

USEFULNESS AND LIMITATION IN PREDICTION OF A SHIFT IN A FUTURE NUMBER OF JAPANESE MAINTENANCE HEMODIALYSIS PATIENTS BY APPLYING A DYNAMIC ANALYSIS OF COMPUTER - APPROXIMATING MATHEMATICAL MODELS

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A number of Japanese maintenance hemodialysis patients has been increasing as many as approximately 260,000 in an end of 2005 so officially commented as to show a linear increment. However, our prediction applying a dynamic year-shifting analysis of computer- approximating mathematical models reveals that it has been coming to a ceiling level. A multiitem approximation formula created applying the Microsoft Excel for a HD pt number (Y) - year(X) relation is :  $Y = - 0.0127 X^5 + 1.1069X^4 - 34.673 X^3 + 643.47 X^2 - 1884.6 X + 1293.6$  (R= 0.9996). A first (Y') and a second derivative formula(Y'') are :

$$Y'=-0.0635X^4+4.4276X^3-104.019X^2+1286.94X-1884.6,$$

$Y''=-0.254X^3+13.2828X^2-208.038X+1286.94$ . A first derivative value, a speed in a shift in a patient number, started decreasing while a second derivative value turned negative in 1999. Extrapolation indicates that a first derivative value will become negative, that is, a patient number will start decreasing, in 2009. A similar prediction using JUSE-StatWorks/V4.0 (The Institute of JUSE) shows that it will in 2017. Our conclusion is that approximation modeling is verified and very useful within a limit of a use of really given numbers, but precaution should be so paid that different results may be induced with different computer softs when prediction is done as extrapolating outsidess really given numbers.