

CHAPTER 11

Haemodialysis Practices

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SECTION 11.1: VASCULAR ACCESS AND ITS COMPLICATIONS

The proportion of patients undergoing haemodialysis (HD) using a fistula has consistently and gradually reducing for the past 10 years. It was 90.8% in year 2007 and was only 85.0% in year 2016. This is most likely caused by a significant proportion of incident dialysis cases did not have a functioning fistula upon initiation of HD and the increasing elderly and diabetic patients with no vascular access dialyzing with dialysis catheter.

The development of interventional nephrology has brought to an increase in patients undergoing HD via a cuffed- HD catheter and non cuff catheter. In fact, the number of patients undergoing HD via cuffed- HD catheters is very near to the number of patients using non-cuffed HD catheter nationwide.

Table 11.1.1: Vascular access on haemodialysis, 2007-2016

Access types	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
Wrist AVF*	8308	64.3	9493	61.5	10667	59.7	11182	57.3	12341	55.6
BCF*	3421	26.5	4403	28.5	5246	29.3	6122	31.4	7253	32.7
BBF*	0	0.0	70	0.5	133	0.7	191	1.0	295	1.3
Graft	341	2.6	479	3.1	466	2.6	495	2.5	492	2.2
HD Catheter -cuffed	261	2.0	298	1.9	464	2.6	515	2.6	571	2.6
HD Catheter -Non Cuffed	582	4.5	687	4.5	901	5.0	1006	5.2	1245	5.6
Total	12913	100.0	15430	100.0	17877	100.0	19511	100.0	22197	100.0

Access types	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
Wrist AVF*	13418	52.8	14705	51.2	15811	49.1	16445	47.1	17008	45.1
BCF*	8823	34.7	10118	35.2	11459	35.6	12850	36.8	14114	37.5
BBF*	395	1.6	553	1.9	689	2.1	821	2.3	886	2.4
Graft	519	2.0	545	1.9	577	1.8	559	1.6	517	1.4
HD Catheter -cuffed	947	3.7	1241	4.3	1728	5.4	2000	5.7	2539	6.7
HD Catheter -Non Cuffed	1306	5.1	1581	5.5	1931	6.0	2264	6.5	2613	6.9
Total	25408	100.0	28743	100.0	32195	100.0	34939	100.0	37677	100.0

*AVF = arteriovenous fistula, BBF = Brachiobasilic fistula, BCF = brachiocephalic fistula

No increase in difficulties was reported with vascular access.

Table 11.1.2: Difficulties report with vascular access, 2007-2016

Access difficulty	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
Difficulty with needle placement	478	3.8	417	2.8	523	3.0	557	2.9	473	2.2
Difficulty in obtaining desired blood flow rate	368	2.9	420	2.8	473	2.7	438	2.3	489	2.2
Other difficulties	57	0.5	81	0.5	101	0.6	79	0.4	72	0.3
No difficulties	11576	92.8	14079	93.9	16488	93.8	18141	94.4	20834	95.3
Total	12479	100.0	14997	100.0	17585	100.0	19215	100.0	21868	100.0

Access difficulty	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
Difficulty with needle placement	635	2.5	548	1.9	706	2.2	600	1.7	573	1.5
Difficulty in obtaining desired blood flow rate	581	2.3	488	1.7	543	1.7	515	1.5	521	1.4
Other difficulties	118	0.5	72	0.3	84	0.3	81	0.2	81	0.2
No difficulties	23840	94.7	27542	96.1	30662	95.8	33669	96.6	36437	96.9
Total	25174	100.0	28650	100.0	31995	100.0	34865	100.0	37612	100.0

Complication risk remains less than 10% for the past 5 years and the 3 commonest complications were thrombosis of fistula, aneurysmal dilatation and venous outflow obstruction.

Table 11.1.3: Complications reported with vascular access, 2007-2016

Complication	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
Thrombosis	405	3.2	436	2.9	481	2.7	466	2.4	492	2.2
Bleed	58	0.5	76	0.5	72	0.4	78	0.4	76	0.3
Aneurysmal Dilatation	385	3.1	396	2.6	452	2.6	321	1.7	397	1.8
Swollen limb	101	0.8	98	0.6	162	0.9	150	0.8	141	0.6
Access related infection, local/systemic	97	0.8	92	0.6	133	0.8	124	0.6	127	0.6
Distal limb Ischaemia	27	0.2	31	0.2	25	0.1	33	0.2	25	0.1
Venous outflow obstruction	196	1.6	250	1.7	299	1.7	242	1.3	271	1.2
Carpal tunnel	46	0.4	48	0.3	48	0.3	45	0.2	49	0.2
Others	152	1.2	165	1.1	119	0.7	123	0.6	142	0.6
No complications	11051	88.3	13519	89.5	15873	89.9	17666	91.8	20236	92.2
Total	12518	100.0	15111	100.0	17664	100.0	19248	100.0	21956	100.0

Complication	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
Thrombosis	589	2.3	522	1.8	571	1.8	563	1.6	586	1.6
Bleed	90	0.4	83	0.3	88	0.3	70	0.2	81	0.2
Aneurysmal dilatation	527	2.1	405	1.4	519	1.6	486	1.4	515	1.4
Swollen limb	202	0.8	156	0.5	208	0.6	167	0.5	167	0.4
Access related infection, local/systemic	187	0.7	178	0.6	192	0.6	196	0.6	211	0.6
Distal limb ischaemia	42	0.2	29	0.1	34	0.1	50	0.1	37	0.1
Venous outflow obstruction	366	1.4	343	1.2	448	1.4	376	1.1	405	1.1
Carpal tunnel	47	0.2	53	0.2	42	0.1	36	0.1	46	0.1
Others	191	0.8	189	0.7	224	0.7	177	0.5	180	0.5
No complications	23118	91.2	26809	93.2	29863	92.8	32898	93.9	35442	94.1
Total	25359	100.0	28767	100.0	32189	100.0	35019	100.0	37670	100.0

SECTION 11.2: HD PRESCRIPTION

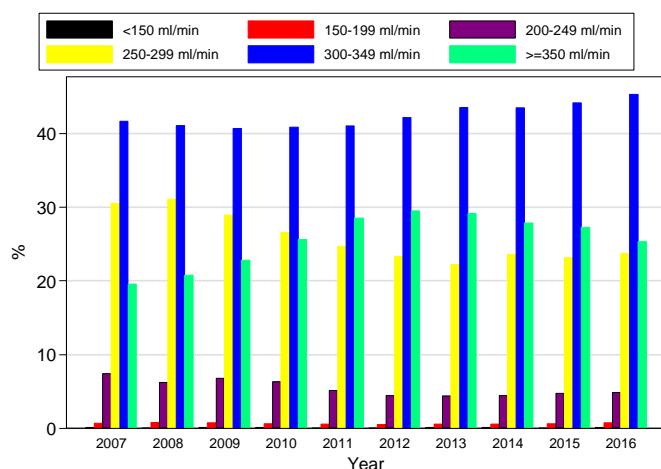
More than 90% of the patients were undergoing HD with the blood flow rate of >250ml/min for the past 5 years. More than a quarter of them were dialyzing at the blood flow rate of >350ml/min although the percentage was dropping gradually over the past 5 years.

Table 11.2.1: Blood flow rates in HD centers, 2007-2016

Blood flow rates (ml/min)	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
<150	10	0.1	10	0.1	14	0.1	16	0.1	13	0.1
150-199	87	0.7	120	0.8	126	0.7	113	0.6	120	0.6
200-249	929	7.4	929	6.2	1178	6.8	1197	6.3	1114	5.1
250-299	3821	30.5	4639	31.1	5050	28.9	5043	26.6	5348	24.7
300-349	5213	41.7	6126	41.1	7097	40.7	7756	40.9	8875	41
>=350	2451	19.6	3095	20.7	3980	22.8	4860	25.6	6166	28.5
Total	12511	100	14919	100	17445	100	18985	100	21636	100

Blood flow rates (ml/min)	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
<150	15	0.1	21	0.1	24	0.1	24	0.1	33	0.1
150-199	128	0.5	158	0.6	175	0.6	203	0.6	265	0.7
200-249	1109	4.5	1245	4.4	1406	4.4	1644	4.7	1813	4.8
250-299	5810	23.3	6300	22.3	7490	23.6	8043	23.2	8911	23.7
300-349	10511	42.2	12324	43.5	13792	43.5	15326	44.2	17011	45.3
>=350	7347	29.5	8259	29.2	8837	27.9	9457	27.3	9499	25.3
Total	24920	100	28307	100	31724	100	34697	100	37532	100

Figure 11.2.1: Blood flow rates in HD centers, 2007-2016



Consistently 97-99% of the HD patients had HD 3 sessions per week for the past 5 years. Similarly, 99% of them were dialyzed for 4 hours during each session.

Table 11.2.2: Number of HD sessions per week, 2007-2016

HD sessions per week	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
1	14	0.1	5	0.0	6	0.0	9	0.0	6	0.0
2	256	2.0	259	1.7	271	1.5	314	1.6	240	1.1
3	12601	97.7	15058	97.9	17581	98.0	19158	98.1	22015	98.8
4	31	0.2	61	0.4	88	0.5	47	0.2	26	0.1
Total	12902	100.0	15383	100.0	17946	100.0	19528	100.0	22287	100.0

HD sessions per week	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
1	33	0.1	37	0.1	57	0.2	26	0.1	92	0.2
2	369	1.4	403	1.4	577	1.8	513	1.5	543	1.4
3	25098	98	28506	98.2	31651	97.8	34605	98.2	37224	98
4	109	0.4	77	0.3	90	0.3	90	0.3	120	0.3
Total	25609	100	29023	100	32375	100	35234	100	37979	100

Table 11.2.3: Duration of HD, 2007-2016

Duration of HD per session (hours)	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
<=3	37	0.3	54	0.4	67	0.4	79	0.4	65	0.3
3.5	11	0.1	10	0.1	25	0.1	36	0.2	10	0.0
4	12791	99.2	15203	98.8	17739	98.8	19304	98.8	22128	99.3
4.5	23	0.2	74	0.5	78	0.4	72	0.4	40	0.2
5	31	0.2	42	0.3	42	0.2	50	0.3	38	0.2
>5	1	0.0	0	0.0	1	0.0	0	0.0	5	0.0
Total	12894	100.0	15383	100.0	17952	100.0	19541	100.0	22286	100.0

Duration of HD per session	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
<=3	115	0.4	124	0.4	133	0.4	137	0.4	201	0.5
3.5	72	0.3	34	0.1	42	0.1	56	0.2	43	0.1
4	25309	98.8	28819	99.3	32116	99.2	34968	99.2	37669	99.2
4.5	66	0.3	23	0.1	29	0.1	56	0.2	42	0.1
5	47	0.2	32	0.1	46	0.1	29	0.1	28	0.1
5	3	0.0	0	0.0	4	0.0	2	0.0	3	0.0
Total	25612	100.0	29032	100.0	32370	100.0	35248	100.0	37986	100.0

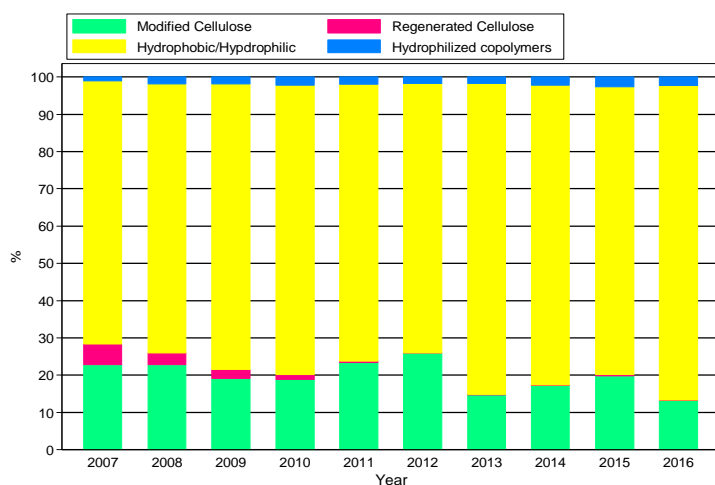
Synthetic membrane type remained the preferred choice for most HD centers as its usage exceeded 70% since year 2007.

Table 11.2.4: Dialyser membrane types in HD centres, 2007-2016

Dialyser membrane	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
Modified Cellulose	2889	22.7	3430	22.7	3245	19.0	3318	18.9	3706	23.4
Regenerated Cellulose	699	5.5	486	3.2	418	2.5	202	1.1	60	0.4
Hydrophobic/ Hydrophilic	8984	70.7	10890	72.2	13056	76.6	13668	77.7	11777	74.2
Hydrophilized copolymers	137	1.1	286	1.9	335	2.0	409	2.3	323	2.0
Total	12709	100.0	15092	100.0	17054	100.0	17597	100.0	15866	100.0

Dialyser membrane	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
Modified Cellulose	3910	25.9	3607	14.6	4742	17.3	5516	19.8	3312	13.1
Regenerated Cellulose	10	0.1	46	0.2	28	0.1	83	0.3	13	0.1
Hydrophobic/ Hydrophilic	10886	72.2	20564	83.4	21994	80.3	21572	77.2	21274	84.4
Hydrophilized copolymers	274	1.8	454	1.8	612	2.2	758	2.7	618	2.5
Total	15080	100.0	24671	100.0	27376	100.0	27929	100.0	25217	100.0

Figure 11.2.4: Dialyser membrane types in HD centres, 2007-2016



For centers which practised dialyser reuse, more than 60% of the dialysers were reused for at least 10 times. The finding was quite consistent throughout the past 7 years from 2010 to 2016. Nevertheless, only 0.3% of the dialysers were reused for 13 times or more in year 2016.

Table 11.2.5: Dialyser reuse frequency in HD centres, 2007-2016

Dialyser reuse frequency	2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%
1	24	0.3	29	0.2	29	0.2	24	0.2	22	0.1
2	117	1.2	87	0.7	115	0.9	67	0.5	127	0.8
3	151	1.6	120	1.0	89	0.7	103	0.7	62	0.4
4	128	1.4	168	1.4	184	1.4	100	0.7	184	1.2
5	809	8.5	699	6.0	743	5.7	570	4.1	756	4.8
6	141	1.5	156	1.3	193	1.5	286	2.1	214	1.4
7	797	8.4	844	7.3	774	6.0	886	6.4	713	4.5
8	107	1.1	248	2.1	294	2.3	349	2.5	318	2.0
9	1530	16.1	2009	17.3	2651	20.5	2455	17.8	3078	19.5
10	94	1.0	101	0.9	61	0.5	121	0.9	110	0.7
11	4075	43.0	5266	45.3	5691	44.0	5899	42.8	6956	44.0
12	1440	15.2	1783	15.3	2009	15.5	2845	20.7	3140	19.9
≥ 13	64	0.7	125	1.1	99	0.8	66	0.5	114	0.7
Total	9477	100.0	11635	100.0	12932	100.0	13771	100.0	15794	100.0

Table 11.2.5: Dialyser reuse frequency in HD centres, 2006-2015 ('cont)

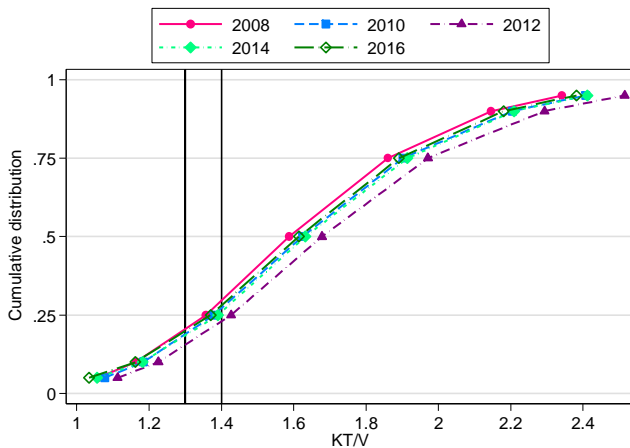
Dialyser reuse frequency	2012		2013		2014		2015		2016	
	n	%	n	%	n	%	n	%	n	%
1	32	0.2	49	0.2	34	0.2	53	0.2	141	0.6
2	185	1.0	96	0.5	167	0.8	228	1.0	421	1.7
3	87	0.5	112	0.6	93	0.4	110	0.5	172	0.7
4	133	0.8	156	0.8	183	0.8	276	1.2	525	2.1
5	989	5.6	978	5.0	695	3.1	784	3.3	914	3.6
6	256	1.4	368	1.9	589	2.7	438	1.8	472	1.9
7	811	4.6	1207	6.1	1602	7.2	1477	6.2	1675	6.6
8	296	1.7	111	0.6	174	0.8	173	0.7	100	0.4
9	3497	19.7	3734	19.0	4323	19.6	4768	20.1	4591	18.2
10	66	0.4	101	0.5	109	0.5	109	0.5	124	0.5
11	6979	39.4	8017	40.7	9292	42.0	9829	41.3	10317	40.9
12	4229	23.9	4513	22.9	4691	21.2	5418	22.8	5683	22.5
≥ 13	162	0.9	251	1.3	152	0.7	116	0.5	80	0.3
Total	17722	100.0	19693	100.0	22104	100.0	23779	100.0	25215	100.0

The mean and median of prescribed Kt/V was 1.6 in year 2016. More than 81% of patients had a prescribed Kt/V of 1.3 and above whereas 72% of them had a prescribed Kt/V of 1.4 and above in year 2016. Similarly, the finding was quite consistent for the past 5 years.

Table 11.2.6(a): Distribution of prescribed Kt/V, HD patients 2007-2016

Year	Number of patients	Mean	SD	Median	LQ	UQ	% patients ≥ 1.3	% patients ≥ 1.4
2007	12353	1.6	0.4	1.6	1.3	1.9	79	69
2008	14754	1.6	0.4	1.6	1.4	1.9	80	70
2009	17257	1.7	0.4	1.6	1.4	1.9	84	75
2010	18798	1.7	0.4	1.6	1.4	1.9	82	73
2011	21482	1.7	0.4	1.7	1.4	1.9	84	76
2012	24709	1.7	0.4	1.7	1.4	2.0	85	77
2013	28052	1.7	0.4	1.6	1.4	1.9	82	74
2014	31371	1.7	0.4	1.6	1.4	1.9	82	74
2015	34302	1.7	0.4	1.6	1.4	1.9	83	74
2016	37137	1.6	0.4	1.6	1.4	1.9	81	72

Figure 11.2.6(a): Cumulative distribution of prescribed Kt/V, HD patients 2007-2016



The mean and median delivered Kt/V was 1.4 in year 2016. These findings were quite consistent for the past 5 years. Sixty four percent of the patients had a delivered Kt/V of at least 1.3. In fact, 80% of the patients achieved a delivered Kt/V of 1.2 and above.

Similar good results were observed if the adequacy of dialysis were to be assessed by using urea reduction ratio (URR). The mean and median URR was 71.1 and 71.9 respectively. Fifty nine percent of patient achieved URR at 70%.

Table 11.2.6(b): Distribution of delivered Kt/V, HD patients 2012-2016

Year	Number of patients	Mean	SD	Median	LQ	UQ	% patients ≥ 1.2	% patients ≥ 1.3	Variance*
2012	15813	1.5	0.5	1.5	1.3	1.7	82	67	0.15
2013	19146	1.5	0.4	1.4	1.2	1.7	80	64	0.13
2014	21191	1.5	0.5	1.4	1.3	1.7	81	65	0.13
2015	23822	1.5	0.7	1.4	1.2	1.7	81	65	0.13
2016	26051	1.4	0.5	1.4	1.2	1.6	80	64	0.12

*Variance = (prescribed Kt/V – delivered Kt/V)/ Prescribed Kt/V

Figure 11.2.6(b): Cumulative distribution of delivered Kt/V, HD patients 2012-2016

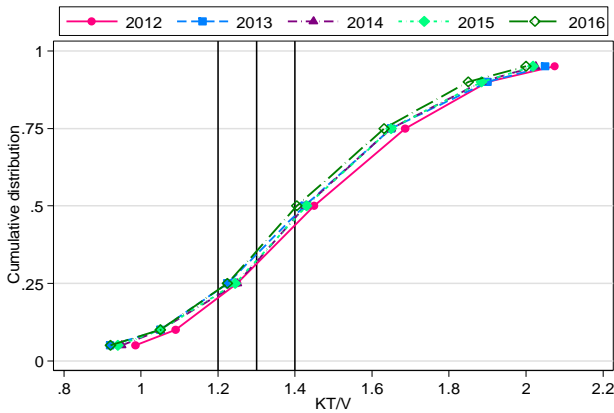


Figure 11.2.6 (c): Cumulative distribution of URR, HD patients 2012-2016

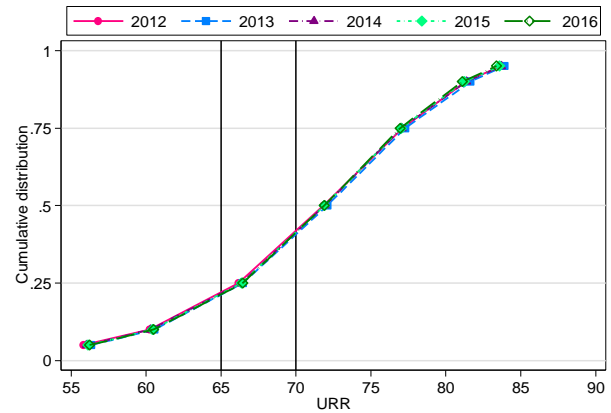


Table 11.2.6(c): Distribution of URR, HD patients 2012-2016

Year	Number of patients	Mean	SD	Median	LQ	UQ	% patients ≥ 65%	% patients ≥ 70%
2012	22560	71.1	9.0	71.8	66.2	77.1	79	59
2013	26022	71.4	8.8	72.1	66.5	77.3	80	60
2014	29289	71.2	8.9	71.9	66.3	77.1	79	60
2015	32171	71.2	8.8	71.9	66.4	77.0	80	60
2016	34534	71.1	8.7	71.9	66.5	76.9	80	59

The median blood flow rates in HD centers remain the same for the past 10 years, i.e. 300ml/min. However, there was a trend of minimal blood flow rate of below 200ml/min for the past 5 years.

Table 11.2.7(a): Variation in median blood flow rates in HD patients, HD centres, 2007-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2007	302	200	250	280	300	300	350	400
2008	355	200	250	280	300	300	350	400
2009	404	180	250	280	300	320	350	400
2010	435	150	250	280	300	320	350	400
2011	495	200	250	300	300	330	350	400
2012	553	165	250	300	300	350	350	400
2013	603	140	250	300	300	345	370	400
2014	644	160	250	300	300	330	350	400
2015	668	165	250	300	300	330	350	400
2016	697	135	250	300	300	305	350	400

Figure 11.2.7 (a): Variation in median blood flow rates in HD patients among centres 2016

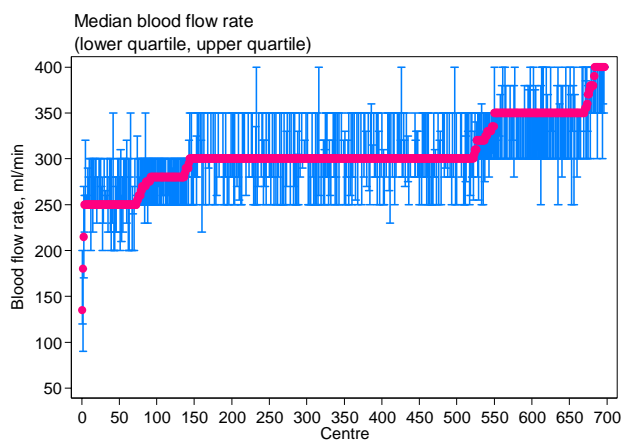
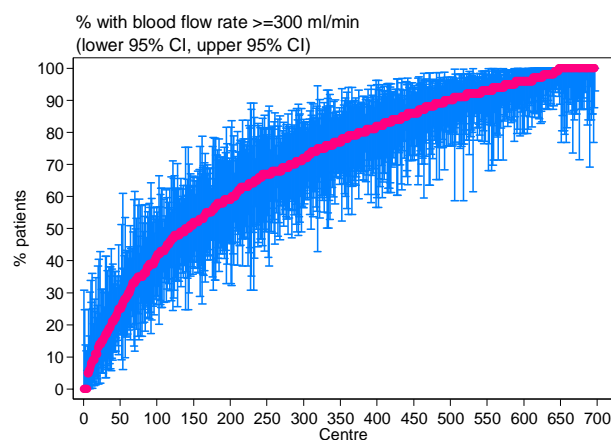


Figure 11.2.7 (b): Variation in Proportion of patients with blood flow rates ≥ 300 ml/min among HD centres 2016



There is two centers with median blood flow rate of less than 200mls/min. There is one center with none of their patients with blood flow rates ≥ 300 ml/min. (Table & Figure 11.2.7 b)

Fifty percent of centers had 77% of their patients with blood flow rates of ≥ 300 ml/min. However, is still a wide variation in the proportion of patients with a blood flow rate of ≥ 300 ml/min.

Table 11.2.7 (b): Proportion of patients with blood flow rates > 300 ml/min, HD centres 2007-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2007	302	0	7	37	68	84	96	100
2008	355	0	9	40	70	86	99	100
2009	404	0	11	42.5	72	88	99	100
2010	435	0	9	46	75	90	100	100
2011	495	0	14	55	77	91	100	100
2012	553	0	22	58	80	91	100	100
2013	603	0	23	59	79	92	100	100
2014	644	0	21	58.5	77	90	100	100
2015	668	0	22	57.5	78	91	100	100
2016	697	0	19	55	77	92	100	100

The majority of centres had 100% of their patients with 3 HD sessions/ week. There was six centers with less than 60% of their patients on 3 HD sessions per week. This have increased compared to last year.

Table 11.2.7(c): Proportion of patients with 3 HD sessions per week, HD centres 2007-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2007	309	51	87	98	100	100	100	100
2008	359	51	89	98	100	100	100	100
2009	404	18	88	100	100	100	100	100
2010	437	20	90	100	100	100	100	100
2011	497	50	92	100	100	100	100	100
2012	559	17	90	98	100	100	100	100
2013	611	48	92	99	100	100	100	100
2014	645	20	91	98	100	100	100	100
2015	669	49	93	98	100	100	100	100
2016	697	33	92	98	100	100	100	100

Figure 11.2.7(c): Variation in proportion of patients with 3 HD sessions per week among HD centres 2016

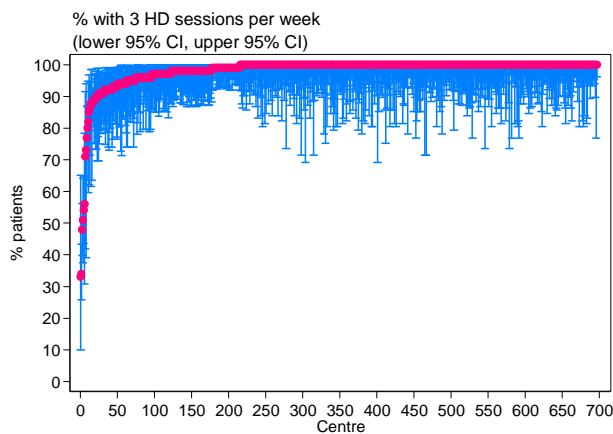
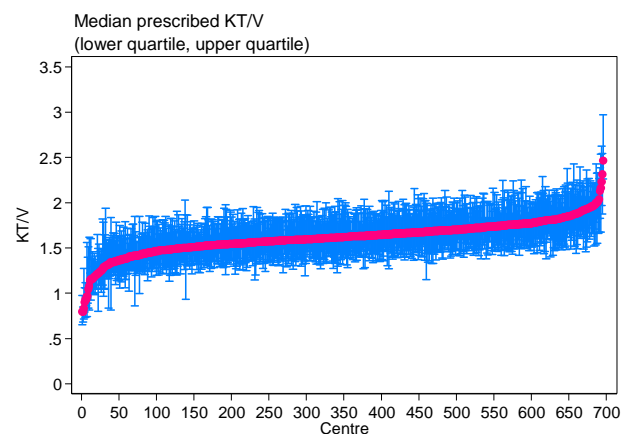


Figure 11.2.7(d): Variation in median prescribed Kt/V in HD patients among HD centres 2016



The median prescribed Kt/V was 1.6. In 2016, half of the centres had 84% of their patients with a prescribed Kt/V ≥ 1.3 . However there was still a wide variation in proportion of patients with Kt/V ≥ 1.3 among the centres. There were seven centres with less than 30% of their patients with prescribed Kt/V ≥ 1.3 .

Table 11.2.7(d): Median prescribed Kt/V in HD patients, HD centres 2007-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2007	302	1.1	1.3	1.4	1.6	1.7	1.9	2.2
2008	353	1.1	1.3	1.5	1.6	1.7	1.9	2.1
2009	400	1.1	1.3	1.5	1.6	1.8	1.9	2.2
2010	434	0.8	1.3	1.5	1.6	1.7	1.9	2.9
2011	495	1.1	1.3	1.5	1.7	1.8	2.0	2.5
2012	552	1.1	1.4	1.5	1.7	1.8	2.0	2.8
2013	602	0.8	1.3	1.5	1.6	1.7	2.0	2.5
2014	644	0.8	1.3	1.5	1.6	1.7	1.9	2.7
2015	667	0.7	1.4	1.5	1.6	1.7	1.9	2.5
2016	696	0.8	1.3	1.5	1.6	1.7	1.9	2.5

Table 11.2.7(e): Proportion of patients with prescribed Kt/V ≥ 1.3 , 2007-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2007	302	21	50	67	81	90	97	100
2008	353	14	48	69	84	90	98	100
2009	400	26	53.5	75	86	92	100	100
2010	434	6	50	75	85	92	100	100
2011	495	15	58	78	87	94	100	100
2012	552	29	60	79	87	94	100	100
2013	602	4	55	75	85	92	100	100
2014	644	10	56	75	84	91	98	100
2015	667	0	60	77	85	91	97	100
2016	696	0	50	76	84	90	97	100

Figure 11.2.7(e): Variation in proportion of patients with prescribed Kt/V ≥ 1.3 among HD centres 2016

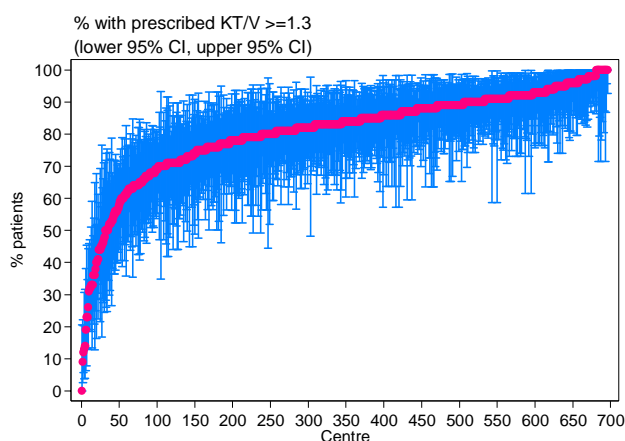
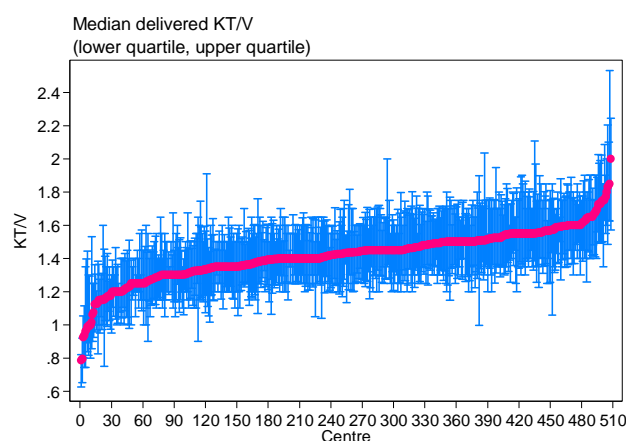


Figure 11.2.7(f): Variation in median delivered Kt/V in HD patients among HD centres 2016



The median delivered Kt/V was 1.4. There were three centres with median delivered Kt/V of less than 1. Half of the centres had 82% of their patients with a delivered Kt/V ≥ 1.2 in 2016. The proportion of patients with a delivered Kt/V ≥ 1.2 has dropped since 2012. There were five centers with less than 30% of its patients with a delivered Kt/V ≥ 1.2 in 2016. One center had none of their patients with a delivered Kt/V ≥ 1.2 .

Table 11.2.7(f): Median delivered Kt/V in HD patients, HD centres 2012-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2012	355	1.0	1.2	1.3	1.5	1.5	1.7	2.2
2013	415	0.6	1.2	1.3	1.4	1.5	1.7	2.0
2014	443	0.8	1.2	1.3	1.4	1.5	1.7	2.0
2015	471	0.7	1.2	1.3	1.4	1.5	1.6	2.2
2016	508	0.8	1.2	1.3	1.4	1.5	1.6	2.0

Table 11.2.7(g): Proportion of patients with delivered Kt/V ≥1.2, HD centres 2012-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2012	355	26	49	74	85	92	98	100
2013	415	4	47	71	82	90	98	100
2014	443	0	50	72	83	91	98	100
2015	471	3	54	73	83	90	97	100
2016	508	0	46	73.5	82	89	96	100

Figure 11.2.7(g): Variation in proportion of patients with delivered Kt/V ≥1.2, HD centres 2016

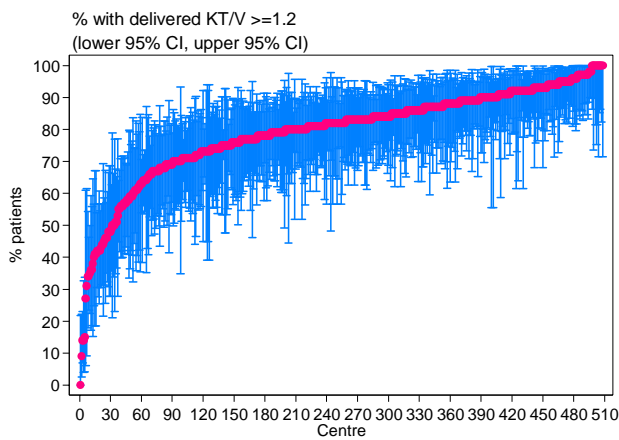
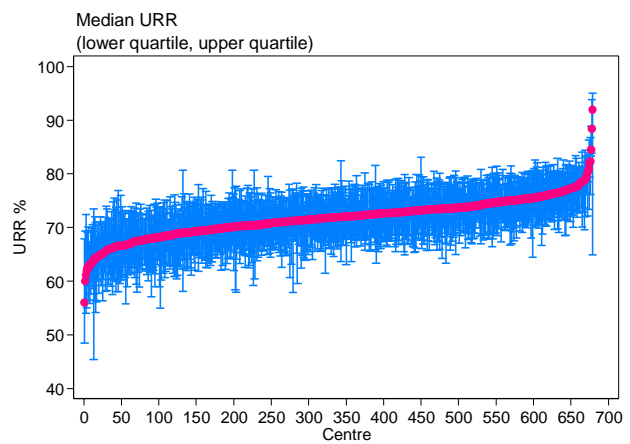


Figure 11.2.7(h): Variation in median URR among HD patients, HD centres 2016



The median URR for 2016 was 71.9%. Half of the centers had 82% of their patients with URR ≥65%. There were three centres with less 40% of their patients with URR ≥65%.

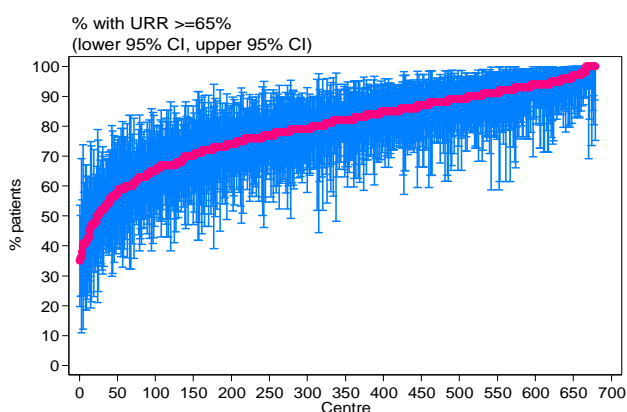
Table 11.2.7(h): Median URR among HD patients, HD centres 2012-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2012	524	56.3	65.2	68.6	71.7	74.0	77.5	96.0
2013	583	59.6	64.6	68.7	71.7	74.4	77.9	95.2
2014	626	55.1	65.2	69.1	71.7	74.3	77.1	96.6
2015	654	57.7	65.1	69.3	72.0	73.9	77.2	94.3
2016	679	56.0	66.0	69.6	71.9	73.8	77.0	91.9

Table 11.2.7(i): Proportion of HD patients with URR ≥65%, HD centres 2012-2016

Year	Number of centres	Min	5 th centile	LQ	Median	UQ	95 th centile	Max
2012	524	17	50	69	81	89	98	100
2013	583	23	50	69	81	91	98	100
2014	626	25	50	69	81	90	97	100
2015	654	21	50	71	82	89	97	100
2016	679	35	53	72	82	89	96	100

Figure 11.2.7(i): Variation in proportion of patients with URR \geq 65% among HD centres 2016



SECTION 11.3: TECHNIQUE SURVIVAL ON DIALYSIS

There was no apparent difference in the unadjusted technique survival by years of starting dialysis for the years 2000 to 2009 even after censoring for death and transplant. Technique survival by year 2010-2014 of starting dialysis seems to be lower even after censoring for death and transplant.

Table 11.3.1(a): Unadjusted technique survival by era, 2000-2016

Year Interval (month)	2000-2004			2005-2009			2010-2014			2015-2016		
	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	10859	100		18856	100		30117	100		14222	100	
6	10135	94	0	17542	94	0	27698	92	0	10034	93	0
12	9381	88	0	16326	88	0	25654	86	0	6325	87	0
24	8128	78	0	14209	77	0	22237	75	0	245		
36	7111	69	0	12464	68	0	15183	65	0	245		
48	6232	61	0	10916	60	0	9355	57	0	245		
60	5442	53	0	9518	52	0	5266	49	0	245		
72	4770	47	0	8292	45	0	2180	43	0	245		
84	4138	41	0	7058	39	0	32			245		
96	3635	36	0	4636	33	0	32			245		
108	3188	32	0	2899	29	0	32			245		
120	2789	28	0	1583	25	0	32			245		

Figure 11.3.1(a): Unadjusted technique survival by year of entry, 2007-2016

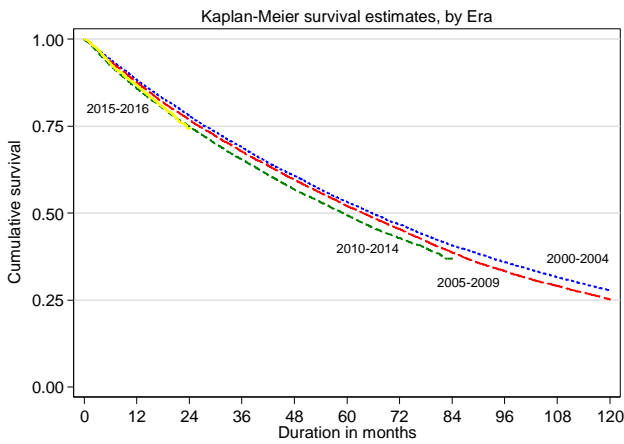


Figure 11.3.1(b): Unadjusted technique survival by year of entry (censored for death & transplant), 2007-2016

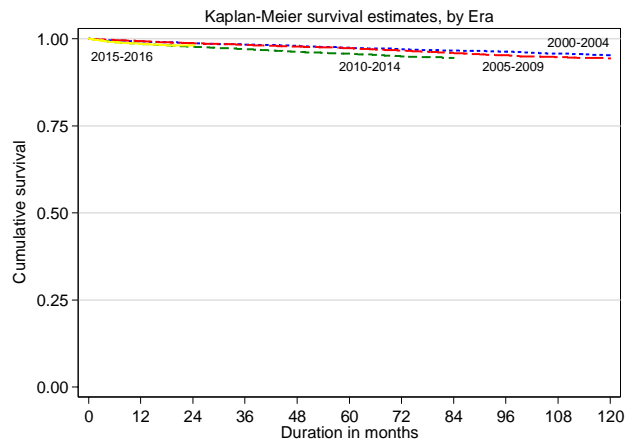


Table 11.3.1(b): Unadjusted technique survival by year of entry (censored for death & transplant), 2000-2016

Year Interval (month)	2000-2004			2005-2009			2010-2014			2015-2016		
	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	10859	100		18856	100		30117	100		14222	100	
6	10135	100	0	17542	100	0	27698	99	0	10034	99	0
12	9381	99	0	16326	99	0	25654	99	0	6325	99	0
24	8128	99	0	14209	99	0	22237	98	0	245		
36	7111	98	0	12464	98	0	15183	97	0	245		
48	6232	98	0	10916	98	0	9355	96	0	245		
60	5442	97	0	9518	97	0	5266	96	0	245		
72	4770	97	0	8292	97	0	2180	95	0	245		
84	4138	97	0	7058	96	0	32			245		
96	3635	96	0	4636	95	0	32			245		
108	3188	96	0	2899	95	0	32			245		
120	2789	95	0	1583	94	0	32			245		

The unadjusted technique survival was better in the younger age groups (except those less than 15 years old) than the older age group. The 9 year unadjusted technique survival for the age groups of ≤14, 15-24, 25-34, 35-44, 44-54, 55-64 and ≥65 years old were 47%, 69%, 59%, 47%, 32%, 22% and 11% respectively. There was no apparent difference in the unadjusted technique survival by age once censored for death & transplant except for those less than 15 years old. Patients who were less than 15 years old had poorer technique survival compared to all other age group.

Table 11.3.2(a): Unadjusted technique survival by age, 2007-2016

Age group (year) Interval (month)	≤ 14			15-24			25-34			35-44		
	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	181	100		1350	100		3391	100		5991	100	
6	153	93	2	1222	96	1	3015	96	0	5314	95	0
12	130	88	3	1094	92	1	2702	92	0	4701	91	0
24	102	81	3	897	87	1	2164	87	1	3677	83	1
36	69	77	4	708	83	1	1750	83	1	2868	77	1
48	56	70	4	568	81	1	1358	79	1	2164	72	1
60	40	67	5	448	78	1	1030	75	1	1604	66	1
72	29	63	5	346	75	1	742	70	1	1159	61	1
84	19	53	6	247	72	2	500	66	1	762	56	1
96	14	53	6	150	71	2	308	63	1	457	51	1
108	6	47	8	78	69	2	141	59	2	193	47	1
120	1			2			2			8		

Age group (year) Interval (month)	45-54			55-64			≥ 65		
	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	13568	100		17634	100		14698	100	
6	11987	94	0	15323	93	0	12384	90	0
12	10605	89	0	13233	86	0	10390	81	0
24	8160	79	0	9708	75	0	7226	66	0
36	6162	71	0	7008	64	0	4893	54	0
48	4513	63	0	4773	55	0	3152	43	0
60	3255	56	1	3228	47	0	1954	34	1
72	2189	50	1	2035	39	1	1128	26	1
84	1353	43	1	1162	32	1	608	19	1
96	761	37	1	606	26	1	276	14	1
108	324	32	1	241	22	1	102	11	1
120	6			1			1		

Figure 11.3.2(a): Unadjusted technique survival by age, 2007-2016

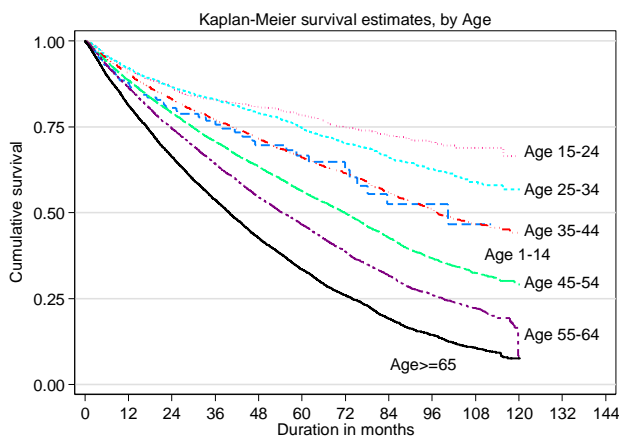


Figure 11.3.2(b): Unadjusted technique survival by age (censored for death & transplant), 2007-2016

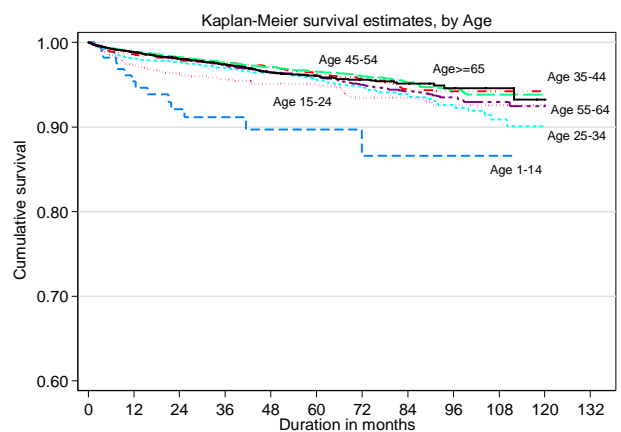


Table 11.3.2(b): Unadjusted technique survival by age (censored for death & transplant), 2007-2016

Age group (year) Interval (month)	≤ 14			15-24			25-34			35-44		
	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	181	100		1350	100		3391	100		5991	100	
6	153	98	1	1222	99	0	3015	99	0	5314	99	0
12	130	95	2	1094	97	0	2702	98	0	4701	99	0
24	102	92	2	897	96	1	2164	98	0	3677	98	0
36	69	91	2	708	96	1	1750	97	0	2868	98	0
48	56	90	3	568	95	1	1358	96	0	2164	97	0
60	40	90	3	448	95	1	1030	96	0	1604	96	0
72	29	87	4	346	93	1	742	95	1	1159	96	0
84	19	87	4	247	93	1	500	94	1	762	95	1
96	14	87	4	150	93	1	308	93	1	457	94	1
108	6	87	4	78	93	1	141	91	1	193	94	1
120	1			2			2			8		

Age group (year) Interval (month)	45-54			55-64			≥ 65		
	n	% Survival	SE	n	% Survival	SE	n	% Survival	SE
0	13568	100		17634	100		14698	100	
6	11987	99	0	15323	99	0	12384	99	0
12	10605	99	0	13233	99	0	10390	99	0
24	8160	98	0	9708	98	0	7226	98	0
36	6162	98	0	7008	97	0	4893	97	0
48	4513	97	0	4773	97	0	3152	97	0
60	3255	97	0	3228	96	0	1954	96	0
72	2189	96	0	2035	95	0	1128	96	0
84	1353	95	0	1162	94	0	608	95	0
96	761	94	0	606	94	0	276	95	1
108	324	94	1	241	93	1	102	95	1
120	6			1			1		

Unadjusted technique survival in non-diabetics at 1, 5 and 9 years was 88%, 61% and 42% respectively. Unadjusted technique survival for diabetics was worse than non-diabetics; 86% at 1 year, 44% at 5 years and only 19% at 9 years. There was no apparent difference in the unadjusted technique survival by diabetes status when censored for death & transplant.

Table 11.3.3(a): Unadjusted technique survival by diabetes status, 2007-2016

Diabetes status Interval (month)	Non-Diabetic			Diabetic		
	n	% Survival	SE	n	% Survival	SE
0	21433	100		35380	100	
6	18818	93	0	30579	93	0
12	16725	88	0	26130	86	0
24	13104	80	0	18830	73	0
36	10074	73	0	13384	62	0
48	7549	67	0	9034	52	0
60	5513	61	0	6046	44	0
72	3842	55	0	3785	36	0
84	2505	50	0	2145	29	0
96	1455	45	1	1093	23	0
108	659	42	1	425	19	0
120	14			3		

Figure 11.3.3(a): Unadjusted technique survival by diabetes status, 2007-2016

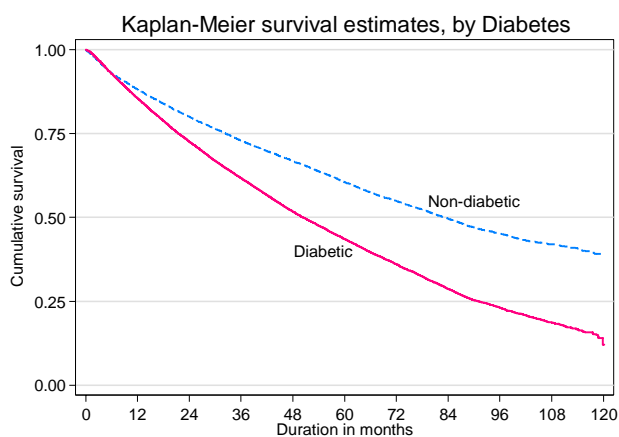


Figure 11.3.3(b): Unadjusted technique survival by diabetes status (censored for death & transplant), 2007-2016

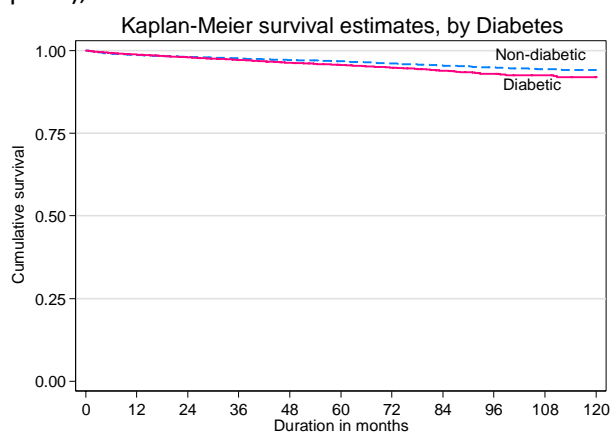


Table 11.3.3(b): Unadjusted technique survival by diabetes status (censored for death & transplant), 2007-2016

Diabetes status Interval (month)	Non-Diabetic			Diabetic		
	n	% Survival	SE	n	% Survival	SE
0	21433	100		35380	100	
6	18818	99	0	30579	99	0
12	16725	99	0	26130	99	0
24	13104	98	0	18830	98	0
36	10074	98	0	13384	97	0
48	7549	97	0	9034	96	0
60	5513	97	0	6046	96	0
72	3842	96	0	3785	95	0
84	2505	95	0	2145	94	0
96	1455	95	0	1093	93	0
108	659	94	0	425	93	0
120	14			3		