

Functionality of Renal computer systems

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Background

Within the renal community there is great pride in the way clinical IT systems have been developed to support the care of patients with chronic kidney disease. Despite the most common system now being a “legacy” system with a text based interface this continues to be developed by units whilst waiting for new IT developments. Some units have successfully secured funding for new renal IT systems which have been developed specifically for the care of patients with CKD. These universally differ from generic “PAS” systems as they contain a multitude of functions essential to patient care, not present in any current generic hospital IT system.

Aim

The aim of the survey was to document the current functionality of Renal unit IT systems. It was hoped that this information could be used to promote further opportunities for development of IT systems to support patient care. It was also intended to counter the belief that current generic PAS systems could provide this functionality.

Methods

A 83 item questionnaire was developed and piloted in six centres known to have an interest in clinical IT, and with a wide range of functionality. This questionnaire was then sent by Email to the Clinical Directors of all the UK Renal Units, and separately to the system managers of the UK Proton users via their user group and to other suppliers of EPRs used by renal units at the end of January 2006. Responses were collected until the 15 March 2006. A few more key respondents are being pursued, including some paediatric centres.

Results

Responses were received from 41 units in the UK (31 of 52 English and Welsh Adult units described in the 2004 UK Registry report as having computer systems, 6 of 7 units from Scotland, and 2 units from Northern Ireland). 16 units used Proton (CCL), 4 Mediqual, 1 Kings system, 1 ClinicalVision (CCL), 1 "other". The remaining units did not fill in their system type. Responses were received from three Paediatric renal units (all Proton).

Crude range of functionality ranged between zero (one unit in Scotland with no IT system), to 83% of functions (figure1). A summary of the questions and the proportion of responses is attached (table1)

Conclusions

Only a tiny minority of UK Renal Units are now without a clinical IT system. For all the rest there is an impressive range of IT functionality directly supporting patient care, providing data for comparative audit, and to enable effective commissioning and charging for renal care. Basic demographics are present in almost all systems, but other systems include complex decision support, and the storage and retrieval of a vast array of data important to patient care. At some sites systems it is reasonable to claim that this has developed into a functional electronic patient record, and in many units has surpassed the paper clinical record if not yet entirely replaced it.

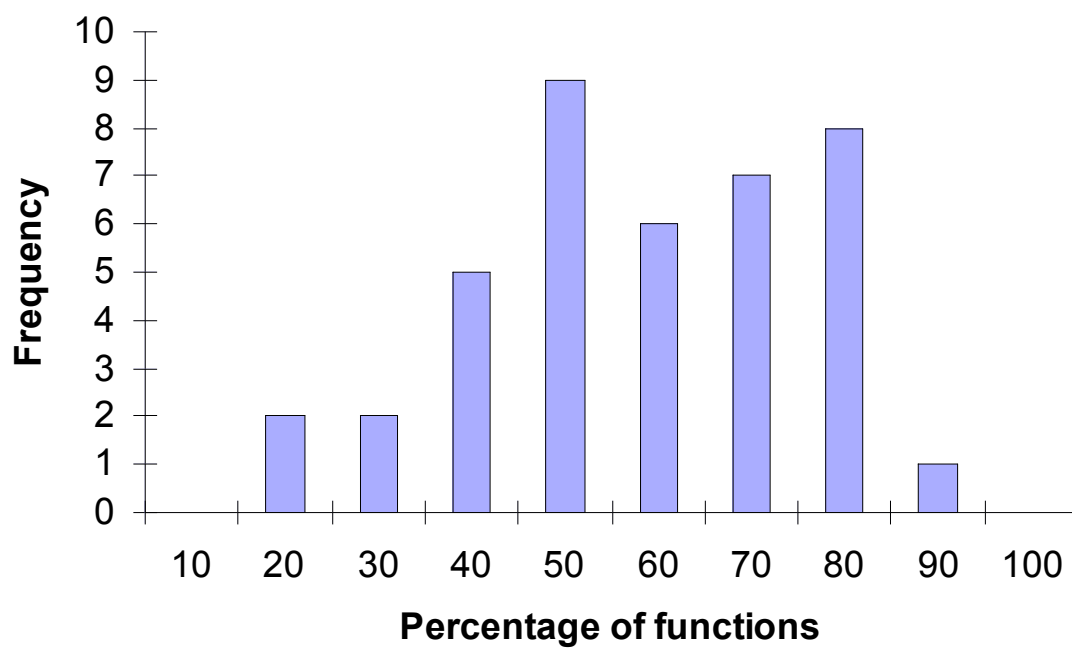


Figure 1: Proportion of functions reported by renal units as present in their Clinical IT systems

Table 1
Proportion of responses by renal units for each function

	Yes	No	% Yes
Demographic Data			
Name & Address	41	0	100
Unique identifiers for different hospital systems, renal registry, UKT	39	2	95
Flags for basis clinical states; RRT modality/care centre, Risk of infection, diabetes	39	1	98
Cause of ERF	41	0	100
Co morbid conditions and associated procedures	35	3	92
Cause of death	38	1	97
Current and all previous modalities of RRT with dates and locations	41	0	100
Clinical Contacts			
Serial data on all clinical contacts (clinic visits, home visits, home assessments, in-patient episodes, telephone calls)	31	8	79
Preliminary discharge summary generation	18	19	49
Results			
Lab interface	39	2	95
User configurable lab interfaces	32	6	84
Tabular display of results; biochemistry, haematology, microbiology	41	0	100
Tabular display of tests for which text report available; radiology, histopathology	14	27	34
Linear regression of GFR with estimated time to RRT with confidence intervals	11	30	27
Transfusion Record	24	13	65
Graphical display of result trends	36	5	88
Advanced Graphics	6	31	16
Link to 24 hour BP machine	2	39	5
Monitoring of test cycles (e.g HbS, MSUs)	10	28	26
Order communications system (OCS)	6	35	15
Biometric Data			
Serial record of height, weight, blood pressure from all clinical contacts. MAC, TSF, and calculated BMI and BSA.	31	10	76
Transplantation			
Transplant status; current and previous transplant suitability and stages of assessment with justification on decisions.	32	9	78
Status of available (or no-available) live transplant donors	16	24	40
Blood Group, Tissue type, Viral antibody status	34	7	83
Details of patient registration with UKT (acceptable and unacceptable antigens, matchgrade, waiting time, points scores for age, sensitisation, wait)	20	21	49
Haemodialysis			
Record of current haemodialysis prescription	36	5	88
Record of dialysis sessions delivered including the dialysis dose, location, delays.	35	6	85

Urea reduction ratio for all appropriate pre and post dialysis urea results	35	5	88
Single pool KT/V for individual patients if required	30	9	77
Record of current and previous dialysis access (fistula, central lines)	29	12	71
Line sepsis episodes	22	19	54
Direct link to HD machines	9	31	23
Haemodialysis appointments diary by patient, dialysis station or dialysis shift	9	30	23
Symptom and Intervention scoring and reporting (HD)	8	31	21
Peritoneal Dialysis			
Current dialysis regimen	32	8	80
Record of current dialysis adequacy and peritoneum characteristics	32	8	80
Full UKM modelling, PET calculation, and change in dialysis regimen modelling	14	26	35
Peritonitis and exit site infection history	36	3	92
Audit			
Record of all invasive procedures (line insertion, renal biopsy) with clinical context, procedure and operator details, success and complications.	21	20	51
Extraction of Summary statistics including graphical format for compliance with Renal Association standards amongst others	25	16	61
Other secondary data uses			
Identification of clinician at clinic visit	17	23	43
Report of individual clinician's activity for CPD/CVs	7	33	18
Scheduling, careplans			
Diary systems for OPD	8	32	20
Standardisation of treatment work sheets (HD)	17	23	43
Customised OPD work sheets	12	28	30
Commissioning			
Record of dialysis modality, and primary care physician details	40	1	98
Customised contract information (e.g ARF)	18	18	50
Clinical Notes and Letters			
Notes of all home nurse visits, nurse clinic and dietetic attendances	23	18	56
All outgoing clinical correspondence stored by clinical contact type	21	20	51
User configurable results in letters	26	15	63
Incoming correspondence stored	3	38	7
Store and retrieve images attached to database	9	32	22
Medication			
Serial record of all medication	32	9	78
Record of drug allergy with warnings of drug allergy based on drug name and drug class	21	20	51
Prescription generation for pharmacy and by modality	16	24	40
Graphics for immunosuppression doses	4	34	11
Summaries of information on single screens	4	0	100
Haemoglobin, Iron status, CRP, PTH, EPO dose, Iron doses)	25	16	61

Pre-dialysis care (Hb, GFR, HepB status, access and access plan, cadaver and live donor transplant plan)	22	19	54
Instruction on which tests required based on clinical status (eg CKD4, HD, PD) and when test last performed	8	32	20
INR, Hb, previous warfarin dose to aid dosing	13	28	32
Ability to calculate derived variable from different screens eg combine Ht, Wt to calculate BSA and use this in PD adequacy. Calculation.	30	11	73
Decision Support			
Help files	13	28	32
Doctor's Handbook on line	9	30	23
Electronic guidelines (Hepatitis vaccination advice based on vaccination history, antibody and antigen status)	9	32	22
Cardiovascular risk assessment based on stored variables (age, DM, BP, cholesterol, smoking history)	3	38	7
Prompts and reminders	17	23	43
Integration with clinical protocols (Lemniscate) for LRD and T/P screening and workup	3	36	8
Post clinic results reporting (by clinician)	8	29	22
Full anaemia management algorithms	8	33	20
Computerised prompts for clinical action	9	29	24
Summary Documents			
Exception reports of all type (transplant status, incomplete data, lab values out of range)	18	23	44
Automatic user configurable exception reporting	14	27	34
Production of weekly business meeting report summarising: eg High [K]recent deaths (for an M&M meeting)Letters outstanding following recent admissions, eGFR below a threshold with no RRT pans recorded Patients for discussion - our informal Crit incident reporting Review of patients on RRT who do not have a Tx status recoded.	13	28	32
IT strengths			
Expert system support	28	9	76
Flexible enquiry language	32	8	80
Wireless technology on wards	22	19	54
"Off-line" version of database for use on community visits with full read-write and straightforward synchronisation with main database on return to main site (Project-A).	5	36	12
Method of retrieving data in a stand alone back up system (in the event of a power or communication failure)	13	24	35
Download data to registry send list of patients to labs	38	2	95
Multiple indexes - allows patient select by: Name, DoB, Post Code, any Diagnosis or procedure, In patient location, out patient location, date of next OP appt, Sex ...	32	9	78
Extensive use of linked entities - linked data bases = look up tables. e.g. Enteral nutrition, Staff, dialysers, Drugs,	14	27	34

Indefinite retention of records for future audit, research, teaching and service planning.	40	1	98
Search system by any word, text or coded item	27	14	66
Audit trail of data altered	25	13	66
Audit trail of data viewed	5	34	13
"Roll Back" backup system	22	16	58
Other			
Support of remote satellites/clinics	29	9	76
Support of clinical trials	23	15	61