

**CHAPTER 10**

**HEPATITIS ON DIALYSIS**

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**SECTION A: PREVALENCE**

In PD patients, the annual prevalence of hepatitis infection remained low and is quite similar comparing Hepatitis B and Hepatitis C, with ranges from 3-6%.

In HD patients, the annual prevalence of Hepatitis B is similar to PD patients implying that there is no increased risk of seroconversion when comparing the 2 modalities of dialysis. With stringent implementation of infection control protocols, Hepatitis C seroconversion is also markedly reduced as we continue to see steady decline in it's annual prevalence to only 6% last year.

**Table 10.1:** Prevalence of positive HBsAg and positive Anti-HCV at annual survey, HD patients 2002-2011

Year	Number of patients	Prevalence of HBsAg+ (%)	Prevalence of Anti-HCV+ (%)
2002	6106	5	20
2003	6977	5	19
2004	7618	5	17
2005	8957	4	14
2006	11295	5	12
2007	12496	5	11
2008	14951	4	9
2009	17353	4	8
2010	18829	4	7
2011	22070	4	6

**Table 10.2:** Prevalence of positive HBsAg and positive Anti-HCV at annual survey, PD patients 2002-2011

Year	Number of patients	Prevalence of HBsAg+ (%)	Prevalence of Anti-HCV+ (%)
2002	891	3	4
2003	1223	3	4
2004	1200	4	5
2005	1318	4	5
2006	1494	5	4
2007	1731	5	4
2008	2017	4	3
2009	2144	4	3
2010	2280	3	3
2011	2521	3	3

## SECTION B: CENTER VARIATION

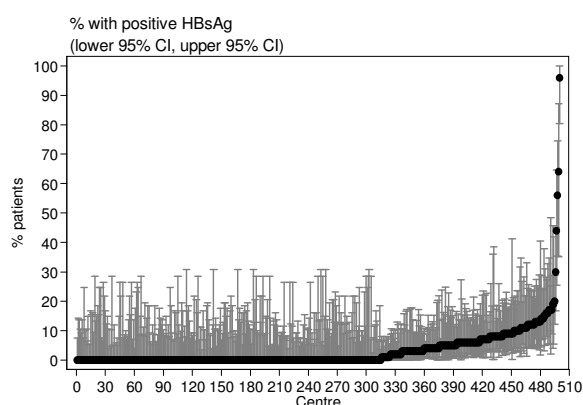
There was a larger center to center variation among HD compared to PD centers in terms of the proportion of Hepatitis B patients. Some centers may practice the policy of not accepting Hepatitis B patients and therefore causing more segregation of patients to the larger and older centers.

Similarly for Hepatitis C, there was a wide center variation among HD centers. This reflects the diversities in infection control protocols among HD centers.

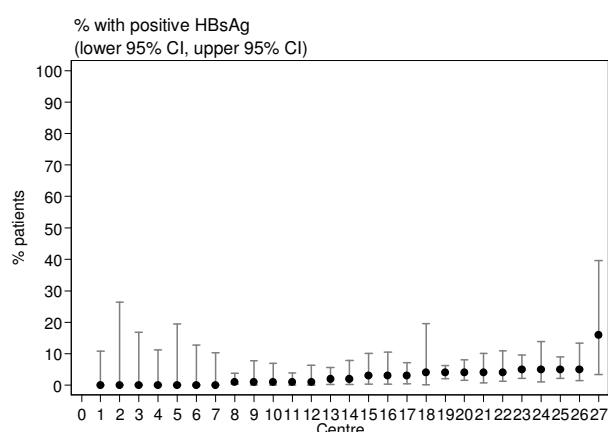
**Table 10.3:** Proportion of patients with positive HBsAg at annual survey among HD centres, 2002-2011

Year	Number of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
2002	153	0	0	0	3	8	14	26
2003	183	0	0	0	3	8	15	73
2004	210	0	0	0	3	8	14	92
2005	241	0	0	0	2	6	15	100
2006	288	0	0	0	1	6	16	94
2007	319	0	0	0	0	7	15	100
2008	370	0	0	0	0	6	12	100
2009	403	0	0	0	0	5	13	96
2010	445	0	0	0	0	5	12	100
2011	500	0	0	0	0	4.5	13	96

**Figure 10.3:** Variation in proportion of patients with positive HBsAg among HD centres, 2011



**Figure 10.4:** Variation in proportion of patients with positive HBsAg among PD centres, 2011



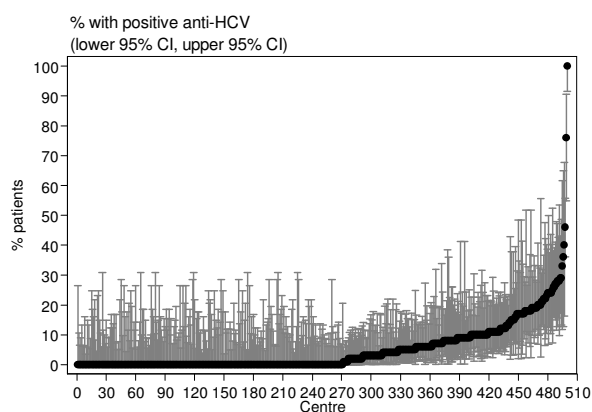
**Table 10.4:** Proportion of patients with positive HBsAg at annual survey among PD centres, 2002-2011

Year	Number of centres	Min	5 <sup>th</sup> Centile	LQ	Median	UQ	95 <sup>th</sup> Centile	Max
2002	15	0	0	1	3	6	18	18
2003	18	0	0	2	4	6	8	8
2004	18	0	0	1	3.5	5	11	11
2005	19	0	0	1	3	5	10	10
2006	22	0	0	2	4	6	9	13
2007	22	0	0	0	4	6	8	11
2008	23	0	0	1	4	5	10	13
2009	24	0	0	1	3.5	5	9	10
2010	24	0	0	1	3	4	6	7
2011	27	0	0	0	2	4	5	16

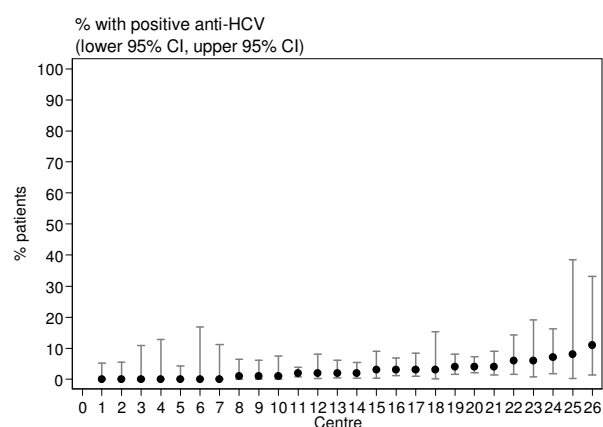
**Table 10.5:** Proportion of patients with positive anti-HCV at annual survey among HD centres, 2002-2011

Year	Number of centre	Min	5 <sup>th</sup> centile	LQ	Median	UQ	95 <sup>th</sup> centile	Max
2002	153	0	0	5	15	26	54	94
2003	183	0	0	6	14	25	50	90
2004	212	0	0	4	12	24	50	100
2005	243	0	0	0	10	21	38	98
2006	287	0	0	0	8	18	40	98
2007	318	0	0	0	7	14	35	100
2008	370	0	0	0	5	12	30	100
2009	403	0	0	0	3	10	27	98
2010	445	0	0	0	1	9	24	98
2011	500	0	0	0	0	8	21.5	100

**Figure 10.5:** Variation in proportion of patients with positive anti-HCV among HD centres, 2011



**Figure 10.6:** Variation in proportion of patients with positive anti-HCV among PD centres, 2011



**Table 10.6:** Proportion of patients with positive anti-HCV at annual survey among PD centres, 2002-2011

Year	Number of centre	Min	5 <sup>th</sup> centile	LQ	Median	UQ	95 <sup>th</sup> centile	Max
2002	15	0	0	0	3	8	11	11
2003	18	0	0	1	4.5	7	9	9
2004	18	0	0	1	4.5	7	10	10
2005	19	0	0	2	4	8	11	11
2006	22	0	0	1	2.5	6	8	11
2007	22	0	0	1	2.5	6	8	9
2008	23	0	0	0	4	4	5	9
2009	24	0	0	0	2	3.5	7	7
2010	24	0	0	0.5	2	3	5	7
2011	26	0	0	0	2	4	8	11

## SECTION C: SEROCONVERSION RISKS

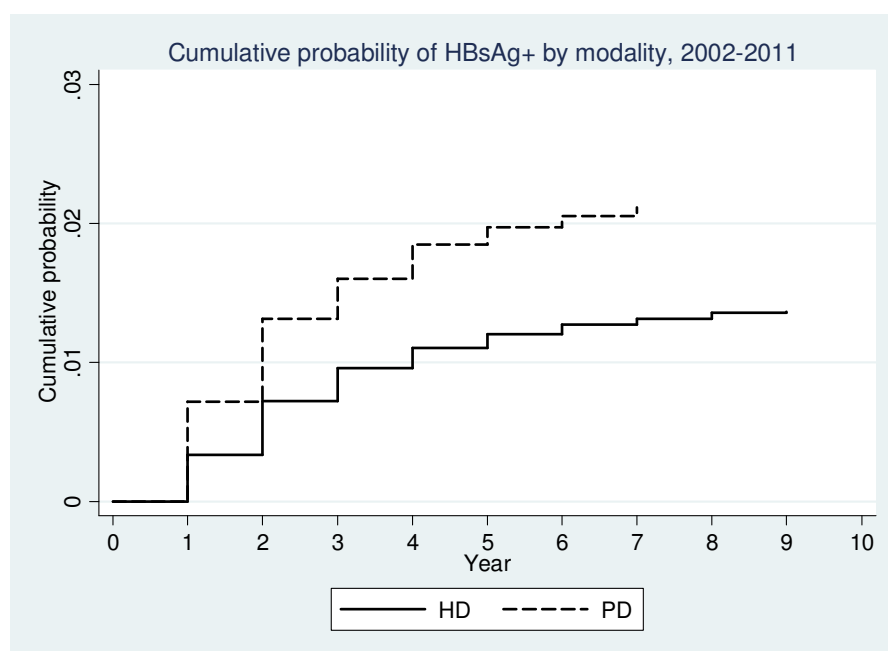
The seroconversion risk of HBV infection at 7 years was 2.12% on PD and 1.32% for HD. The risks were low, and appeared to be slightly higher on PD. This could be due to the smaller PD population compared to HD. Another possible factor is that patients who choose to undergo HD may be more likely to receive HBV vaccination in the pre dialysis stage.

The cumulative risk of HCV infection at 7 years was 1.73% on PD compared to 2.56% on HD. Although it is a known fact that patients on HD have increased risk of Hepatitis C infection through nosocomial transmission, these risks have gradually decline with stringent infection control protocols and continuous surveillance.

**Table 10.7 (a):** Cumulative risk of sero-conversion to HBsAg positive among sero-negative patients at entry into dialysis, comparing HD and PD 2002-2011

Modality Interval (years)	PD		HD	
	% Cumulative probability	SE*	% Cumulative probability	SE*
1	0.72	0.21	0.33	0.10
2	1.31	0.17	0.72	0.11
3	1.60	0.09	0.96	0.07
4	1.85	0.07	1.11	0.04
5	1.97	0.04	1.20	0.03
6	2.05	0.03	1.27	0.02
7	2.12	0.02	1.32	0.01
8			1.36	0.01
9			1.37	0.00
10			1.37	0.00

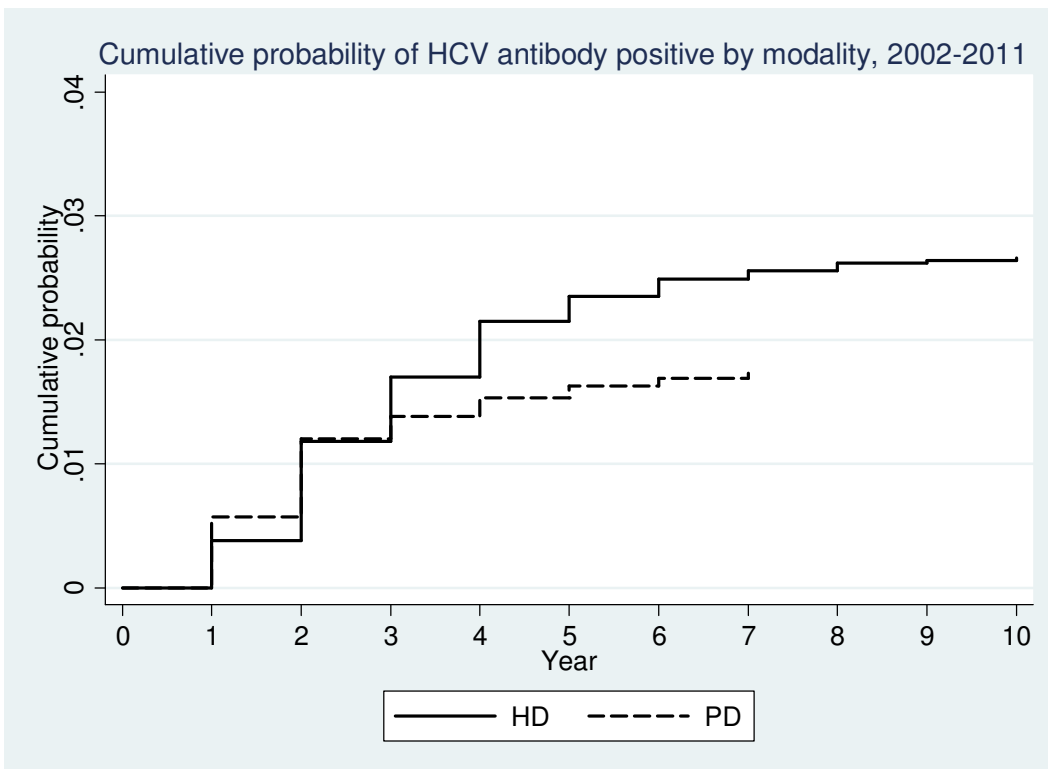
**Figure 10.7 (a):** Cumulative risk of sero-conversion to HBsAg positive among sero-negative patients at entry into dialysis, comparing HD and PD 2002-2011



**Table 10.7 (b):** Cumulative risk of sero-conversion to anti HCV antibody positive among sero-negative patients at entry into dialysis, comparing HD and PD 2002-2011

Modality Interval (years)	PD		HD	
	% Cumulative probability	SE*	% Cumulative probability	SE*
1	0.57	0.17	0.38	0.11
2	1.20	0.19	1.18	0.23
3	1.38	0.06	1.70	0.15
4	1.53	0.04	2.15	0.13
5	1.63	0.03	2.35	0.06
6	1.69	0.02	2.49	0.04
7	1.73	0.01	2.56	0.02
8			2.62	0.02
9			2.64	0.01
10			2.66	0.00

**Figure 10.7 (b):** Cumulative risk of sero-conversion to anti HCV antibody positive among sero-negative patients at entry into dialysis, comparing HD and PD 2002-2011



Tables 10.8(a) and 10.8(b) looked at the risk for HCV seroconversion in relation to patient characteristics and HD practices. Higher seroconversion risks were seen in patients with previous renal transplant, blood transfusions and a switch of dialysis modality from HD to PD. There was a tendency for increased risk among men and older age groups.

In terms of HD practices, centers which still use the manual dialyzer reprocessing systems have significantly higher risk of seroconversion. However a significantly lower seroconversion risk was seen when dialyzers are used > 10 times. This may be due to the fact that centers which practice dialyzer reuse of > 10 times are mostly also using fully automated reprocessing systems, and this reduces the seroconversion risks markedly.

**Table 10.8(a):** Risk factors in relation to HD practices for seroconversion to anti-HCV positive among sero-negative patients 2002-2011

Risk factor	Number of patients	Risk Ratio	95% CI	p-value
<b>Assistance to Perform HD</b>				
Self care <sup>(ref*)</sup>	93	1.00		
Partial self care	95	1.02	(0.76;1.37)	0.879
Completely assisted	603	1.13	(0.9;1.42)	0.297
<b>Dialyzer Reuse</b>				
less than 10 <sup>(ref*)</sup>	460	1.00		
more than 10	325	0.46	(0.39;0.53)	<0.001
<b>Dialyzer Reprocessing System</b>				
Fully Auto <sup>(ref*)</sup>	570	1.00		
Semi Auto	77	1.36	(1.07;1.72)	0.012
Manual	62	1.62	(1.25;2.11)	<0.001
<b>Age</b>				
≤20 <sup>(ref*)</sup>	6	1.00		
21-40	86	1.42	(0.62;3.22)	0.406
41-60	345	1.57	(0.7;3.52)	0.275
>60	358	1.58	(0.7;3.57)	0.267
<b>Gender</b>				
Female <sup>(ref*)</sup>	324	1.00		
Male	471	1.19	(1.03;1.39)	0.414
<b>Diabetes</b>				
No <sup>(ref*)</sup>	360	1.00		
Yes	435	0.87	(0.75;1.02)	0.081
<b>Previous Renal Transplant</b>				
No <sup>(ref*)</sup>	769	1.00		
Yes	26	2.06	(1.37;3.09)	0.001
<b>History of Blood Transfusion</b>				
No <sup>(ref*)</sup>	452	1.00		
Yes	343	1.40	(1.21;1.62)	<0.001

**Table 10.8(b):** Risk factors for seroconversion to anti-HCV positive among sero-negative patients in PD 2002-2011

Risk factor	Number of patients	Risk Ratio	95% CI	p-value
<b>Age</b>				
≤20 (ref*)	5	1.00		
21-40	20	1.78	(0.67;4.7)	0.248
41-60	41	1.63	(0.63;4.19)	0.311
>60	19	0.78	(0.29;2.15)	0.637
<b>Gender</b>				
Female (ref*)	35	1.00		
Male	50	1.55	(1.01;2.38)	0.046
<b>Diabetes</b>				
No (ref*)	60	1.00		
Yes	25	0.71	(0.44;1.15)	0.167
<b>Switch from HD to PD</b>				
No (ref*)	57	1.00		
Yes	28	2.27	(1.41;3.67)	0.001
<b>Previous Renal Transplant</b>				
No (ref*)	85	1.00		
Yes	0	0.00	-	-
<b>History of Blood Transfusion</b>				
No (ref*)	41	1.00		
Yes	44	1.46	(0.95;2.25)	0.087

## Conclusion

HD patients run the risk of Hepatitis infection due to nosocomial transmission. However, over the years, we have seen an encouraging decline in its prevalence with lower seroconversion rates. This is largely due to constant surveillance and strict implementation of infection control protocols within HD facilities around the country.