

Background

- Patient safety is of paramount importance in organised healthcare
- Data from the general population suggests preventable deaths occur in 4.1-6.0% of all admissions to general hospitals
- Despite the additional complex care needs of patients on renal replacement therapy (RRT), it has been reported that only a minority of preventable deaths are directly related to the RRT process
- Reflective practice is one recognised tool to improve patient safety

Aims

- Describe the incidence of death with clinical concern contributing to or causing death in the Scottish RRT population
- Describe themes responsible for those deaths with clinical concern
- Describe actions taken to prevent recurrence via specific examples

Method

- The Scottish Renal Registry collects mortality data as part of the Scottish Mortality Audit in Renal Replacement Therapy (SMARRT)
- In addition to clinical and demographic data, the patients' clinical team are asked to categorise each death on a scale from 1-5 according to the presence or absence of clinical concern at death
- Data from categories 4 & 5 – those where a concern *contributed to or caused* death - were further examined through a review of case notes, records of mortality meetings, procurator fiscal reports or significant event analyses.
- Annual incidence and cases per unit were calculated. Recurrent themes were identified and demographics compared.
- Currently, all Scottish renal units reflect on deaths at mortality meetings. For 2013, we present cases resulting in formal investigation

Results

- Between 2008 and 2013 there were 2614 death in patients receiving renal replacement therapy.
- Areas of clinical concern were reported in 100 cases, representing 3.2-4.2% of deaths per annum
- Inter-unit variation ranged from 0.5-6.5% of all deaths/unit (Fig. 1)

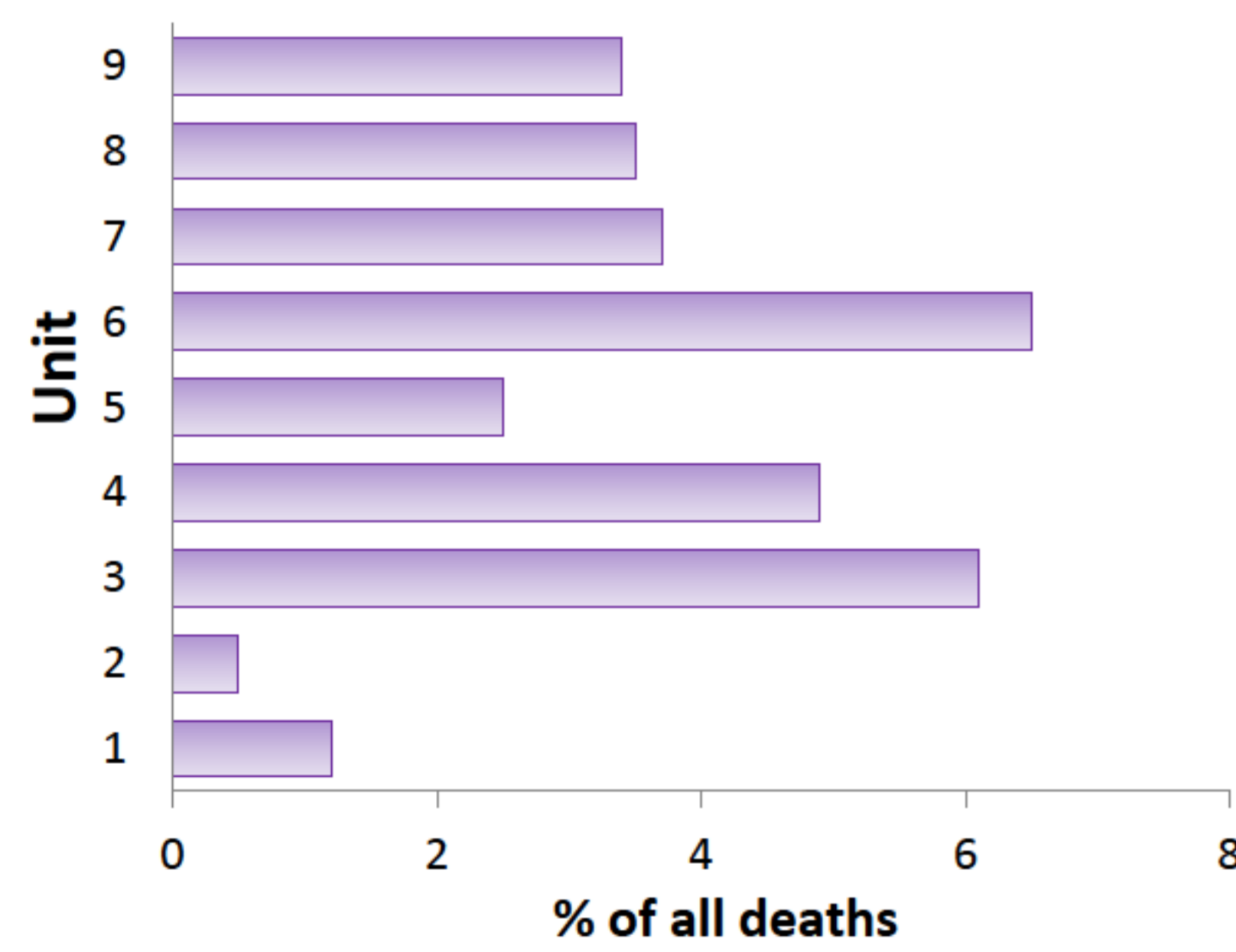


Fig. 1 Inter-unit variation

- Recurrent common themes emerged: Infection (30), Systems of Care (26), Prescribing (13), Interventions (11), Vascular Access (11), Hyperkalaemia (6) and Other (3) (Fig. 2)
- Demographics are compared in table 1
- The hyperkalaemia cohort were significantly younger compared to all others

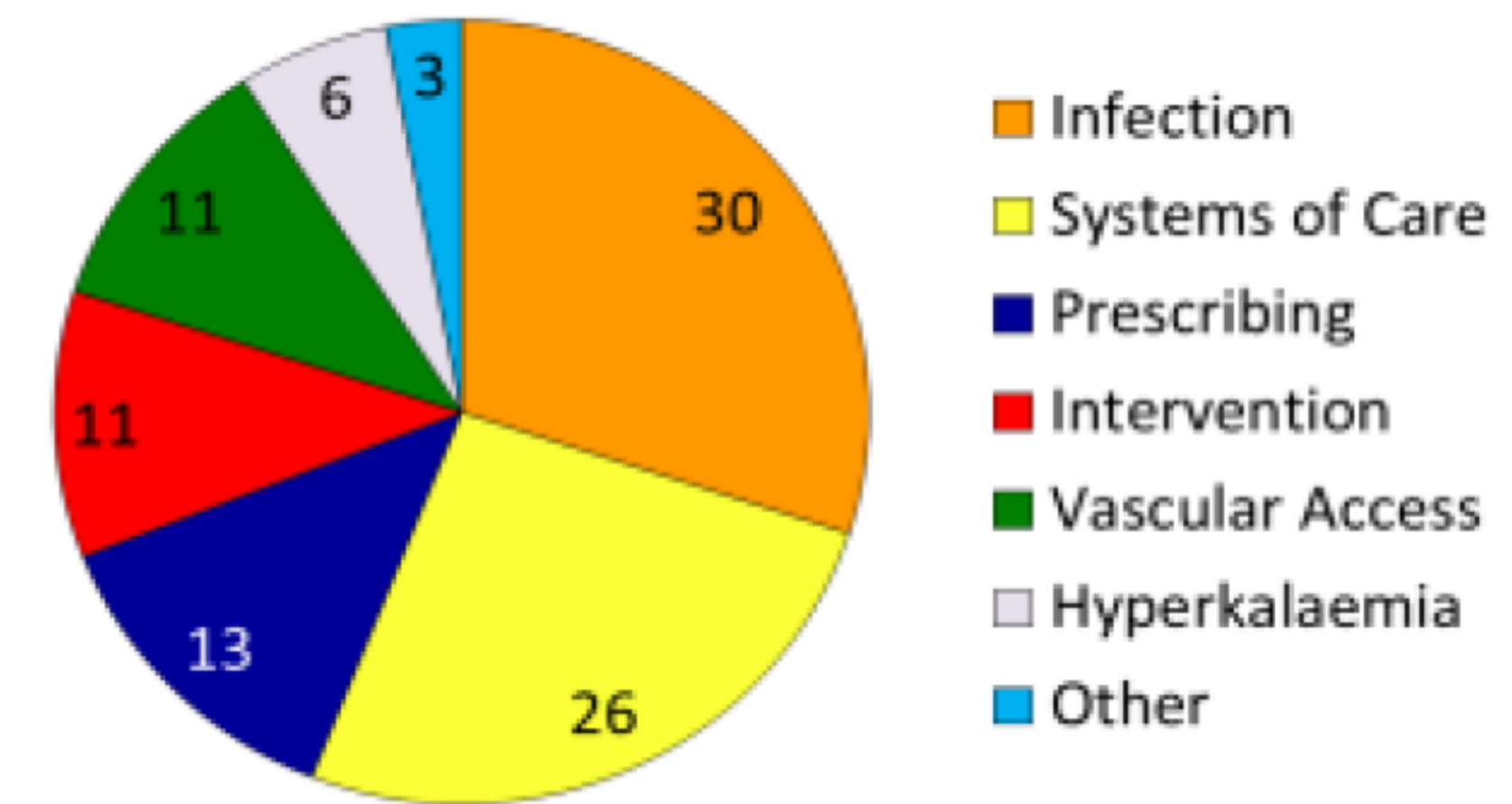


Fig. 2 Themes

- In 2013 there were 5 category 5 and 13 category 4 deaths
- Two category 5 deaths generated local Significant Event Analysis (SEA) reports
- Two category 4 deaths generated a local SEA report, 1 was investigated by the procurator fiscal and it is unknown if further investigation was taken on 2 other cases
- None of the remaining cases generated formal reports
- The action taken following investigation is shown (table 2)

Concern	Response
Category 4	
Patient with PD related peritonitis admitted to hospital without inpatient renal cover. Deemed fit to transfer by referring team. Deteriorated in transit, developing septic shock. Death on arrival.	Significant Event Analysis Production of new guideline on assessment of fitness to transfer
Patient on HD who underwent dialysis out-of-hours. Dialysis needle dislodgement led to significant blood loss. Deterioration and death followed despite prompt resuscitation.	Significant Event Analysis Re-education for medical & nursing staff of existing policy for out of hours dialysis.
Patient on HD who underwent a thoracoscopy, complicated by an arterial bleed requiring embolisation. Re-admitted with confusion and sepsis. Discovered deceased on morning round.	Procurator fiscal investigation Post-mortem clarified cause of death as bronchopneumonia following intervention.
Category 5	
Patient on HD with infected diabetic foot ulcer. Managed on general medical ward. Dialysis TCVC used for insulin infusion, resulting in life-threatening bleed, cardiac arrest and death.	Significant Event Analysis Feedback and education provided to unit involved
Patient on HD with poor compliance, attended A&E with hyperkalaemia. Cardiac arrest and death prior to commencing dialysis.	Significant Event Analysis Production of new guideline on managing hyperkalaemia in A&E

Table 2 Formal investigation and response

Discussion

- Death with areas of clinical concern accounts for 3.8% of all deaths in a 6 year period
- Inter-unit variation highlights a subjective nature of this reporting
- Formal investigation was deemed necessary in a minority of cases (27.8% in 2013) and identified themes common to general patient care (e.g. initial assessment, patient transfer and complications following interventions) and not those specific to the routine process of RRT
- Sharing the identified causes and solutions to potentially avoidable harm is the start to improving patient safety within renal services and beyond

	Infection	Systems	Prescribing	Intervention	Vascular Access	High K ⁺	Other	p-value	
	Category 1-3								
	Category 4 & 5								
Age (median, years)	71	68	68	61	65	73	33	62	<0.001
Female % (n)	41 (1030)	53.3 (16)	38.5 (10)	23.1 (3)	36.4 (4)	27.3 (3)	33.3 (2)	66.7 (2)	0.587
RRT modality %									
HD (n)	79.3 (1994)	83.3 (25)	61.5 (16)	69.2 (9)	63.6 (7)	100 (11)	83.3 (5)	100 (3)	0.342
PD (n)	6.2 (157)	0	19.2 (5)	15.4 (2)	0	0	16.7 (1)	0	
Transplant (n)	14.1 (355)	16.7 (5)	19.2 (5)	15.4 (2)	36.4 (4)	0	0	0	
Duration of RRT (median, days)	1357	545	911	780	1438	1351	1856	2359	0.96

Table 1 Demographics by theme