

Use of Continuous Renal Replacement Therapy by Paediatric Intensive Care Units in the UK and the Republic of Ireland

PICANET Renal Custom Audit

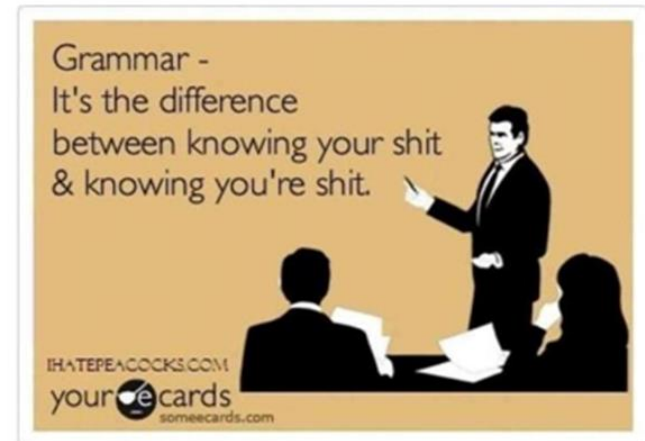
Introduction

Paediatric Intensive Care Audit Network **PICA**
University of Leeds
University of Leicester
'A framework for the future'
Net

Paediatric Continuous Renal Replacement Therapy Database UK

Claire Westrope
PICANET Annual Meeting
18th October 2012

Does PCRRT work?





Renal Replacement Therapy in the Critically Ill Child

Westrope C, Fleming S, Kapetanstrataki M,
Parslow RC, Morris KP

PCCM 2018, Mar 19 (3) 210-2107

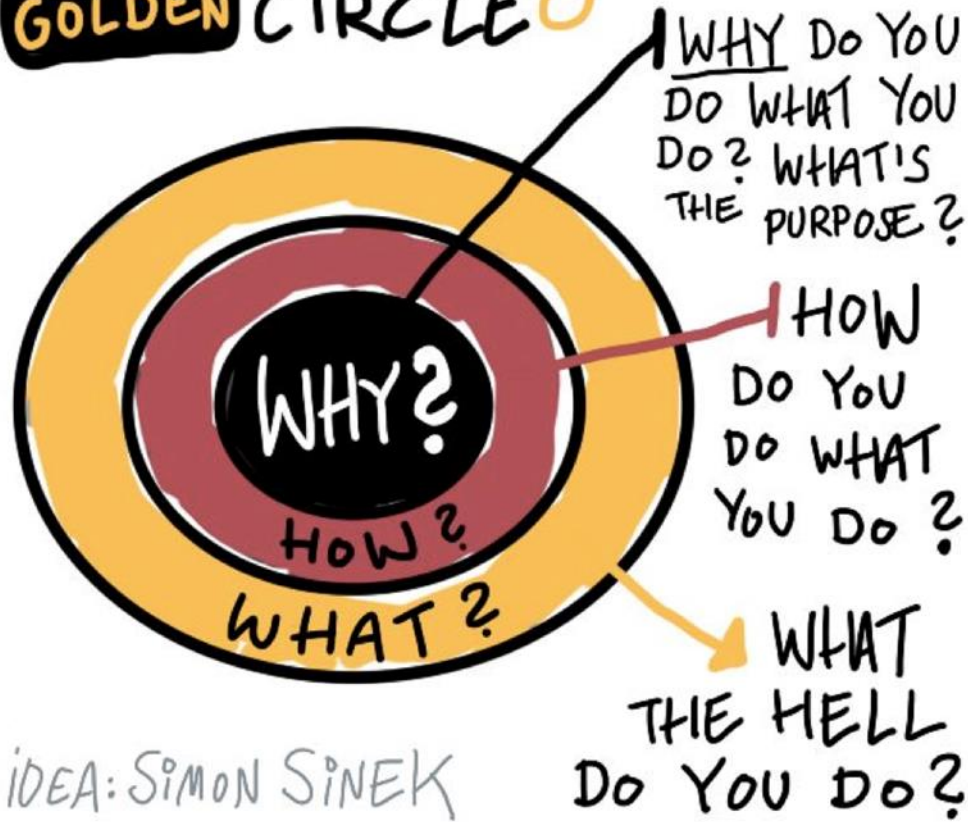
130,000 UK PICU Admissions, 3825 patients had RRT

Prevalence 3%

Overall Mortality 25%

Mortality associated with Age <1 yr, mode of RRT, Duration RRT and primary diagnosis

GOLDEN CIRCLE

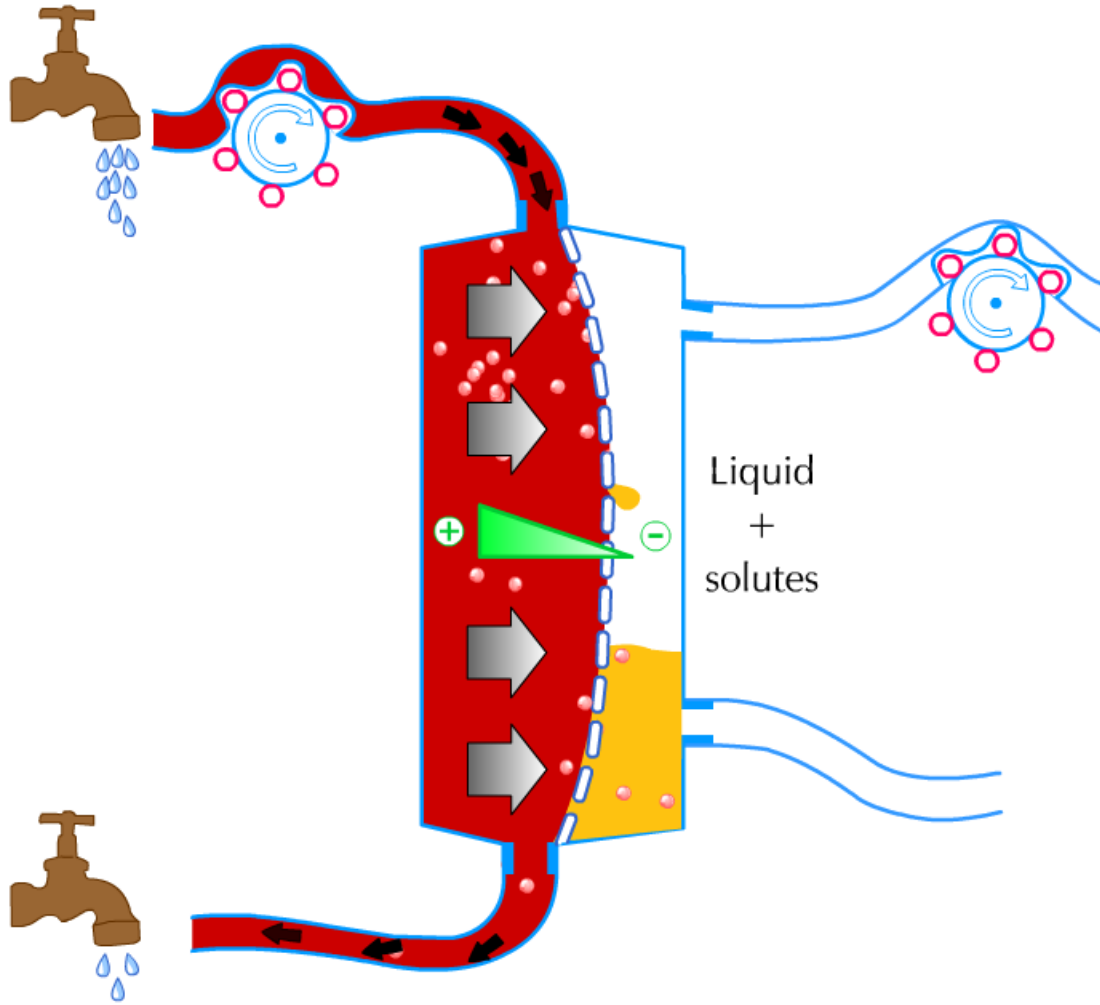


IDEA: SIMON SINEK

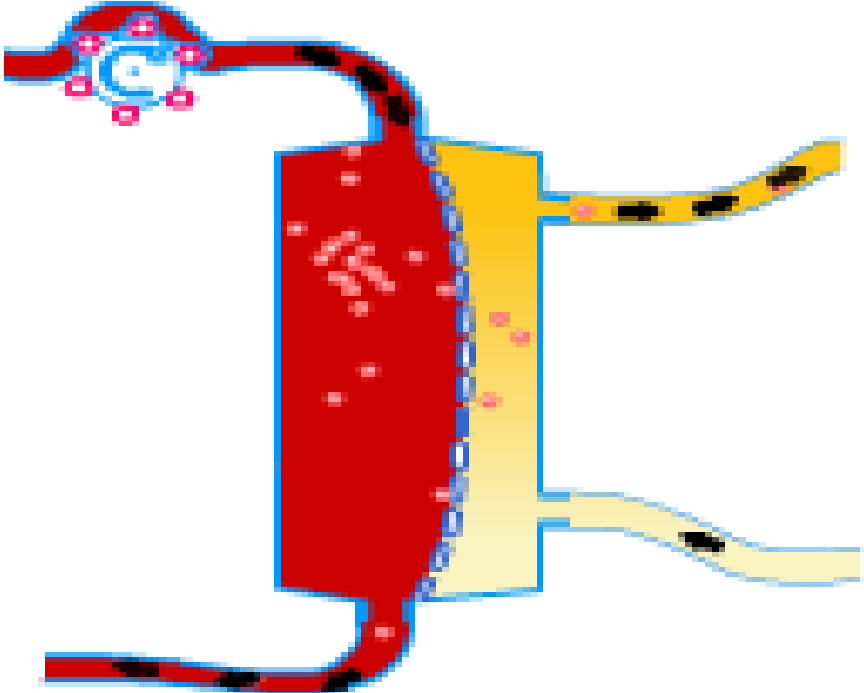
Terminology

- RRT
 - Intermittent/continuous
- ‘Continuous RRT’
 - PD
 - Extracorporeal CRRT (CVVH/CVVHD/CVVHDF)
- ‘CRRT’ Continuous Renal Replacement Therapy
 - Extracorporeal ‘continuous RRT’

CONVECTION



DIFFUSION



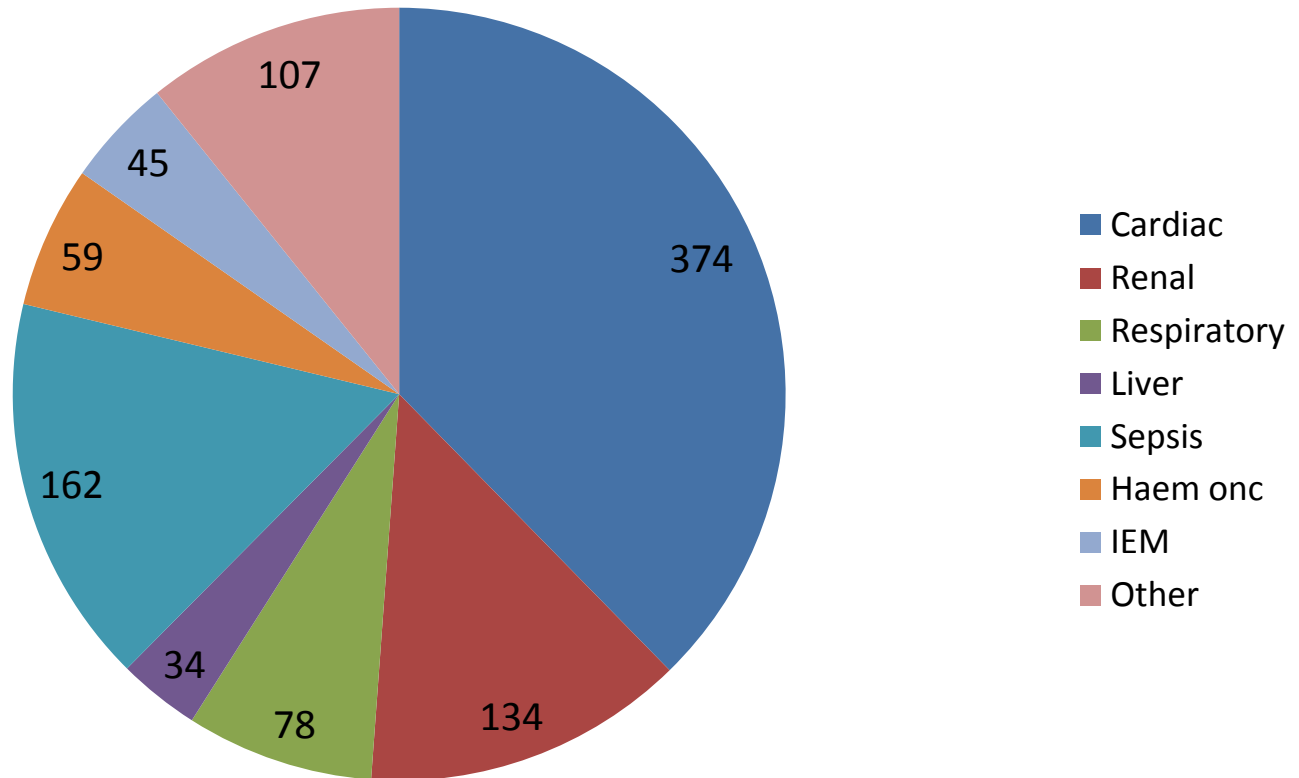
Results

- Voluntary Audit
- Data collection commenced in 2014
- 21/32 UK PICU's
- Dataset frozen 25/10/2018
- Corrected for data input anomalies
- Data on 996 episodes continuous RRT,
715/996 CRRT

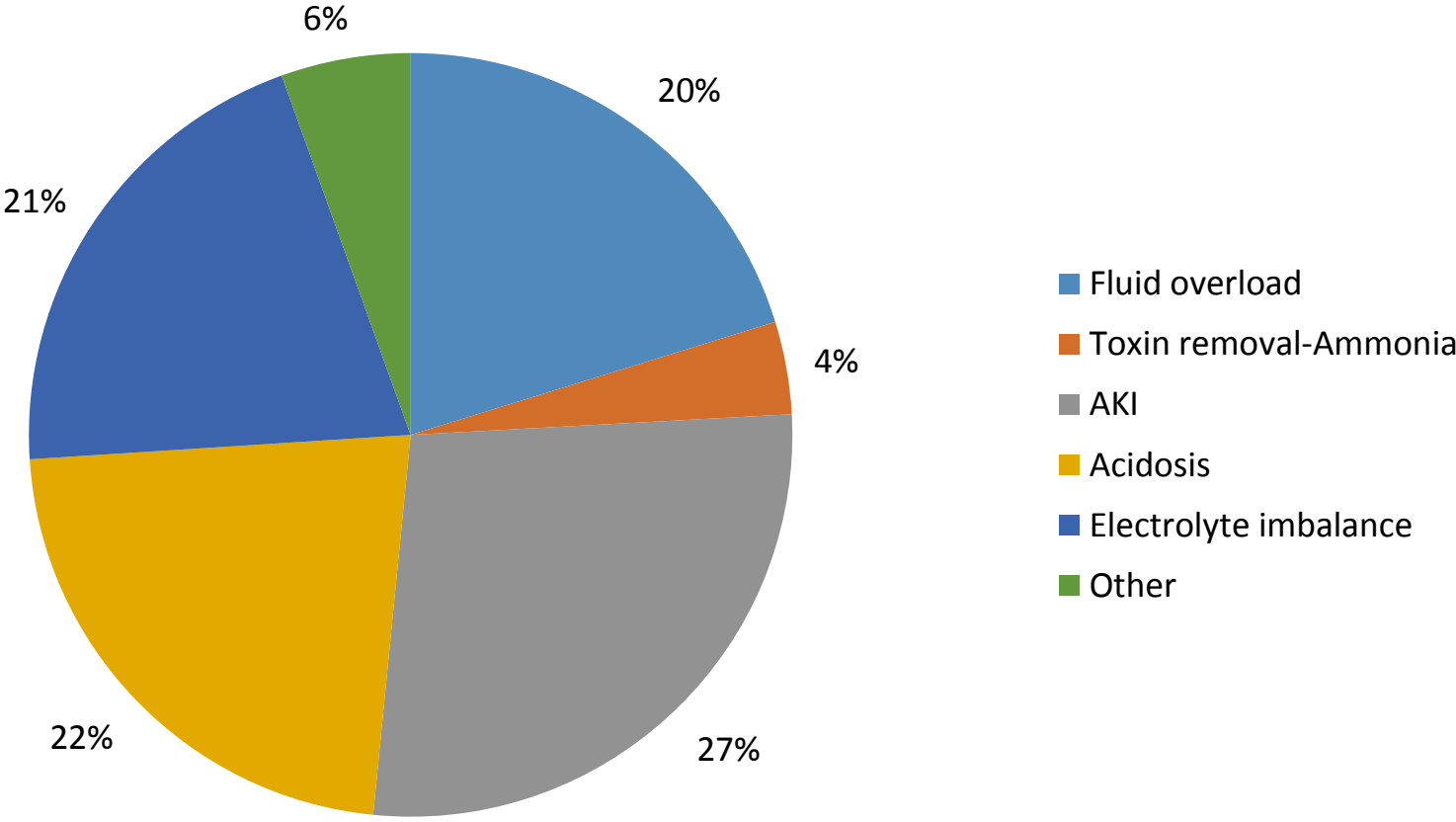
Results

- Neonates
- Infant
- Older
- Weight range 1.68-104kg

Admission Diagnoses



CRRT Indication



CRRT modality

- 21 centres
 - 14 predominantly CVVH
 - 4 predominately CVVHDF
 - 1 predominately CVVHD
 - 2 half/half CVVH/CVVHDF

CRRT Modality

CRRT type	Age			Total
	Neonate	Infant	Older	
CVVH only	79 58.52	82 76.64	347 73.36	508 71.05
CVVHD only	7 5.19	8 7.48	8 1.69	23 3.22
CVVHDF only	37 27.41	10 9.35	82 17.34	129 18.04
CVVH & CVVHD	0 0.00	1 0.93	0 0.00	1 0.14
CVVH & CVVDF	10 7.41	6 5.61	34 7.19	50 6.99
CVVHD & CVVHDF	0 0.00	0 0.00	2 0.42	2 0.28
CVVH & CVVHD & CVVHDF	2 1.48	0 0.00	0 0.00	2 0.28
Total	135 100.00	107 100.00	473 100.00	715 100.00

Dose

ownerorg	admissions	medcvvhbloodweight ml/min/kg	iqrcvvhbloodweight	medcvvhultraweight ml/hr/kg	iqrcvvhultraweight
PIC001	129	7	5.14-10	30	10-100
PIC003	6	6	4-7.69	29	28.57-28.57
PIC005	12	8	4.9-8.63	26	21.43-30
PIC008	30	9	6.67-10.34	31	29.66-36.94
PIC009	1	3	2.7-2.7	27	27.03-27.03
PIC011	110	8	5.71-12.71	77	54.01-109.88
PIC014	11	9	8.93-8.93	6	3.57-13.53
PIC015	3	4	3.14-4.83	4	2.29-5.2
PIC021	2		.-.		.-.
PIC022	38	6	5.83-6.31	35	34.55-35
PIC023	17	6	3.89-7.61	30	30-30.33
PIC024	2	8	4.81-10.24	35	34.94-34.94
PIC026	53	5	3.69-5.56	35	31.58-37.04
PIC029	4	7	5.12-8.36	31	25.22-32.2
PIC031	5	4	4.41-5	32	29.09-35
PIC034	15	6	5.36-7.5	40	32.85-55.56
PIC035	51	6	4.83-6.4	37	34.59-42.39
PIC036	18	6	5.61-6.43	10	3.04-21.35
PIC039	54	5	4.05-8.06	48	33.96-64.98

CVVH Dose

- Median blood flow (Q_b) (ml/kg/min)
 - 6.1 (IQR 5-8.9)
- Median UF rate (Q_f) (ml/kg/hr)
 - 36 (30-63.7)

CVVH Dose

	admissions	medcvvhbloodweight	iqrcvvhbloodweight	medcvvhultraweight	iqrcvvhultraweight
Neonate	91	13	9.66-16.4	38	29.63-128.57
Infant	89	9	6.95-11.5	38	30.61-76.27
Older	381	6	4.37-6.67	35	30.05-54.8

CVVH Dose

diaggroup	admissions	medcvvhbloodweight	iqrcvvhbloodweight	medcvvhultraweight	iqrcvvhultraweight
Cardiac	125	7	4.81-10	35	26.79-50
Renal	85	6	5-8.33	37	30.24-75
Respiratory	54	8	5.3-9.09	41	30-62.98
Liver	28	7	5.08-10	55	14.41-111.81
Sepsis	125	6	5-7.5	37	34.29-52.63
Haem/Onc	46	6	5.14-7.27	35	28.51-69.05
IEM	28	9	5-16.67	105	31.79-220
Other	68	6	4.4-9.52	35	30-54.55
Missing	2	4	2.95-5.71	36	34.81-36.79

CVVHDF Dose

- Median blood flow (Q_b)(ml/kg/min)
 - 7 (IQR 5.2-10)
- Median UF rate (Q_f) (ml/kg/hr)
 - 34 (30-50)
- Median Dialysate rate (Q_d) (ml/kg/hr)
 - 27 (20-43)

CVVHDF Dose

agevar	admissions	Medcvvhdf Qb/Kg	Iqrcvvhdf Qb/Kg	Medcvvhdf Qf/kg	Iqrcvvhdf Qf/Kg	Medcvvhdf Qd/Kg	Iqrcvvhdf Qd/Kg
Neonate	49	12	10-16.67	41	32.26-57.14	33	25-57.14
Infant	16	9	7-10	30	29.29-34.69	25	20-50
Older	118	6	4.44-7.41	32	28.18-50	21	19.7-40

CVVHDF Dose

diaggroup	n	Medcvvhdf Qb/Kg	Iqrcvvhdf Qb/Kg	Medcvvhdf Qf/kg	Iqrcvvhdf Qf/Kg	Medcvvhdf Qd/Kg	Iqrcvvhdf Qd/Kg
Cardiac	20	8	6.08-10.51	29	6.67-37.96	21	6.61-50
Renal	21	6	4.76-6.9	31	26.68-34.64	22	19.21-56.43
Respiratory	19	9	8.11-11.11	37	30.77-46.88	23	19.76-46.88
Liver	3	20	14.29-56.67	62	57.04-67.86	54	37.04-71.43
Sepsis	42	7	6-9	32	26.99-47.06	33	20.23-40.37
Haem/Onc	15	5	4.69-6.88	30	24.2-31.41	20	19.61-23.81
IEM	23	10	6.5-14.29	48	32.35-85.71	38	22.5-57.14
Other	39	6	3.98-9	39	30-50	23	20-40

Outcomes

- Survival to PICU discharge (CRRT)
 - 69%

Age Group	n	Survival % (n)
Neonate	134	50 (67)
Infant	106	64 (68)
Older	468	74 (344)

Outcomes

Admission Diagnosis	n	Survival % (n)
Cardiac	151	65 (98)
Renal	102	91 (93)
Respiratory	70	64 (45)
Liver	32	56 (18)
Sepsis	157	65 (102)
Haem/Onc	59	59 (35)
IEM	45	73 (33)
Other	97	73 (71)

Influencing factors

- Early initiation associated with survival?

PICU Discharge Status	n	Median Time PICU admission to CRRT Initiation (hrs)	IQR
Alive	446	13.7	4.5-48
Dead	192	26.8	8.3-103

Influencing factors

- %FO at CRRT initiation associated with survival and need for ongoing RRT?

RRT Status at PICU Discharge	Age Group	Median %FO	IQR
No RRT – patient discharged alive	Neonate	2.8	0.74-5.4
No RRT – patient died	Neonate	10.1	2.4-18.9
Ongoing RRT-Peritoneal dialysis	Neonate	22.0	0.9-43
Ongoing RRT-Intermittent haemodialysis	Neonate	13.6	13.6-13.6
Ongoing RRT-other (specify)	Neonate	12.3	8.2-16.4
No RRT – patient discharged alive	Infant	6.9	3.5-17
No RRT – patient died	Infant	9.4	3.3-21.4
Ongoing RRT-Peritoneal dialysis	Infant	24.5	0.6-48
Ongoing RRT-Intermittent haemodialysis	Infant	2.7	2.4-3.2
Ongoing RRT-other (specify)	Infant	1.1	0.2-2.3
No RRT – patient discharged alive	Older	3.4	0.7-8.7
No RRT – patient died	Older	6.9	3.3-10
Ongoing RRT-Peritoneal dialysis	Older	1.7	0-2.4
Ongoing RRT-Intermittent haemodialysis	Older	2.4	0.3-5.5
Ongoing RRT-other (specify)	Older	4.2	0.7-11

Influencing factors

- 106 (24%) survivors 'Ongoing RRT' at PICU discharge
 - Ongoing RRT Peritoneal Dialysis n=21 (20%)
 - Ongoing RRT Intermittent HD n=67 (63%)
 - Ongoing RRT Other n=18 (17%)

Influencing factors

- Ongoing RRT status at PICU Discharge

Age Group	Survivors	Ongoing RRT n (%)
Neonate	67	8 (12)
Infant	68	14 (20)
Older	344	94 (27)

Diagnosis	Survivors	Ongoing RRT n (%)
Cardiac	79	12 (15)
Renal	84	44 (52)
Respiratory	46	12 (26)
Liver	17	5 (29)
Sepsis	87	10 (11)
Haem/Onc	32	8 (25)
IEM	31	4 (13)
Other	63	14 (22)

Influencing factors

- PIM2 score by indication of RRT (used pim2r2017- the recalibrated pim2 in 2017)

indirrt	pim2group					Total
	<1%	1-<5%	5-<15%	15-<30%	30%+	
Fluid overload	11 7.64	70 48.61	39 27.08	16 11.11	8 5.56	144 100.00
Toxin removal-Ammonia	0 0.00	9 52.94	7 41.18	1 5.88	0 0.00	17 100.00
AKI	22 10.95	100 49.75	60 29.85	18 8.96	1 0.50	201 100.00
Acidosis	8 4.88	74 45.12	47 28.66	19 11.59	16 9.76	164 100.00
Electrolyte imbalance	8 5.13	73 46.79	53 33.97	14 8.97	8 5.13	156 100.00
Other	1 3.03	16 48.48	12 36.36	3 9.09	1 3.03	33 100.00
Total	50 6.99	342 47.83	218 30.49	71 9.93	34 4.76	715 100.00

What next?

- More analysis of this data, with best practice recommendations
- Daily Data
- IKID
- RCT?

THANKS A
MILLION
SQUILLION
BAJILLION

More data

