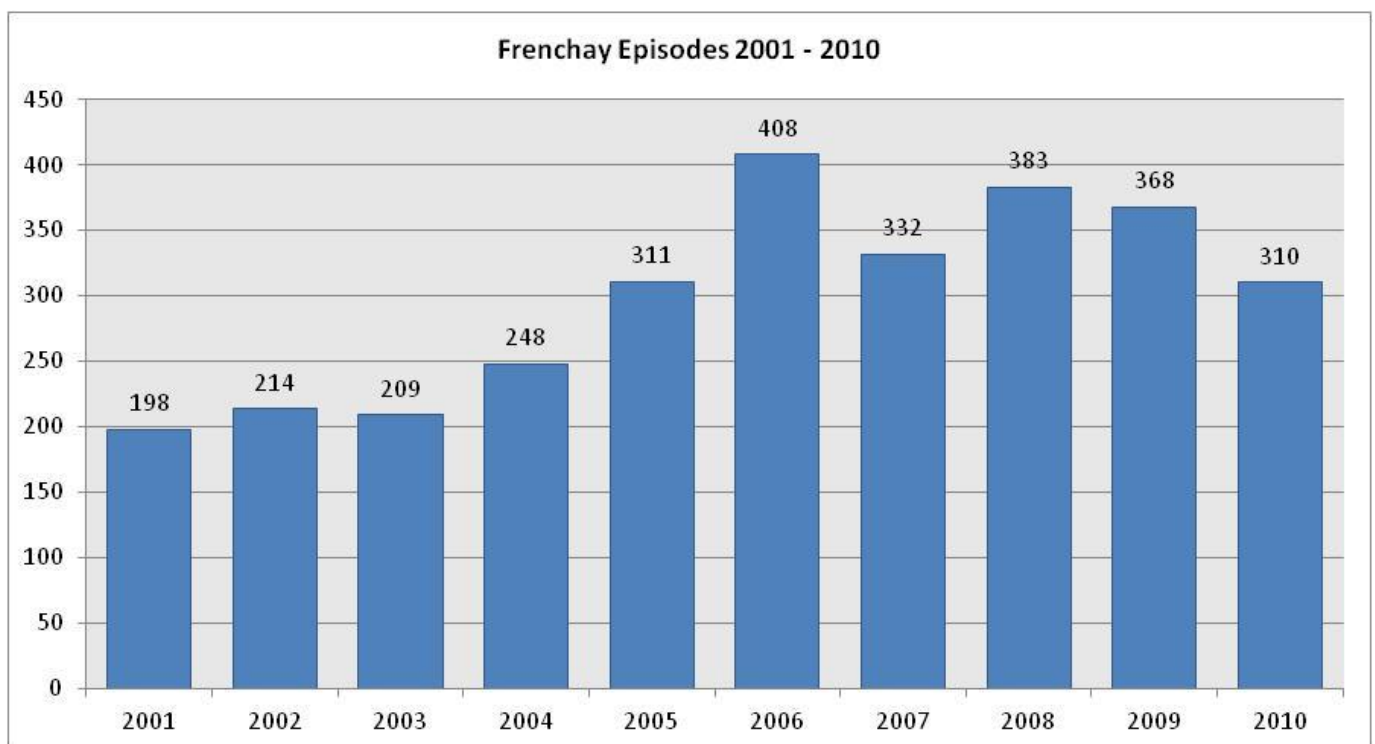
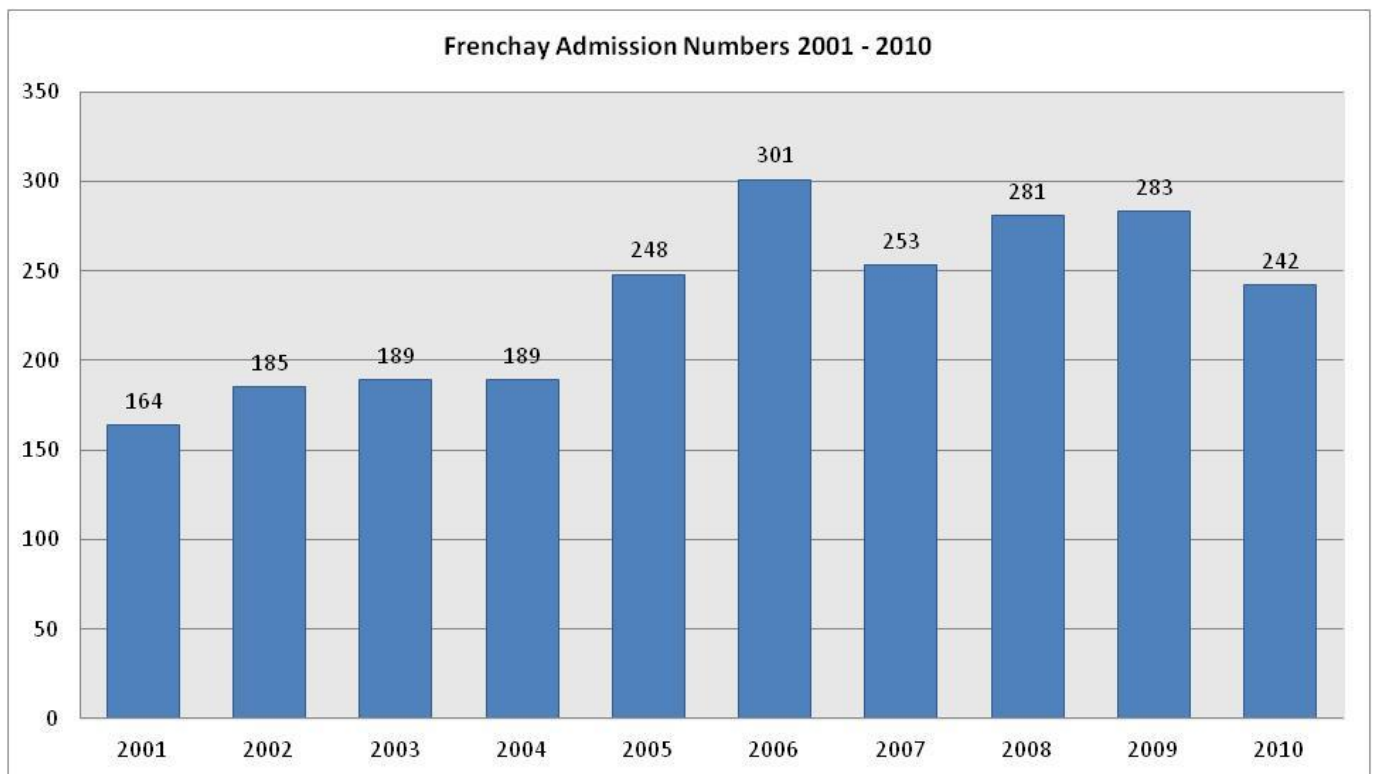
The children in both units are cared for by a group of paediatric critical care nurses, five consultant paediatric anaesthetists and seven middle grade paediatricians. There are strong links between these two units and the regional PICU in Bristol. Nursing rotations have been established and joint protocols are in place.

Operational policies for neurosurgery and burns dictate the length of time that patients should be managed on PACU. A number of out-patient clinics are offered together with specialist support for children and young people with neuromuscular conditions and children with epilepsy. In line with national commissioning standards, Centralisation of Specialist Paediatric services in Bristol involves transferring all specialist inpatient and day-case services from Frenchay Hospital to Bristol Royal Hospital for Children. It is planned for this to be completed by May 2014.

Unlike other hospitals in the region, children admitted to Frenchay Hospital with critical illness are more likely to have multiple episodes of critical illness during the same admission. This reflects the specialist nature of the workload as opposed to the general paediatric population seen elsewhere. This needs to be taken into account when looking at the data. The maximum episodes generated by an individual child in 2010 were 11, over a 4 week admission.

There appears to be no seasonal fluctuation in children reaching critical illness criteria within Frenchay. This differs to the other hospitals in the region, which experience an increased winter workload and is another reflection of the different paediatric population admitted to Frenchay. This may be of benefit with the centralisation of services to BRHC, who also experience a seasonal increase in workload, particularly on PICU.

The following 2 charts show the difference between Frenchay's admissions and episodes.



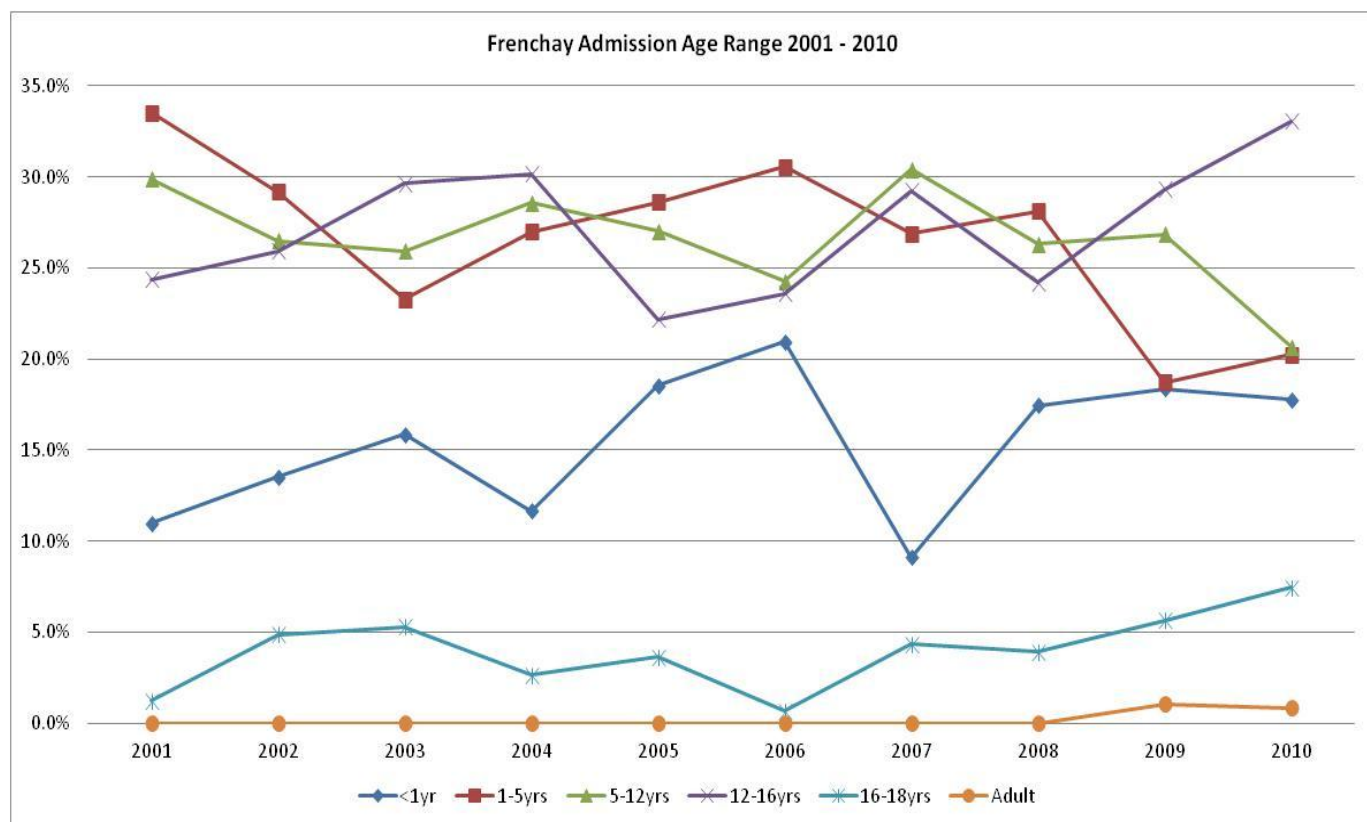
BROAD DIAGNOSTIC CATEGORIES FRENCHAY

Paediatric Critical Illness within Frenchay Hospital is dominated by neurosurgery, with orthopaedics & trauma and burns/plastics constituting the bulk of the rest of the cases.

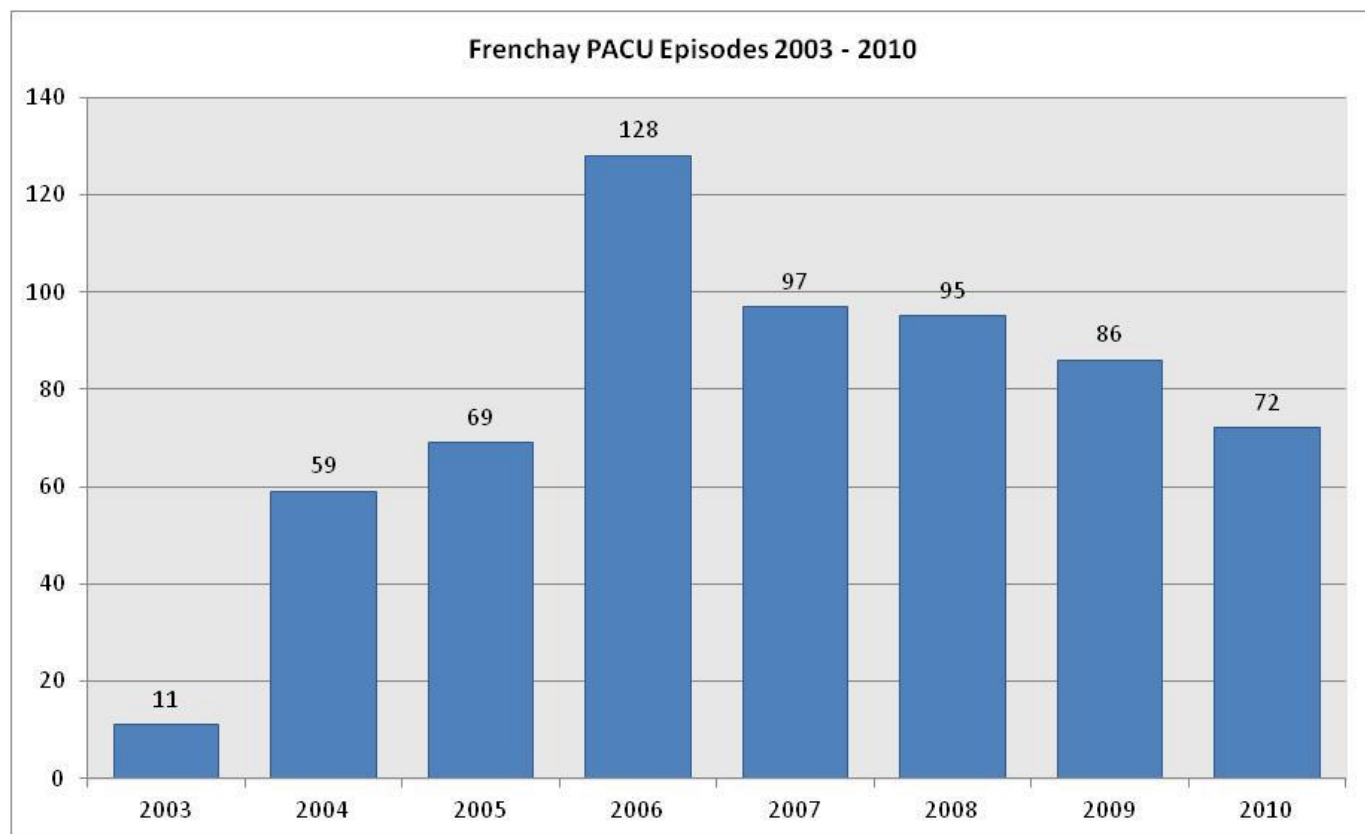
Broad Diagnostic Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Burns/Plastics	25	33	28	31	25	25	34	29	41	36	307
Cardiology		2	3	1		1					7
ENT/Max fax	3	2	4	6	2	6	8	12	1	3	47
Gastroenterology	1		3								4
General Surgery	1	1					1			1	4
Haematology/Oncology									2		2
Infectious	3	2	7	2	4	2	2		2		24
Miscellaneous			2						1		3
Neurology	10	10	19	5	7	7	14	8	7	1	88
Neurosurgery	99	116	88	119	135	173	149	183	180	156	1398
Orthopaedics/Trauma	15	13	25	23	39	31	36	41	46	43	312
Respiratory	4	3	3	1					3	2	16
Craniofacial	3	3	7	1	36	55	9	8			122
(blank)						1					1
Grand Total	164	185	189	189	248	301	253	281	283	242	2335

AGE RANGE

This chart demonstrates age groups by percentage of admission numbers for the 10 year period. There has been an increase in the overall amount of 12-18yr olds. One adult aged 21yr 8 months was admitted to PHDU due to lack of beds in the Adult HDU. There has been a decline in the number of children reaching critical illness status between the ages of 1-12yrs. The less than aged one group has fluctuated over the period, but has remained steady since 2008.



PACU EPISODES



DEPENDENCY LEVELS ON PACU

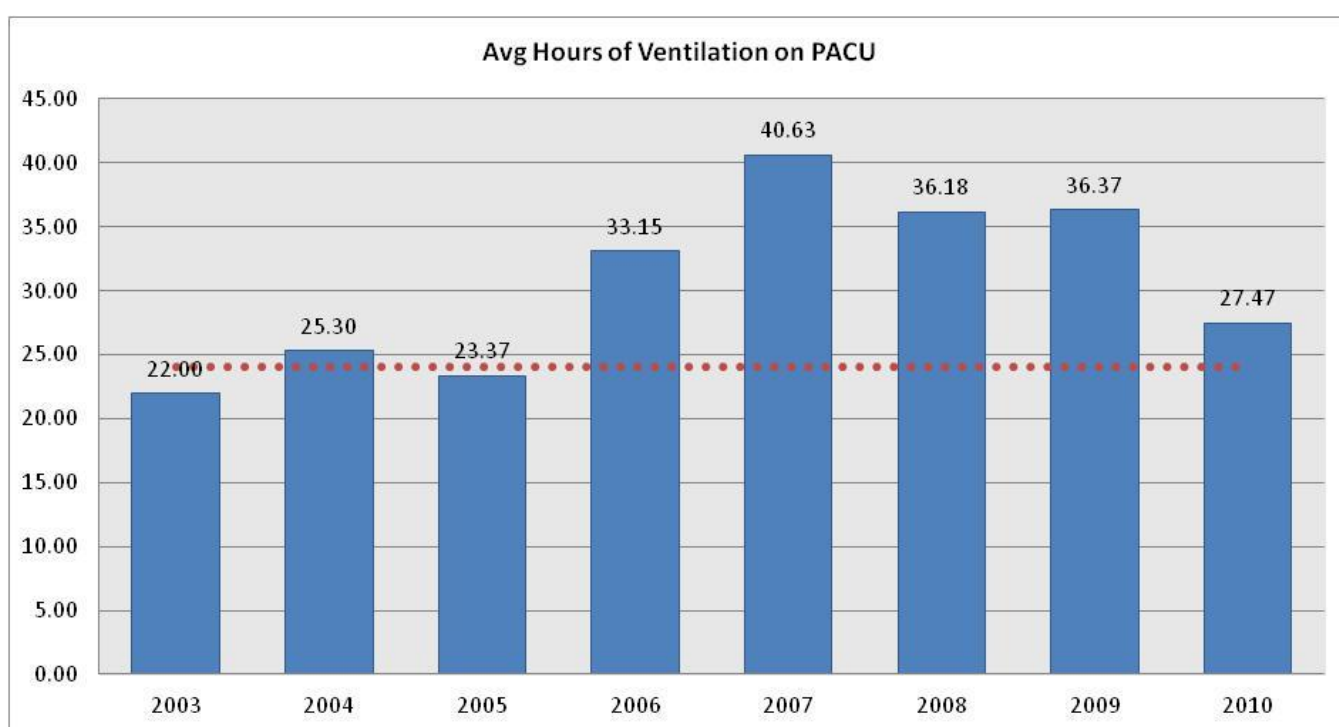
Over the last three years, the majority (38%) of the patients being cared for in PACU were level 1 dependency i.e. they require close monitoring and observation, but do not require acute mechanical ventilation. Long-term ventilated children and children requiring chronic CPAP or Vapotherm are included in this group. Specific single organ support requiring high dependency care also comes under Level 1 dependency, i.e. the child receiving vasoactive drugs to support cardiac output. 30% of the episodes were at level 2 and 17% at level 3.

Year	1	2	3	(blank)	Grand Total
2008	43	31	15	6	95
2009	17	31	17	21	86
2010	37	16	13	6	72

AVERAGE LENGTH OF STAY ON PACU

Year	2003	2004	2005	2006	2007	2008	2009	2010	Total
Avg LOS	0.96	1.24	1.08	1.40	1.50	1.30	1.35	1.08	1.30

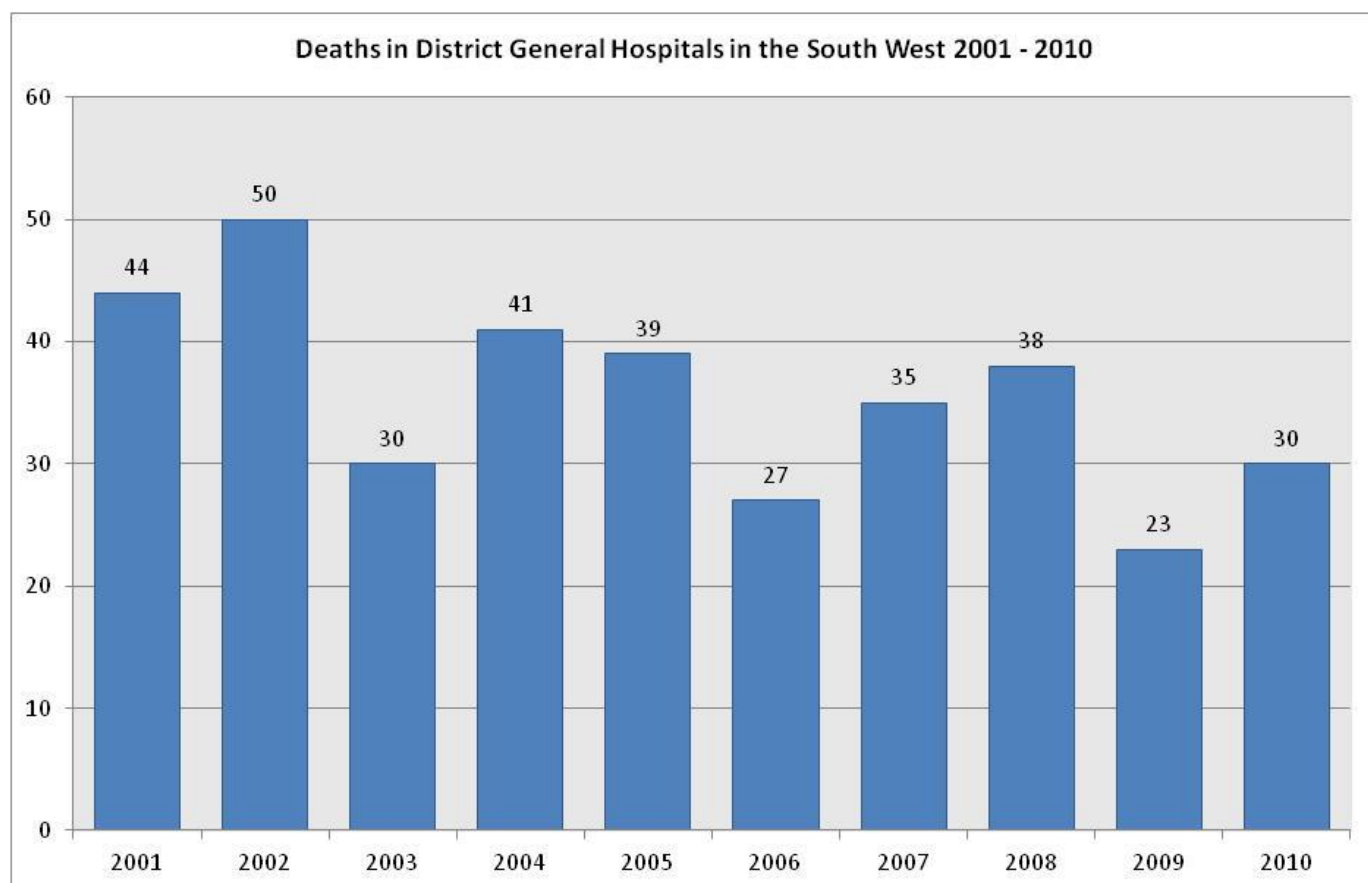
In the last SWACIC report 2007/08, the number of children staying beyond 24 hours on the Peri-Anaesthetic Care Unit (PACU) at Frenchay Hospital remained very high, contrary to the unit's Operational Policy. Of those children requiring ventilation on PACU, the median length of ventilation was significantly longer than 24 hours. Of children requiring Level 3 care (invasive ventilation and inotropic support) during their stay on PACU, 95% stayed longer than 24 hours, as did 44% of those requiring Level 2 care (invasive ventilation). It was recommended that a thorough review of the Operational Policy was required, including an investigation into the worsening compliance with the Policy.



This graph does show a reduction in ventilation hours within PACU over the last three years. However, for the purpose of calculating ventilation times on PACU in 2010, one child has been omitted as they would cause the figures to be significantly distorted. This child received continuous invasive ventilation for **230** hours and inotropic support; this was a private patient from overseas. The non-corrected figure of 34.45 hrs for 2010, would still demonstrate a reduction, but the figures still contravene the 24hr target.

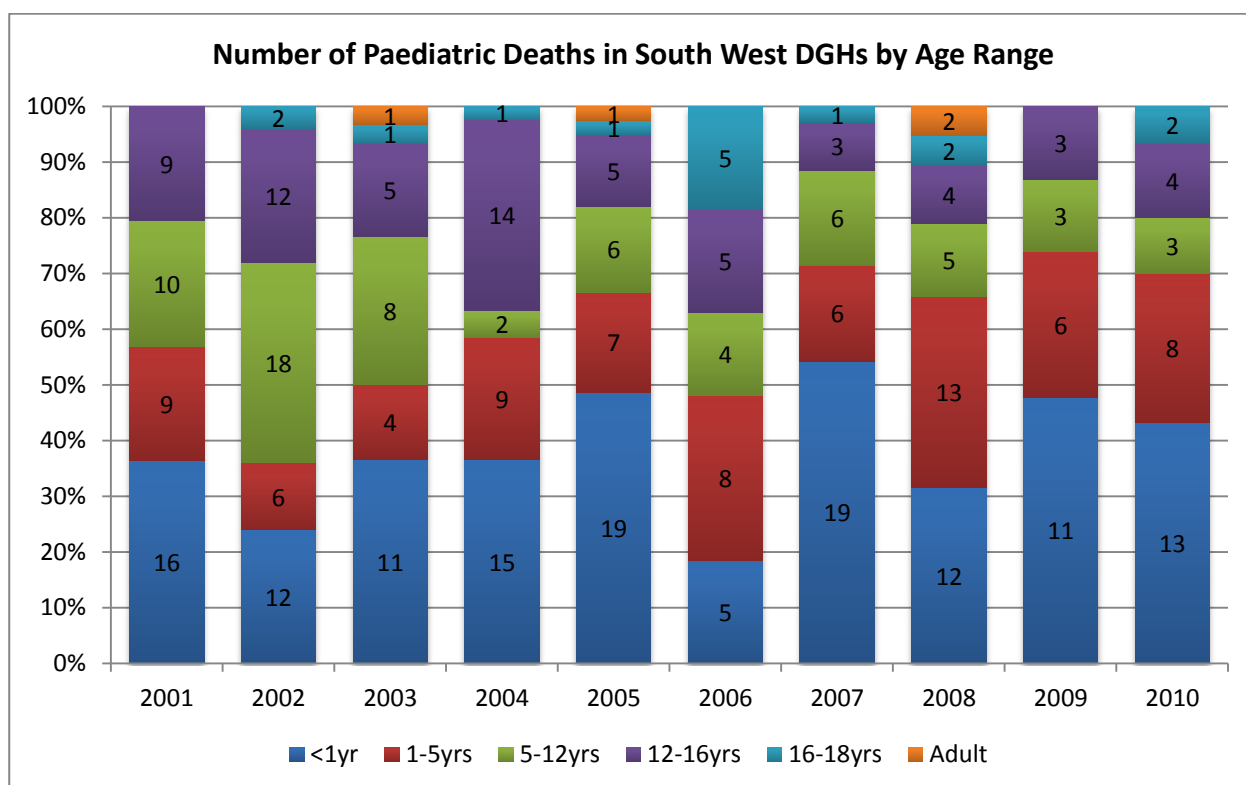
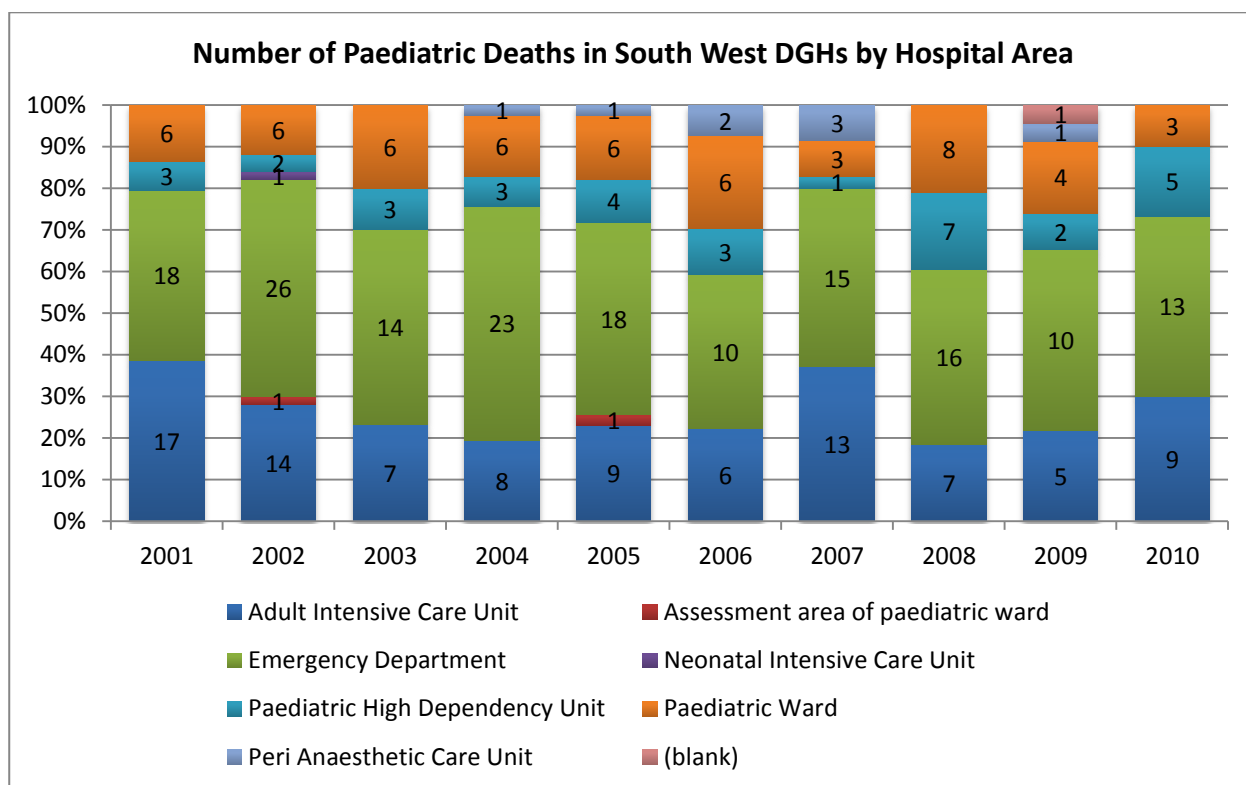
The Peri-Anaesthetic Care Unit (PACU) at Frenchay Hospital remains an interim solution to the regional problem of providing peri-operative critical care to children undergoing paediatric neurosurgery, scoliosis surgery, plastic surgery and burns surgery, on a separate site from the Paediatric Intensive Care Unit at Bristol Royal Hospital for Children.

10. DEATHS REPORTED TO SWACIC



In-hospital paediatric deaths in the region (excluding Bristol Royal Hospital for Children) are grossly under reported in the data, particularly given that a large proportion occur in Emergency Departments which do not routinely report data to SWACIC. Sudden infant deaths will be particularly affected by this. Some of these deaths would have been reported to CEMACH whilst it was running.⁸

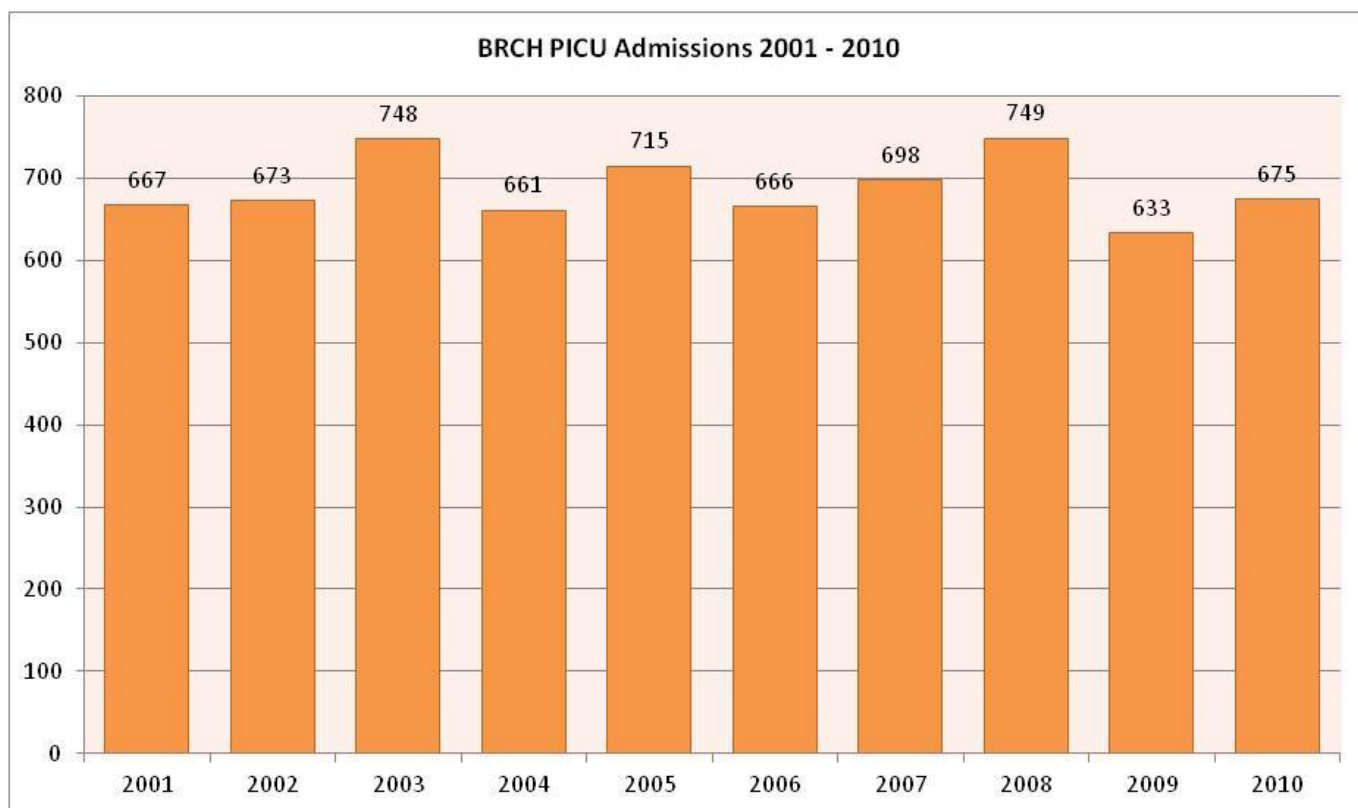
When breaking down the figures by hospital area, just under half of those reported occurred in the Emergency Department, approximately a quarter occurring in general intensive care units, and the rest in other paediatric areas, including both high dependency units and the wards. By age, the overall split of deaths reported to SWACIC is roughly 40% under 1 year of age, and 20% each for 1-5 years, 5-12 years, and 12-16 years.



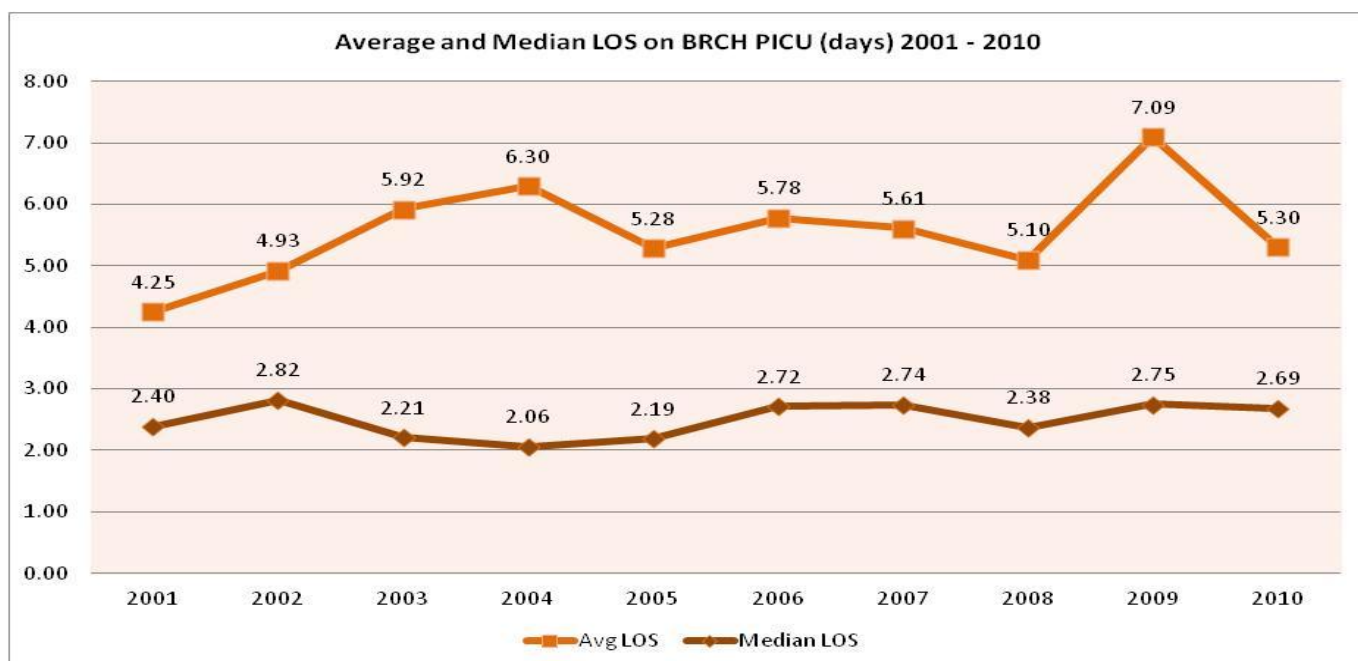
All child deaths are now subject to the Child Death Review process that has superseded CEMACH, and will be reported to the regional Child Death Overview Panels.

11. PAEDIATRIC INTENSIVE CARE UNIT, BRISTOL ROYAL HOSPITAL FOR CHILDREN

The paediatric intensive care unit (PICU) at Bristol Royal Hospital for Children (BRHC) is the regional tertiary centre for children needing intensive care. Over the 10 years of this report, the admission rate of the PICU has remained very steady at around 700 admissions per year.



Although the average length of stay has varied between years, partly on the basis of the number of long-term ventilated children admitted, the median length of stay has remained very consistent at 2 to 3 days.



Prevalence of PICU admission (figures from PICANet)

The prevalence of admission to PICU for children in the South West SHA, remains by some distance, the lowest of any regional SHA in England, and again has remained relatively static at approximately 95 admissions per 100,000 children per year. This is at a time when the prevalence has continued to rise in neighbouring regions in the south of England.⁹

The reasons for this are likely to relate to the network of high dependency units across the country and the regional policy of allowing local general intensive care units to keep children expected to require invasive ventilation for less than 24 hours, rather than referring them to Bristol. Even if children from the region admitted to PACU at Frenchay for level 2 and level 3 paediatric intensive care were included in these figures, the prevalence rate for PICU admission would still be lower than any other region. Please also note that South West in this context also includes South Wiltshire and Dorset, areas that usually refer to Southampton for intensive care, but are included in the overall prevalence figures for PICU admission.

SHA	2005	2006	2007	2008	2009	2010
South West	94	94	95	99	91	81
South Central	107	104	102	111	117	120
West Midlands	103	130	132	135	149	141
South East Coast	104	145	143	159	181	186
London	142	139	157	164	175	176

Bristol PICU Admissions by Area (Note: Dorset & South Wiltshire incl. in “Others”)

Year	All	South West	Wales	Others
2001	667	551	88	28
2002	673	540	101	32
2003	748	601	116	31
2004	661	537	99	25
2005	715	573	114	28
2006	666	520	117	29
2007	698	537	135	26
2008	749	605	117	27
2009	633	491	132	10
2010	675	507	138	30
Total	6885	5462	1157	266
% of Admissions		79.3%	16.8%	3.9%

PICU Admissions by South West Postcode

Year	BA	BS	GL	EX	SN	PL	TA	TQ	TR	Total
2001	59	209	60	52	52	18	38	33	25	546
2002	54	204	73	46	45	23	37	23	30	535
2003	43	217	94	53	49	26	51	36	27	596
2004	47	204	77	48	46	22	42	29	21	536
2005	54	204	57	43	53	46	41	40	34	572
2006	47	187	64	38	40	28	39	45	30	518
2007	47	164	49	71	38	50	41	39	34	533
2008	58	211	66	76	54	36	43	30	31	605
2009	42	176	59	52	40	41	28	22	30	490
2010	60	153	67	68	41	38	35	28	16	506
Total	511	1929	666	547	458	328	395	325	278	5437
% of South West Admissions	9.4%	35.5%	12.2%	10.1%	8.4%	6.0%	7.3%	6.0%	5.1%	
% of All PICU Admissions	7.4%	28.0%	9.7%	7.9%	6.7%	4.8%	5.7%	4.7%	4.0%	

PICU Bed Days by Area (Note: Dorset & South Wiltshire incl. in “Others”)

Bed days on PICU are calculated by the total of minutes occupied, rather than midnight head count as used by the local UHBristol Patient Administration System (PAS). The results will be similar but dependent on case mix. The figures will be somewhat lower than those reported by PICANet as any part of a day for an individual patient is counted as one complete day, as per the method for the Paediatric Critical Care Minimum DataSet (PCCMDS).

Year	All	South West		Wales		Others	
	Number	Number	Percentage	Number	Percentage	Number	Percentage
2001	2835.7	2269.9	80.0%	365.1	12.9%	200.6	7.1%
2002	3316.8	2486.0	75.0%	678.9	20.5%	151.9	4.6%
2003	4431.4	3800.1	85.8%	513.4	11.6%	117.9	2.7%
2004	4161.2	3262.2	78.4%	470.9	11.3%	428.0	10.3%
2005	3778.2	3194.3	84.5%	484.5	12.8%	99.4	2.6%
2006	3852.1	3136.7	81.4%	559.9	14.5%	155.5	4.0%
2007	3916.1	3061.6	78.2%	616.3	15.7%	238.3	6.1%
2008	3818.1	3193.5	83.6%	451.7	11.8%	172.9	4.5%
2009	4490.7	3755.6	83.6%	644.9	14.4%	90.2	2.0%
2010	3579.3	2655.3	74.2%	696.9	19.5%	227.1	6.3%
Total	38179.6	30815.3	80.7%	5482.4	14.4%	1881.9	4.9%

South West Bed days by Postcode

Year	BA	BS	GL	EX	SN	PL	TA	TQ	TR	Total
2001	200.6	901.5	229.4	277.0	261.7	70.0	134.4	99.9	95.4	2269.9
2002	264.3	772.1	437.9	169.9	146.9	95.6	209.3	122.6	267.5	2486.0
2003	198.3	1431.4	589.0	610.6	240.6	158.8	200.3	142.1	228.8	3800.1
2004	276.7	1509.5	339.1	175.9	338.7	88.8	180.5	280.7	72.4	3262.2
2005	407.5	937.6	395.1	127.4	440.2	223.7	179.1	283.2	200.6	3194.3
2006	207.2	848.1	316.3	319.9	309.3	299.3	259.7	427.5	149.4	3136.7
2007	249.5	822.5	390.6	320.7	303.9	399.3	194.7	182.3	198.2	3061.6
2008	276.2	930.9	400.8	448.3	400.2	171.4	232.5	195.5	137.6	3193.5
2009	225.6	1284.7	429.8	306.5	439.1	447.1	375.9	85.5	161.4	3755.6
2010	316.7	830.5	349.8	484.8	130.6	181.3	174.1	100.6	86.8	2655.3
Total	2622.6	10268.8	3877.8	3241.1	3011.2	2135.4	2140.4	1920.0	1598.0	30815.3

PICU Deaths

Year	Admissions	Deaths	% Mortality Rate
2001	667	30	4.5%
2002	673	32	4.8%
2003	748	38	5.1%
2004	661	32	4.8%
2005	715	32	4.5%
2006	666	45	6.8%
2007	698	44	6.3%
2008	749	28	3.7%
2009	633	33	5.2%
2010	675	28	4.1%
Total	6885	342	5.0%

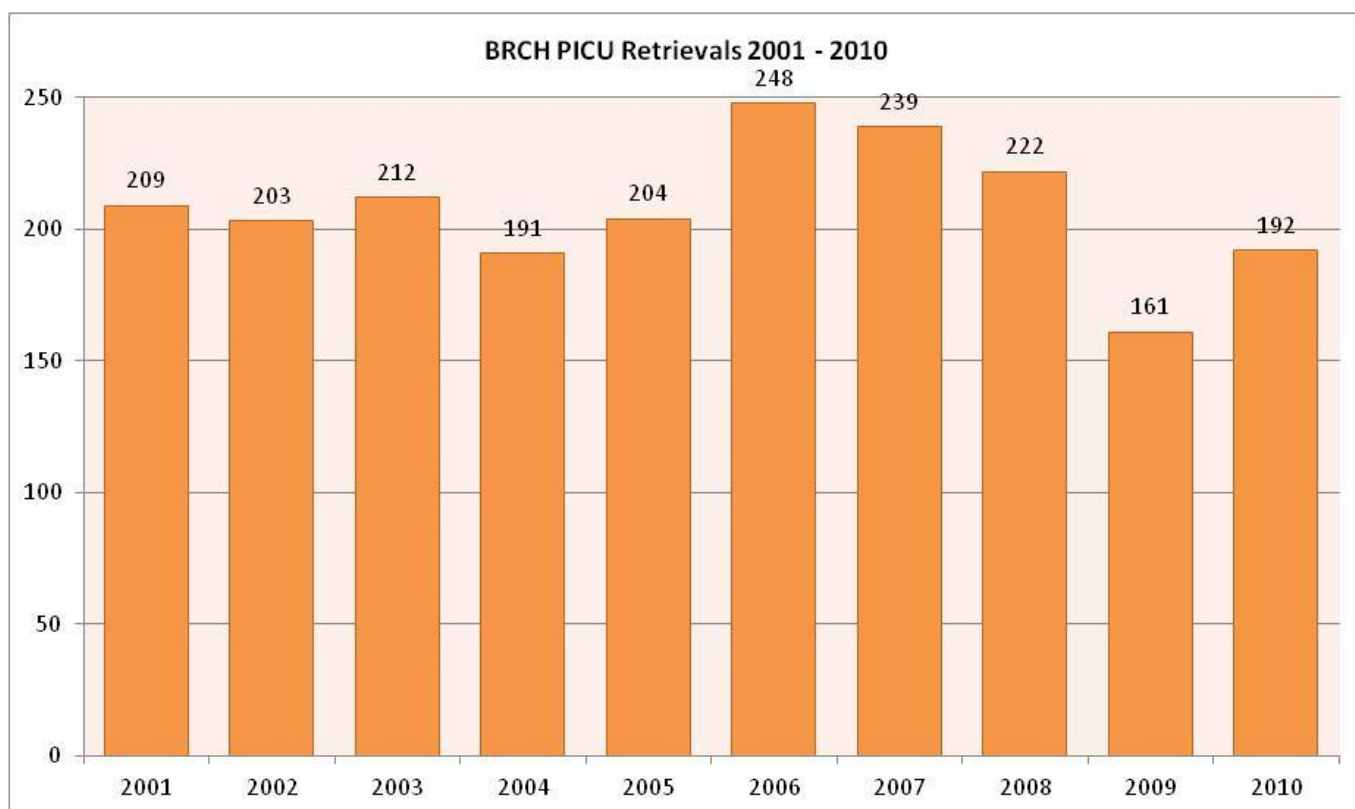
Standardised Mortality Ratios (SMRs) for Bristol Royal Hospital for Children PICU (figures from [PICANet](#))

The risk-adjusted Standardised Mortality Rate (SMR) for the PICU in Bristol has remained well below 1 for the 7 years since PICANet first started to identify units in its mortality figures. In certain years, it has been the lowest of any of the medium or large units in the UK. Similarly the reduction in SMR from the unadjusted to risk-adjusted figure suggests that the unit is performing well, given the severity of illness of children admitted.

SMR	2004	2005	2006	2007	2008	2009	2010
Unadjusted SMR	0.95	0.9	1.25	1.23	0.86	1.2	1.01
Risk-adjusted SMR	0.83	0.75	0.81	0.71	0.63	0.92	0.77

12. RETRIEVALS AND TRANSFERS

The South West Paediatric Acute Transport Service based out of the PICU in Bristol covers 14 referring centres within the region and will undertake out-of-region retrievals as necessary. Over 2600 retrievals have been undertaken by the team from Bristol since 1997. In the last 4 years, 12 children have died in their local centre following activation of the transport service, but no children have died in transit.



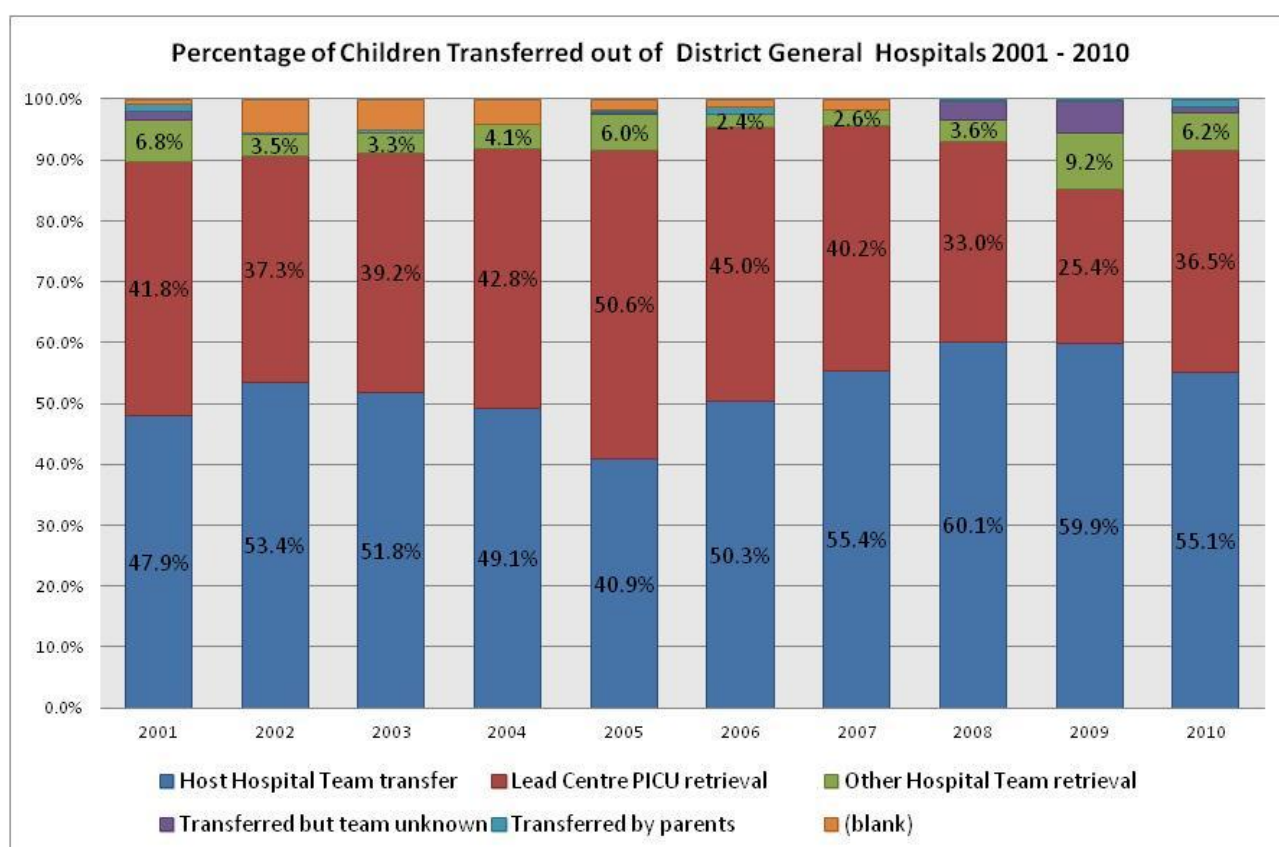
During the period of this report, the number of refused retrievals has remained relatively high, although a number of these children are subsequently retrieved at a later time or date during this admission. However a change in working practices on PICU in 2010 has led to a dramatic reduction in the number of refusals.

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
2001	3	5	6	0	0	0	5	6	0	0	1	3	29
2002	0	1	0	0	0	0	1	1	0	0	2	5	10
2003	1	1	0	1	1	0	0	0	0	2	2	17	25
2004	3	2	3	0	0	0	1	0	0	0	2	7	18
2005	2	0	0	2	0	0	1	0	3	2	8	19	37
2006	6	0	5	3	0	4	1	1	0	0	1	0	21
2007	4	2	0	1	0	0	0	0	2	2	8	3	22
2008	0	0	0	0	0	3	0	0	1	2	6	15	27
2009	6	2	1	7	3	0	2	3	2	2	4	8	40
2010	3	1	0	1	0	0	0	0	0	0	0	5	10
Total	28	14	15	15	4	7	11	11	8	10	34	82	239

Although the majority of children with critical illness remain locally, approximately 10% of children are transferred elsewhere. Over 5% of episodes result in a child being transferred elsewhere by a local non-specialised team.

Transfer Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Grand Total
Host Hospital Team transfer	6.0%	6.8%	6.7%	5.0%	4.9%	6.7%	7.5%	8.3%	7.8%	5.3%	6.5%
Lead Centre PICU retrieval	5.2%	4.7%	5.1%	4.4%	6.1%	6.0%	5.4%	4.6%	3.3%	3.5%	4.8%
Not transferred	87.5%	87.3%	87.1%	89.8%	88.0%	86.7%	86.5%	86.2%	87.0%	90.3%	87.6%
Other Hospital Team retrieval	0.8%	0.4%	0.4%	0.4%	0.7%	0.3%	0.3%	0.5%	1.2%	0.6%	0.6%
Transferred but team unknown	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.7%	0.1%	0.2%
Transferred by parents	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%
(blank)	0.1%	0.7%	0.7%	0.4%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.2%

Approximately 40% of all transfers of critically ill children in the region are performed by the South West Acute Paediatric Transport Service and these represent retrievals to the Paediatric Intensive Care Unit in Bristol. This constitutes the vast majority of transfers of children requiring intensive care. On PICANet figures, approximately 85% of all children transferred to the PICU in Bristol, are transferred by the South West Acute Paediatric Transport Service based on the unit. This figure is significantly higher than most PICUs elsewhere in the UK. Most children that are retrieved from the region are discharged to the wards at Bristol Royal Hospital for Children. Only 30% return from PICU directly to their local hospital.



The majority of other transfers of critically ill children shown in the graph above not undertaken by the Lead Centre are performed by local teams (“Host Hospital Team transfer”). A small proportion of these will be time-critical transfers to either Frenchay Hospital (i.e. head injury, severe burns) or PICU (i.e. abdominal emergencies). However the overwhelming majority of transfers by local teams will be of children requiring on-going high dependency care. Frequently this will be to the specialist wards at Bristol Royal Hospital for Children, but the other significant workload relates to the transfer of children from hospitals without in-patient general paediatric beds to the nearest in-patient paediatric facility (i.e. Cheltenham to Gloucester; Southmead, Frenchay & Weston to BRHC). With changes in the organisation of services in Gloucestershire, there has been a marked increase in the number of transfers between Cheltenham and Gloucester in the last 5 years that has significantly affected the overall figures.

It is important to note that the local medical and nursing staff from the individual district general hospitals undertaking the transfers of critically ill children do not necessarily have the appropriate training or experience in paediatric transport medicine, and will not be subject to the same standards of practice as the specialist paediatric intensive care retrieval team. Additionally they are usually taken from the numbers of staff allocated to individual wards or units, leaving these short-staffed in their absence. These issues constitute a significant on-going clinical governance risk.

Of the very small number of children who were noted to have been transferred by parents, none of these were to the Paediatric Intensive Care Unit in Bristol. It would appear from the data that most of these transfers occurred after the episode of critical illness had finished, and were for on-going care in a specialist unit, or transfer to a hospital out-of-region closer to home.

13. REFERENCES

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14. APPENDIX A

AUDIT FORM FOR WARD/HDU BASED PAEDIATRIC PATIENTS

[Incorporating Paediatric Critical Care Minimum Dataset]



PLEASE ENTER 16 digit unique **PATIENT IDENTIFIER**

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Form cannot be processed unless this section is completed
1st 3 letters of first name, 1st 3 letters of surname, Date of Birth in 6 digit format, 1st part of post code eg: JOHSM1030995GL2- (Enter a dash (-) if box is blank)

DO NOT AFFIX PATIENT STICKERS

GENDER

MALE ☐

FEMALE ☐

Hospital Number

--

SWACIC STUDY No

--

(Office use only)

NAME OF **HOSPITAL**: THIS **WARD/DEPARTMENT AREA**:

DATE&TIME OF ADMISSION TO THIS AREA/...../..... HRS

SPECIALITY OF CONSULTANT **ADMISSION TYPE**: EMERGENCY ☐ ELECTIVE ☐

ADMITTED FROM: HOME ☐ GP ☐ OPD ☐ A&E ☐ HDU ☐ THEATRE ☐

ITU/PICU ☐ ASSESSMENT AREA OF WARD ☐ **WARD** ☐ **NAME OF WARD**

IF FROM ANOTHER HOSPITAL, ENTER **OTHER HOSPITAL NAME+WARD AREA**

INCOMING TRANSFER TEAM: DGH team ☐ SPECIALIST TEAM ☐ I

	Intervention and diagnostic criteria [Complete adjacent boxes for all applicable criteria]	From Date+Time	To Date+Time
09	Supplemental oxygen Therapy (enter %		
73	Continuous Pulse Oximetry		
59	Severe Asthma requiring intravenous bronchodilator, or continuous nebulisers		
57	Upper airway obstruction requiring nebulised adrenaline		
58	Apnoea requiring intervention in past 24 hrs (>3 stimulation or bag-mask)		
55	Nasopharyngeal* or Guedal* airway		
52	Invasive Ventilation via tracheostomy		
51	Invasive Ventilation via endotracheal tube		
53	Non invasive ventilation / CPAP / BIPAP		
50	Continuous ECG monitoring		
20	Cardiac arrhythmia – excluding sinus bradycardia/tachycardia		
07	>10 ml/kg volume bolus at any time		
63	>80 mls/kg volume boluses in 24 hours		
06	Continuous vasopressor infusion		
62	CVP monitoring		
60	Arterial monitoring		
68	ICP monitoring		
69	Intraventricular catheter or external ventricular drain		
70	DKA requiring continuous insulin infusion		
71	Intravenous thrombolysis (tPA, streptokinase)		
11	Surfactant administration		
61	Temporary pacing		
64	CPR in last 24 hrs		
66	Haemodialysis* 05 Peritoneal dialysis* 22 Haemofiltration* 67 Plasmapheresis*		
04	Exchange transfusion		
22	Burns >10%		
17	Glasgow Coma Score < 12		
18	Acute Renal Failure ie Urine output <1ml/kg/hour for >6 hours		
19	Prolonged (eg: > 20 minutes) or recurrent convulsions		
16	Meningococcal Septicaemia (Clinically diagnosed)		
15	Bacterial Meningitis (Proven or suspected)		
24	Pre or post-operative patients following complex surgery (eg: spinal or multi trauma) and/or requiring complex fluid/analgesia management.		
25	The patient with intractable pain eg: acute pancreatitis or oncological conditions		
23	Poisoning/substance misuse with the POTENTIAL for significant problems		
74	Isolation in a side room[*only if one or more of the above criteria are met*]		

* Please circle

Please turn over.....



DIAGNOSTIC DETAILS

Primary diagnosis

Secondary diagnosis

Co-morbidity

Operative procedure (Enter detail and date)

Investigations (CT, MRI etc)

DISCHARGE INFORMATION

Was there a delay in discharge? NO ☐ YES ☐ If YES, why?

If requested, was ICU admission refused? YES ☐ NO ☐ N/A ☐

If YES, why?

DATE/TIME of Discharge/...../..... :.....hrs

DIAGNOSIS ON DISCHARGE

DESTINATION:

Was the patient's condition discussed with BCH PICU at any time? YES ☐ NO ☐

TRANSFER DETAILS – please complete if child is transferred to another hospital

Transferred by your hospital team? YES ☐ NO ☐ Retrieval by BCH PICU? YES ☐ NO ☐

Retrieval by other team? YES ☐ NO ☐ Name of other PICU retrieval team

If YES, was this because:

BCH PICU full? ☐ BCH PICU team unavailable? ☐ BCH PICU team not requested? ☐

Other reason

OUTCOME: ALIVE ☐ DIED ☐ Enter date and time of death...../...../..... :.....hrs

Mode of Death: Treatment Withdrawn ☐ Treatment Limited ☐ Failed CPR ☐

Was there a "Do not Resuscitate" order in place for this patient? YES ☐ NO ☐

Please indicate if any of the following were performed:

Brain Stem Death ☐ Issue/Organ Donation? ☐ Post Mortem? ☐

*** To be signed by a Clinician to verify the patient required high dependency care (form will not be processed unless this section has been signed)

Signed Date

Please ensure that ALL SECTIONS of the form have been completed before return and complete a new form for each admission episode.

DO NOT SEND WITH PATIENT NOTES

THANK YOU FOR YOUR HELP AND CO-OPERATION.

Please return all COMPLETED forms to: Jo Linnitt – Regional PICU Audit Co-ordinator, PICU Consultants Office, Royal Hospital for Children, C/O No 2 St Michael's Hill, Bristol. BS2 8BJ either *by Royal Mail « Special Delivery » ONLY* or email form to: joanne.linnitt@nhs.net (if you have an nhs.net account)
Tel: 0117 342 8843 Mobile: 07890918287 Fax: 0117 342 8910

14. APPENDIX B

AUDIT FORM FOR INTENSIVE CARE BASED PAEDIATRIC PATIENTS

***PLEASE ENTER* 16 digit unique PATIENT IDENTIFIER**
Form cannot be processed unless this section is completed

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

1st 3 letters of first name, 1st 3 letters of surname, Date of Birth in 6 digit format, 1st part of post code eg: JOHSM1030995GL2- (Enter a dash (-) if box is blank)

DO NOT AFFIX PATIENT STICKERS

STUDY No

(Office use only)

MALE ☐ FEMALE ☐

NAME OF HOSPITAL: _____

DATE/TIME OF UNIT ADMISSION: / / : HRS

SPECIALITY OF CONSULTANT

ADMITTED FROM: HOME ☐ GP ☐ OPD ☐ A&E ☐ Adult HDU ☐ Paediatric HDU ☐
THEATRE ☐ ITU/PICU ☐ WARD ☐ WARD NAME _____ OTHER HOSPITAL ☐

IF TRANSFERRED FROM ANOTHER HOSPITAL, ENTER NAME+WARD AREA OF OTHER

HOSPITAL _____ WARD AREA _____

TRANSFERRING TEAM: DGH team ☐ SPECIALIST team ☐ PICU team ☐

PAEDIATRIC INDEX OF MORTALITY (PIM + PIM 2) DATA

Was the child a BOOKED admission after elective surgery, or admission for procedure e.g. insertion of a central line.	YES/NO (please circle)
--	------------------------

If the child has one of these **UNDERLYING CONDITIONS** please TICK the appropriate box.

NONE	TICK	TICK	
		Hypoplastic left heart syndrome, <1 month requiring Norwood.	
Cardiac Arrest OUT of hospital.		HIV or AIDS infection	
Cardiac Arrest IN hospital.		Inborn error in metabolism	
Severe combined Immune deficiency.		Liver Failure	
Leukaemia/lymphoma after completion of 1 st induction		Severe developmental delay	
Spontaneous cerebral haemorrhage from aneurysm or AV malformation.		A neurodegenerative disorder	
Cardiomyopathy or myocarditis		Ex-premature baby < 32/40	

Please enter the **FIRST** value of each variable measured within one hour after first contact with ICU doctor.

Response of pupils to bright light >3mm and both fixed = 1, other = 0, unknown = 0	
Base excess in arterial/capillary/venous blood (include + or - sign)	
PaO ₂ (Arterial sample only)	KPa or mmHg
FIO ₂ or O ₂ flow in litres at time of PaO ₂ sample above -	
METHOD of O ₂ delivery: Nasopharyngeal airway <input type="checkbox"/> Face mask with reservoir bag <input type="checkbox"/> Nasal cannulae or face mask <input type="checkbox"/> Head box <input type="checkbox"/> Endotracheal tube <input type="checkbox"/> Tracheostomy <input type="checkbox"/> Unknown <input type="checkbox"/>	
SYSTOLIC blood pressure in mmHg	
CPAP at any time Nasal <input type="checkbox"/> Facial <input type="checkbox"/> Pronged <input type="checkbox"/>	YES/NO (please circle)
Mechanical ventilation at any time in FIRST HOUR	YES / NO (please circle)

PLEASE TURN OVER

DIAGNOSTIC DETAILS

Primary diagnosis

Secondary diagnosis

Operative procedure

Co-morbidity

ADMISSION DETAILSWas the child ventilated at any time during ITU admission? YES ☐ NO ☐IF YES, please enter the total number of hours ventilated Did the child receive Inotropes during ITU admission? YES ☐ NO ☐Did the child receive renal support during ITU stay? (Eq: CVVH or PD) YES ☐ NO ☐

Please enter the Maximum Intensive care Dependency Levels for each day of ITU stay: (See explanatory notes for definitions)

ITU day number	Highest Level of Intensive care 1 - 3	ITU day number	Highest Level of Intensive care 1 - 3	ITU day number	Highest Level of Intensive care 1 - 3
1		5		9	
2		6		10	
3		7		11	
4		8		12	

DISCHARGE INFORMATIONWas there a delay in ITU discharge? YES ☐ NO ☐

If YES, why?

Date/Time of Discharge hrs Discharge DESTINATION

Was the patient discussed with BOH PICU at any time? YES ☐ NO ☐**TRANSFER DETAILS** – please complete if child is transferred to another hospitalTransferred by your hospital team? YES ☐ NO ☐ Retrieval by BOH PICU? YES ☐ NO ☐Retrieval by other team? YES ☐ NO ☐ Name of other PICU retrieval team

If YES, was this because:

BOH PICU full? ☐ BOH PICU team unavailable? ☐ BOH PICU team not requested? ☐

Other reason

OUTCOME: ALIVE ☐ DIED ☐ Enter date and time of death:/...../..... hrsMode of Death: Treatment Withdrawn ☐ Treatment Limited ☐ Failed CPR ☐Was there a "Do not Resuscitate" order in place for this patient? YES ☐ NO ☐

Please indicate if any of the following were performed:

Brain Stem Death ☐ Tissue/Organ Donation? ☐ Post Mortem? ☐***** To be signed by a Clinician to verify the patient required high dependency care (form will not be processed unless this section has been signed)**

Signed Date/...../.....

Please ensure that all sections of the form have been completed before return and complete a new form for each admission episode*

DO NOT SEND THIS FORM WITH PATIENT NOTES

THANK YOU FOR YOUR HELP AND CO-OPERATION

Please return all COMPLETED forms to: Jo Linnitt – Regional PICU Audit Co-ordinator, PICU Consultants Office, Royal Hospital for Children, C/O No 2 St Michael's Hill, Bristol, B.52 8B J.

Tel: DDI 0117 342 8843 Mobile: 07980918287 Fax: 0117 342 8910 email: joanne.linnitt@nhs.net

14. APPENDIX C

Level I (incorporating Dept of Health recommendations, 1996)

High Dependency Care requiring nurse to patient Ratio of 0.5:1 (1:1 if in a Cubicle)

Close monitoring and observation required but not requiring acute mechanical ventilation. Examples would also include the recently extubated child who is stable and awaiting transfer to a general ward; the child undergoing close post-operative observation with ECG and pulse oximetry and receiving oxygen. Children requiring long term chronic ventilation (with tracheostomy) are included in this category, as are CPAP and non-invasive ventilation. The dependency of a Level 1 patient increases to Level 2 if the child is nursed in a cubicle.

General Situations:

1. Patients requiring single organ support (excluding advanced respiratory support) – see below.
2. Patients requiring more detailed observation/monitoring than can safely be provided on a general ward.
3. Patients who no longer need intensive care but are not well enough for a general ward.
4. Post-operative patients who need close monitoring for more than a few hours.

Specific single organ support requiring high dependency care:

1 Basic Respiratory Monitoring and Support

- a. The need for more than 40% oxygen via a fixed performance mask.
- b. The possibility of progressive deterioration to the point of needing advanced respiratory support.
- c. The need for physiotherapy to clear secretions at least 2-hourly, whether via a tracheostomy, mini tracheostomy, or in the absence of an artificial airway.
- d. Patients recently extubated after a prolonged period of intubation and mechanical ventilation.
- e. The need for CPAP or non-invasive ventilation.
- f. Patients who are intubated to protect the airway, but needing no ventilatory support and who are otherwise stable.

2 Circulatory Support

- a. The need for vasoactive drugs to support arterial pressure or cardiac output.
- b. Support for circulatory instability due to hypovolaemia from any cause and which is unresponsive to modest volume replacement.
- c. This will include, but not be limited to, post-surgical or gastrointestinal haemorrhage or haemorrhage related to a coagulopathy.
- d. Patients resuscitated following cardiac arrest where intensive or high dependency care is considered appropriate.

3 Neurological Monitoring and Support

- a. Central nervous system depression, from whatever cause, sufficient to prejudice the airway and protective reflexes.
- b. Invasive neurological monitoring.

4 Renal Support

- a. The need for acute renal replacement therapy (haemodialysis, haemofiltration or haemodiafiltration).

Level 2

Intensive Care requiring nurse to patient ratio of 1:1

The child requiring continuous nursing supervision who is usually receiving advanced respiratory support, i.e. intubated and ventilated or receiving BiPAP

Also the unstable non-intubated child, for example some cases with acute upper airway obstruction who may be receiving nebulised adrenaline.

The dependency of a Level 2 patient increases to Level 3 if nursed in a cubicle.

Level 3

Intensive Care requiring nurse to patient ratio of 1.5:1

The child requiring intensive supervision at all times who needs additional complex therapeutic procedures and nursing. For example, unstable ventilated children on vasoactive drugs and inotropic support or with multiple organ failure. The dependency of a Level 3 patient increases to Level 4 if nursed in a cubicle.

Level 4

Intensive care requiring a nurse to patient ratio of 2:1

Children requiring the most intensive interventions such as particularly unstable patients, Level 3 patients managed in a cubicle, those on ECMO, and children undergoing renal replacement therapy

14. APPENDIX D

Responsibilities of the Referring Hospital

This document is extensively based on the National Coordinating Group's ('NCG') report of July 1997 to the Chief Executive of the NHS Executive as well as subsequent advice and recommendations including The acutely or critically sick or injured child in the district general hospital – a team response ("The Tanner Report") from 2006 and most recently in 2010 the Standards for the Care of Critically Ill Children 4th Edition, published by the Paediatric Intensive Care Society.

- **All hospitals receiving acutely ill children should be able to provide Level 1 and initiate Level 2 intensive care, irrespective of whether the child is to be transferred to a 'lead centre PICU' subsequently.** The exact details of the resuscitation and the personnel to be involved are best determined by each hospital according to its own circumstances. The PICU in Bristol is available to advise regarding clinical management on a 24 hour-a-day basis.
- Treatment should follow closely the guidelines of the Resuscitation Council (PALS) or the Advanced Life Support Group (APLS). All hospitals should be able to admit such a child to a critical care area that is suitably equipped with facilities for airway, respiratory and circulatory management, and that has equipment, monitoring and disposables for the full paediatric age range.
- Staffing with respect to both experience and training of the medical and nursing personnel involved, together with the appropriate equipment, should be available to maintain Level 2 intensive care until a retrieval team arrives. Delays in retrieval can arise as a result of time needed to mobilise extra staff, adverse weather & traffic conditions or prior engagement on another retrieval.

Referral

All children admitted as emergencies to intensive care should be discussed with the lead PICU. The need for transfer will depend on the likely duration of the child's stay in ICU and the capability of the hospital to deliver Level 1/2 care. In addition, other considerations may apply; for example, it may not be indicated to move a child who has undergone brain-stem death. **For definitions of levels of care, please see appendix C.**

- Children with Level 1 illness may be managed at the local hospital, at the discretion of the local clinicians. However, it may become necessary to transfer such children if care becomes protracted or if tertiary involvement is required.
- Where appropriate all referring centres may keep children at Level 2 for short term care assuming that the case has been discussed with the lead PICU and there is an agreed plan for management. If, on admission, it is anticipated that the admission will be for more than 24 hours the patient should be referred to the lead PICU.
- All Level 3 cases should be referred.

In all cases, the decision to transfer should be the result of a discussion between the referring and receiving consultants, the basis of which includes an assessment of the risks, benefits and urgency for that individual patient.

Retrieval

- i. If the child is suffering from a **neurosurgical emergency or severe burn** and the neurosurgical / burns unit has requested that the child be transferred, there should be no delay in this being achieved. **The Regional Neurosurgery/Burns guidelines should be followed.**
- ii. If a child is suffering from a general surgical (abdominal) emergency, and the tertiary surgical / PICU teams have requested that the child be transferred, there should be no delay in this being achieved.
- iii. For all other cases, the PICU in Bristol offers a 24hr, 7 day a week retrieval service. If the team is already out, or multiple referrals have been made, it may be necessary to prioritise the retrieval team's activity. In these circumstances:-
 - It may be possible to retrieve on a later shift
 - It would help the system work better if the less urgent cases are discussed with PICU early so that as far as possible transfers occur during daylight hours.
- iv. If no staffed bed is available in Bristol, the PICU staff will provide advice and will help to locate a bed in a neighbouring PICU.

<http://www.swretrieval.nhs.uk/Guidelines/Regional%20Retrieval%20Guideline.doc>

15. ACKNOWLEDGEMENTS

Audit Nurses

Angie Bancosta – Cheltenham
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Amanda Kirkup – Gloucester
Gemma Bick - Gloucester
Suzanne MacKenzie – Gloucester
Mary McDonagh – Bath
Rosie Corbett - Bath
Nancy Brown - Swindon
Sarah Shinn – Frenchay
Nicole Zilm - Frenchay
Emily Selley - Taunton
Debbie Light – Yeovil
Anna Cannon – Yeovil
Silvia Morton - Yeovil
Claire Tanner – North Devon
Karen Jones – North Devon
Lisa Wilkie – Exeter
Louise Knapman - Exeter
Sandy Discombe - Torbay
Kim Wilkins – Torbay
Alison Emmett – Derriford
Heidi Pearson – Derriford
Annie Maddox – Truro
Dani Walkie – Truro
Elicia James – Weston

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Dr Sue Smith - Cheltenham
Dr Lyda Jadresic - Gloucester
Dr Sue Matthai - Gloucester
Dr Steve Twigg - Gloucester
Dr Steve Jones – Bath
Dr Andy Padkin - Bath
Bev Boyd - Bath
Dr Janet King - Swindon
Dr Renu Arya – Swindon
Jo Smith - Swindon
Dr Amber Young – Frenchay
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Dr Neil Archer – Taunton
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Allison Bellamy – Taunton
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Dr Matthew Wooton – Yeovil
Dr Michael Fernando - Yeovil
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Anita Chin – North Devon
Dr Patrick Oades – Exeter
Dr Nigel Osborne – Exeter
Dr David Bartle - Exeter
Dr Clive Sainsbury – Torbay
Dr Richard Tozer
Dr Jonathan Ingham – Torbay
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Dr Alan Cade – Derriford
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