

(Table 1)	Multiitem approximation formula for shift in HD pt number – various degree -	「MS-Excel」
degree	Multiitem approximation formula	R
1	$Y = 7289.5 X - 45643$	0.9779
2	$Y = 155.69 X^2 + 1217.4 X - 5162.8$	0.9991
3	$Y = -1.8002 X^3 + 261 X^2 - 446.81 X + 594.08$	0.9993
4	$Y = -0.1338 X^4 + 8.6331 X^3 - 2.9055 X^2 + 1911.1 X - 4539.1$	0.9995
5	$Y = -0.0127 X^5 + 1.1069 X^4 - 34.673 X^3 + 643.47 X^2 - 1884.6 X + 1293.6$	0.9996

(Table 2) Change in gradient of tangent lines to year-HD
 pt number approximation curves in various year blocks

「MS-Excel」

year block	tangent line	gradient	R
1968 ~ 1977	$Y = 2488.3 X - 6089.1$	2488.3 up	0.94789
1978 ~ 1987	$Y = 5923.4 X + 19342$	5923.4 up	0.99725
1988 ~ 1997	$Y = 10443 X + 71653$	10443 down	0.99227
1998 ~ 2005	$Y = 10321 X + 17619$	10321	0.9989

(Table 3) first derivative value of 5th degree multiitem approximation formula 「MS-Excel」

year	first derivative value		
1968	-697.3149	1987	7507.4
1969	307.6088	1988	7923.2211
1970	1154.4507	1989	8352.7128
1971	1865.9664	1990	8789.6747
1972	2463.3875	1991	9226.3824
1973	2966.4216	1992	9653.5875
1974	3393.2523	1993	10060.5176
1975	3760.5392	1994	10434.8763
1976	4083.4179	1995	10762.8432
1977	4375.5	1996	11029.0739
1978	4648.8731	1997	11216.7
1979	4914.1008	1998	11307.3291
1980	5180.2227	1999	down 11281.0448
1981	5454.7544	2000	11116.4067
1982	5743.6875	2001	10790.4504
1983	6051.4896	2002	10278.6875
1984	6381.1043	2003	9555.1056
1985	6733.9512	2004	8592.1683
1986	7109.9259	2005	7360.8152

first derivative of 5th degree multiitem approximation formula

$$Y' = -0.0635 \cdot X^4 + 4.4276 \cdot X^3 - 104.019 \cdot X^2 + 128694 \cdot X - 18846$$

(Table 4) second derivative value of 5th degree multiitem approximation formula $Y'' = -0.254X^3 + 13.2828X^2 - 208.038X + 1286.94$ 「MS-Excel」

year	Second derivative		
1968	1091.9308	1987	407.3
1969	down 921.9632	1988	423.5628
1970	775.5132	1989	434.3872
1971	651.0568	1990	438.2492
1972	547.07	1991	433.6248
1973	462.0288	1992	down 418.99
1974	394.4092	1993	392.8208
1975	342.6872	1994	353.5932
1976	305.3388	1995	299.7832
1977	280.84	1996	229.8668
1978	267.6668	1997	142.32
1979	264.2952	1998	35.6188
1980	269.2012	1999	0 > -91.7608
1981	up 280.8608	2000	-241.3428
1982	297.75	2001	-414.6512
1983	318.3448	2002	-613.21
1984	341.1212	2003	-838.5432
1985	364.5552	2004	-1092.1748
1986	387.1228	2005	-1375.6288

(Table 5) Future Prospect of Shift in Jpn HD pt Number Applying Specified Software for Statistical Analysis

「JUSE-StatWorks/V4.0」

4 th degree multiitem approximation formula	$y = -0.134 \times x^4 + 8.633 \times x^3 - 2.906 \times x^2 + 1911.113 \times x - 4539.099$
1 st degree derivative of 4 th degree multiitem approximation formula	$y' = -0.536 \times x^3 + 25.899 \times x^2 - 5.812 \times x + 1911.113$
2 nd degree derivative of 4 th degree multiitem approximation formula	$y'' = -1.608 \times x^2 + 51.798 \times x - 5.812$

In the 1st degree derivative of 4th degree multiitem approximation formula, $Y' < 0$ between a year of 2016 and 2017.

(Table 6) **Reimbursement Payment May Affect
a Number of Maintenance HD Patients in Japan**

year	items
1985	technical fee reduced
1986	equipment fee reduced
1988	equipment fee reduced
1990	equipment fee reduced
1992	equipment fee reduced
1994	fee for dialysate, anticoagulant & saline included in technical fee
	technical & equipment fee reduced
1996	equipment fee reduced
1998	equipment fee reduced
2000	outpatient manage fee reduced
	outpatient manage fee reduced
2002	outpatient manage fee reduced
2004	outpatient manage fee reduced
2006	erythropoietin included in technical fee