COMPUTER-ASSISTING PROJECTION WITH CURVE FITTING METHOD FOR POPULATION OF PATIENTS LIVING WITH HIV/AIDS IN TAIWAN

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BACKGROUND/AIMS: Worldwide millions of people contract HIV infection annually. The case number of HIV infection has continually increased in Taiwan since 1982. Estimation of prevalence is obviously of critical importance for care and planing with limited resource. Several methods have been reported and error of estimation seems to be unavoidable. Reported here is a computer-aided methodology, applying polynomial regression to project the annual incidence of HIV infection in Taiwan.

METHODS: Curve fitting is often used to find a virtual curve calculated from a set of data points. To fit the data, a polynomial with one variable can be written in the following general formula:

$$f(x) = a_0 x^N + a_1 x^{N-1} + a_2 x^{N-2} + \ldots + a_N$$

The degree of a polynomial is equal to the largest value used as an exponent.

Similarly, higher degrees of polynomial are accessible if a set of $n + 1$ points is used to determine an $n\text{-}th$ degree polynomial, all $n + 1$ points will fall on the polynomial curve. With computer-aided calculation, surveillance data was processed with Matlab language

RESULTS: The estimate of case number for 2nd and 3rd degree curve fitting is 871 and 894, respectively (figure1-4). The real incidence was 861 in 2003, with an estimate error of 1.2%.

DISCUSSION/CONCLUSIONS: Several languages and environments are available for technical computing, the fittest one should be easy to learn and use and accurate. With computer-aided mathematics, projection of incidence of patients living with HIV/AIDS is not relatively difficult. This would be helpful for the policymaking and control of AIDS.

Key words: HIV, Curve fitting, Polynomial