



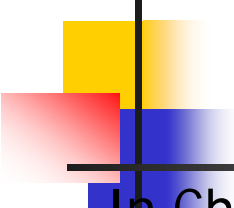
# HEALTH AND INEQUITY: THE CASE OF MEXICO

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# Equity and health conditions in Mexico

(Health Review , Mexico, 2004)



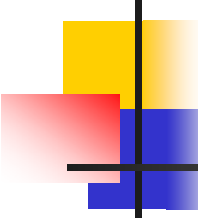
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In Chiapas province, 30 % of infant mortality is related with diarrhoeal episodes, respiratory infections and malnutrition, while in Nuevo León and Aguascalientes provinces only share 7 %.

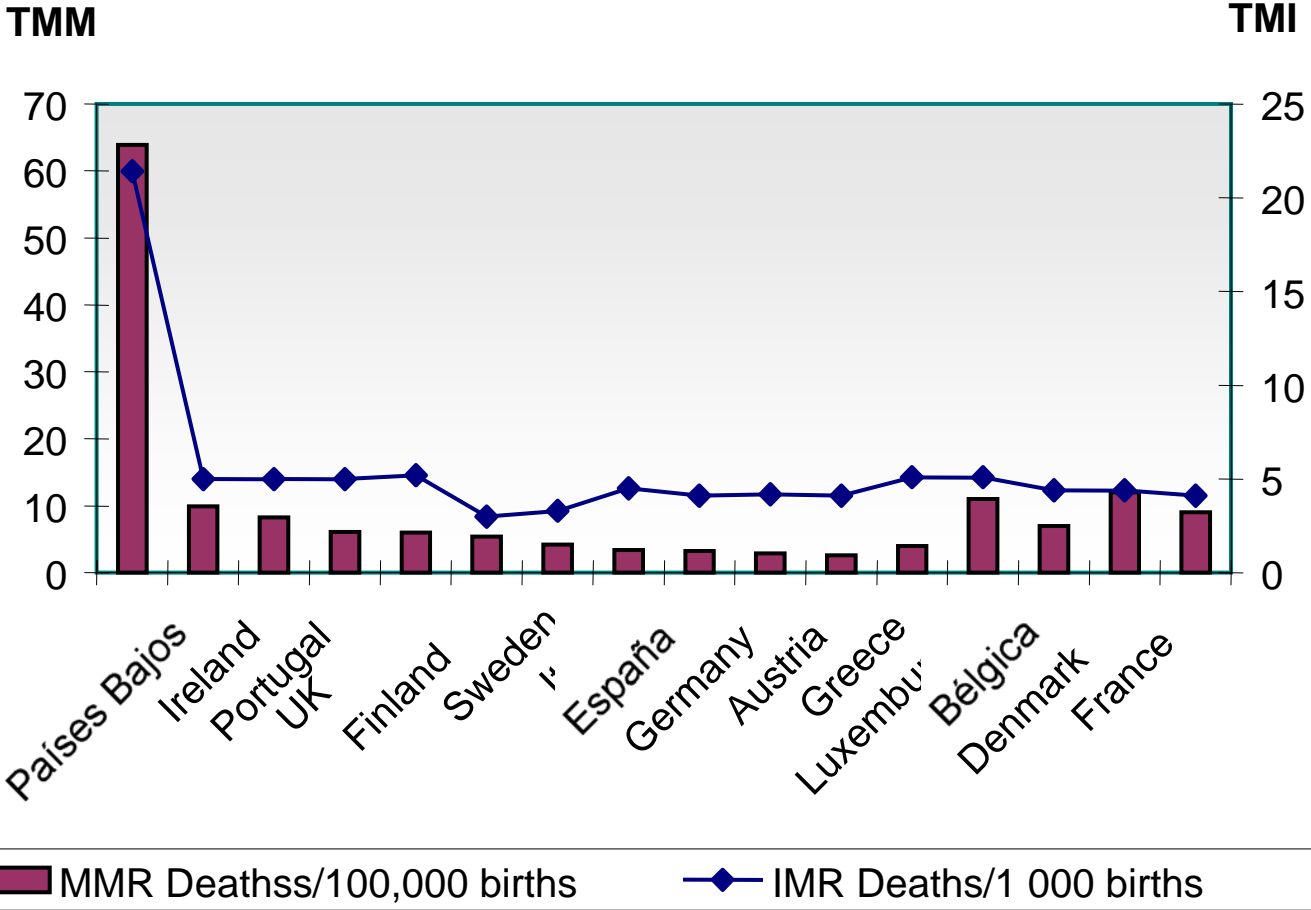
- MMR in Nuevo León and Aguascalientes provinces is like one in high income countries, but in Chiapas and Guerrero provinces is five times higher than those provinces.
- Indigenous woman shows anemia while the national average is 26%.
- The average age of breast cancer in Chiapas province is 49 years, while in Yucatán reaches 72 years
- The mortality rate of cervical-uterine cancer in Mexico is twice as that in Uruguay or Argentina y 0.5 times higher than that in Chile and Costa Rica.

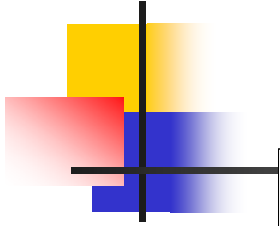
## Mexican poor population (*millions*) (1963 – 2000)

Years	Extreme poor people (millions)	Poor People (millions)	Total poverty people (millions)	Non-poor people (millions)	Total population (millions)
1963	23.4	4.7	28.1	10.4	38.5
1984	31.2	14.5	45.7	20.5	76.2
1994	27.9	17.7	45.6	43.8	89.4
1996	37.2	18.5	55.7	36.9	92.6
2000	30.1	20.0	50.1	47.6	97.7
Source	Own estimates from Hernández Laos, E.. Globalización, desigualdad y pobreza. UAM y PyV, 2003.				

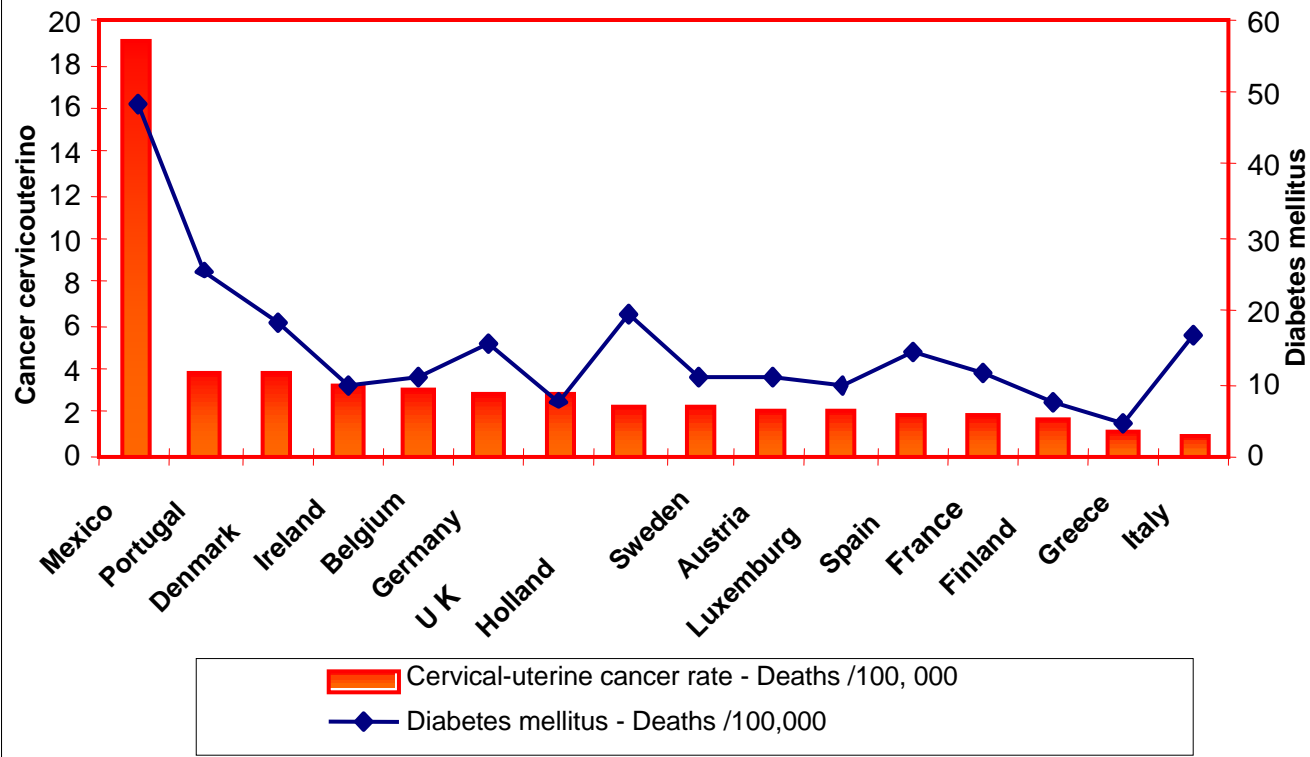


### European Union, 2001: IMR and MMR

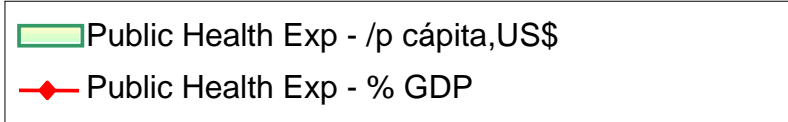
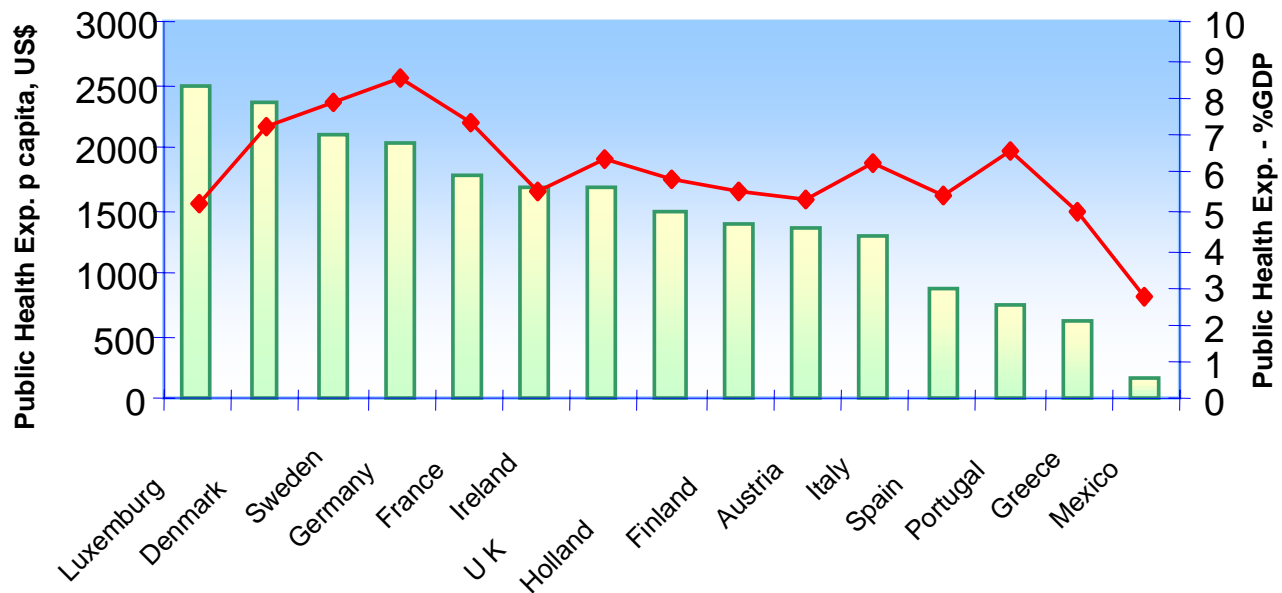




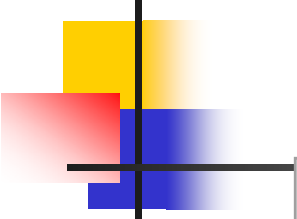
## European Union, 2001: Cervical-uterine cancer rate and Diabetes Mellitus rate



### European Union and Mexico, 2001: Public Health Expenditure



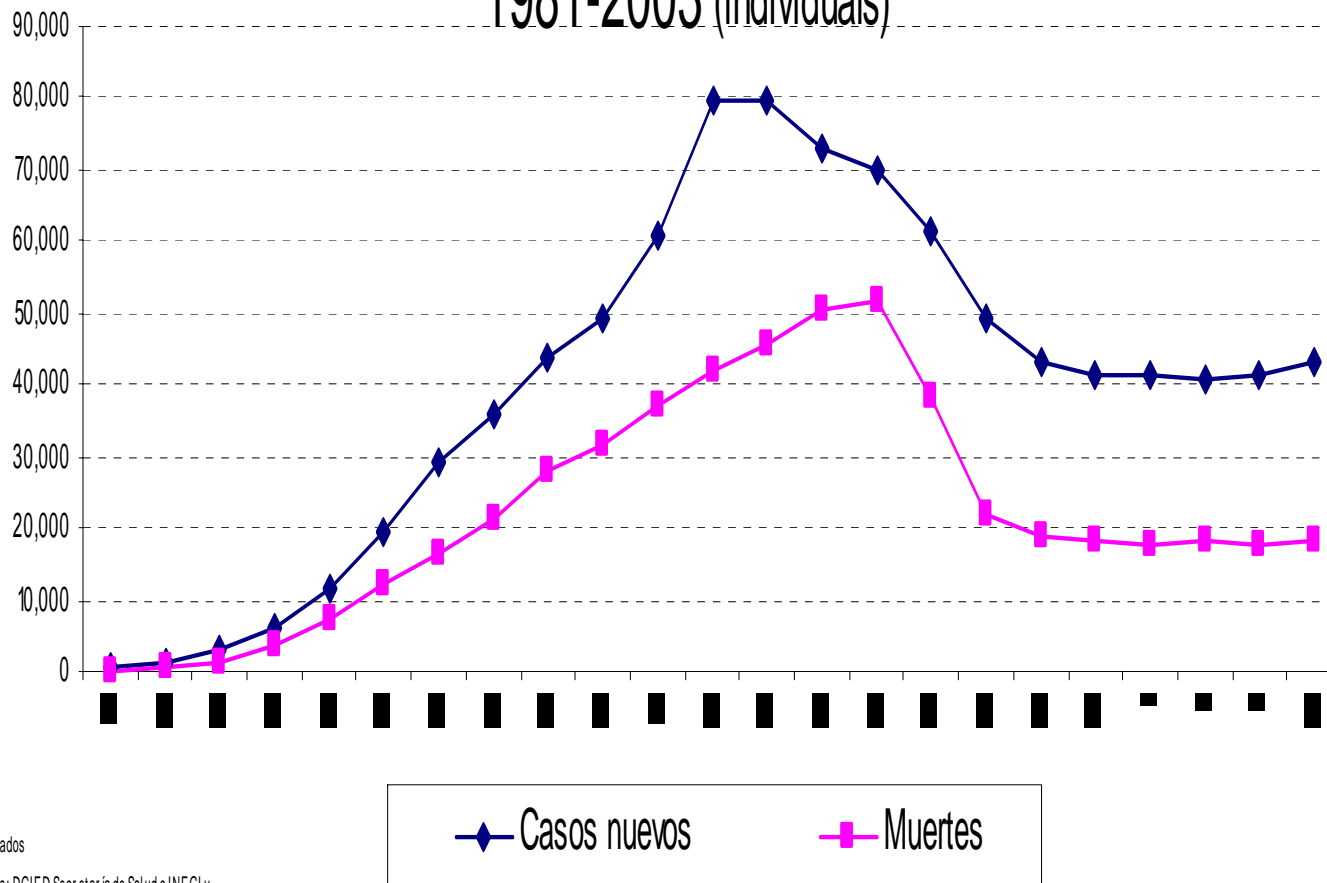
# Health systems: equity and financing



Health systems	Financing	Gestión	Equity financing	Equity access
Liberal	Fee for event	Market	Regressive	Low
Voluntary insurance	Prime según riesgo	Market	Regressive	Moderate
Compulsory insurance	Salary share	Burocratic	Medium Progressive	High
National health system	General Taxes	Burocratic	Progressive	High

Source: Manuel-Keenoy E. y Oleaga-Usategui J.L. **Análisis de los Sistemas Sanitarios**. Granada, Escuela Andaluza de Salud Pública, 2000.

# AIDS in USA: Number of new cases and deaths per year, 1981-2003 (individuals)

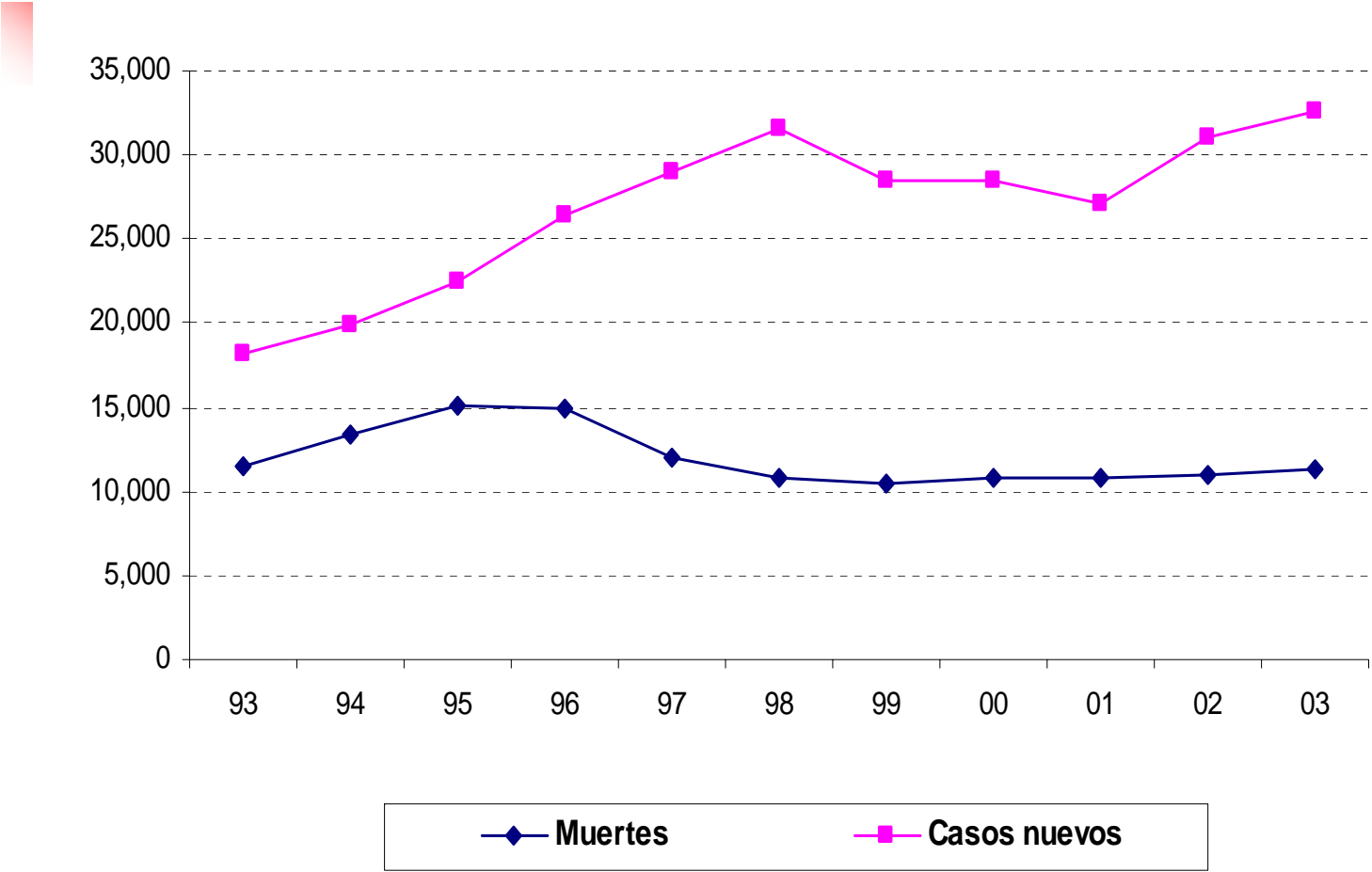


\*Estimados

Fuentes: DGIED Secretaría de Salud e INEGI y

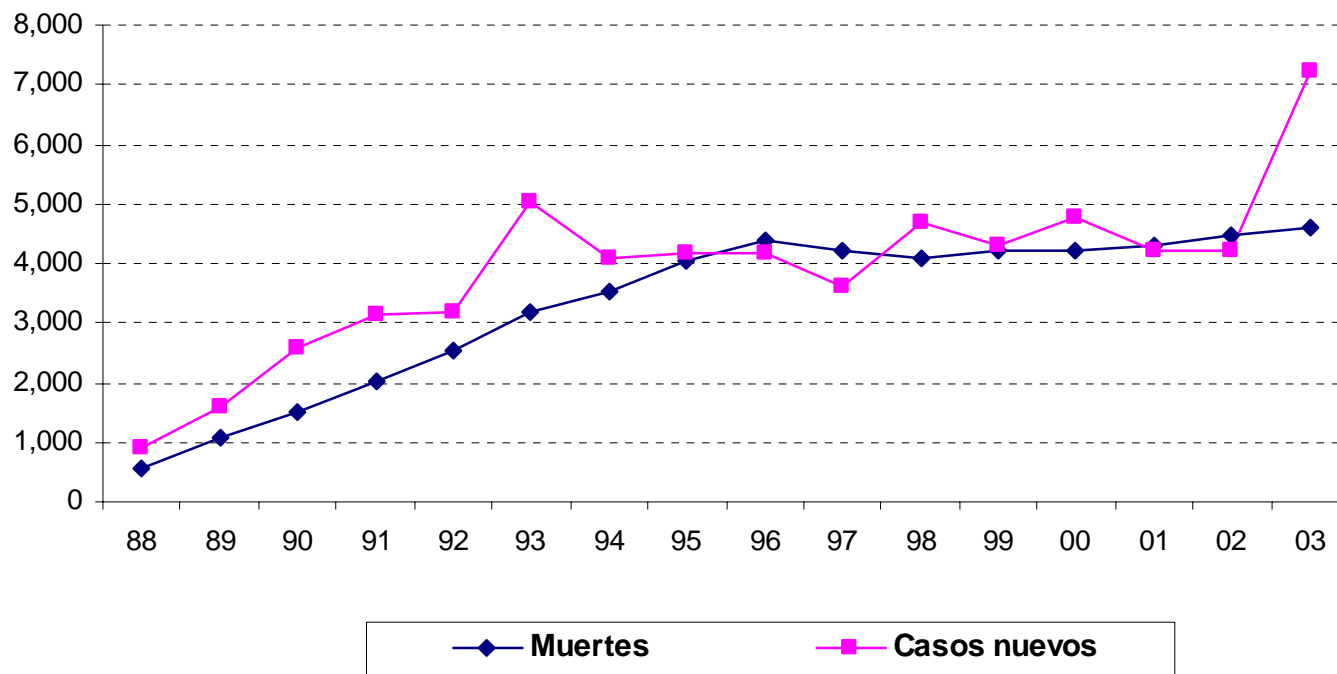
[www.bea.gov](http://www.bea.gov)

# Aids in Brasil: number of new cases and deaths per year (individuals), 1993-2003

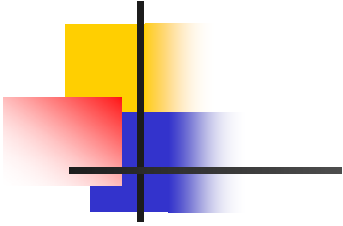


Fuentes: DGIED Secretaría de Salud e INEGI

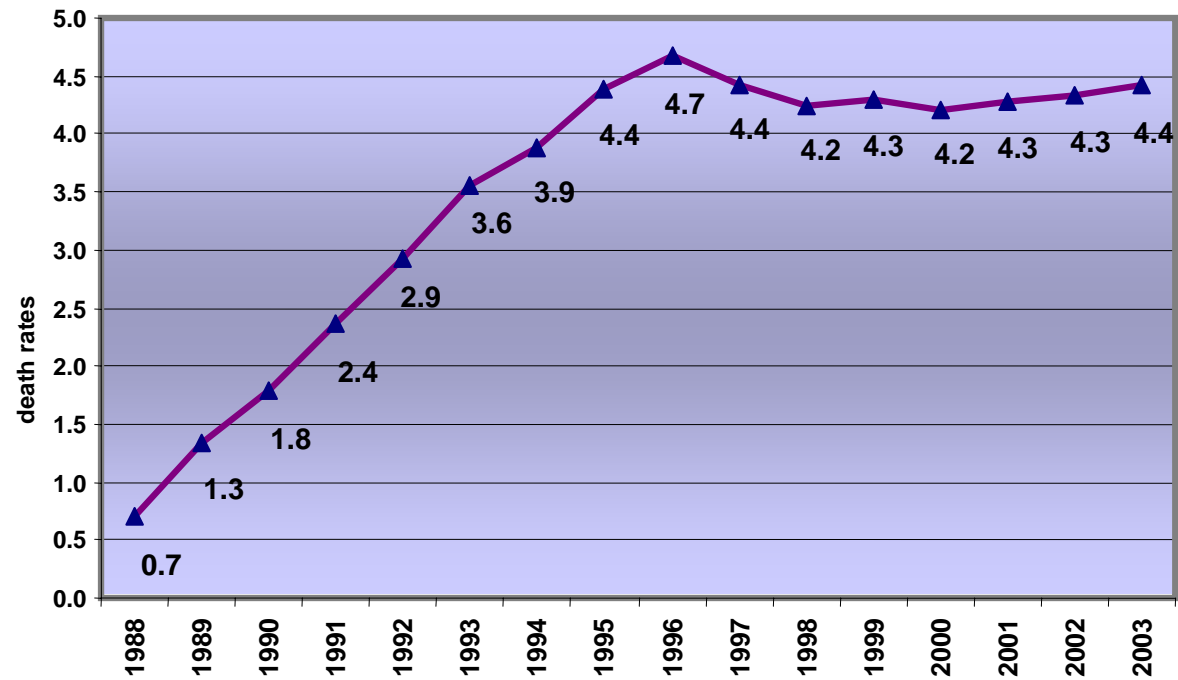
## AIDS in Mexico: number of new cases and deaths (individuals), 1988-2003



Fuentes: DGIED Secretaría de Salud e INEGI

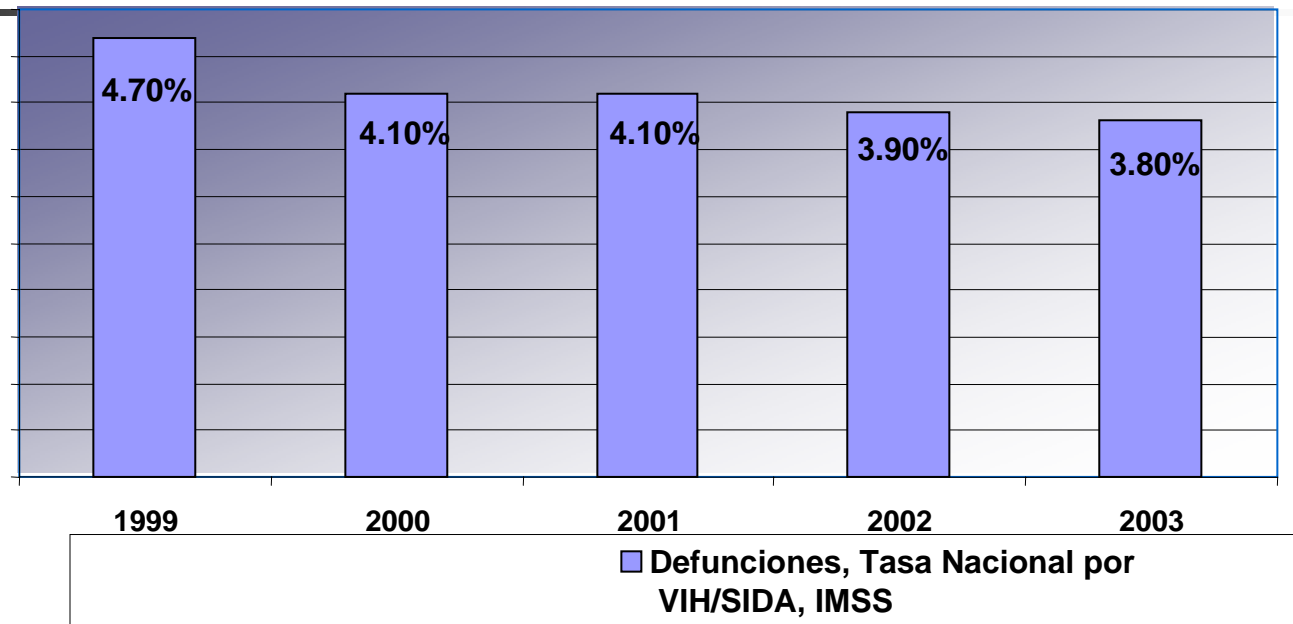


## Mexico: HIV/AIDS Total Death Rate, 1988-2003



Source: DGIED, Secretaría de Salud, retes by 100 000 peple

**Mexico: Social Security System (IMSS) HIV/Aids Death rates  
per 100,000 covered people 1999-2003**



Source: Own estimates from data of Sistema Institucional De Mortalidad (SISMOR), Rev. Med. IMSS, 1999,2000,2001,2002 y 2003



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- Objective: It is to analyze the relationship of health's public financing, and especially with an econometrics model, it is studied the relationship of health with income inequity and gross domestic product per-capita for the case of Mexico during the period 1980 – 2002
- Methodology. A model of time series lineal regression is presented for the period 1980 - 2002, where the incidence of Per capita GDP ( $GDP_{pc}$ ) is studied as well as the Gini's income inequity index ( $GINI$ ) on two of the most important health level of the general population indicators, as the mother's death rate ( $MMR$ ) and children under five years old death rate ( $IMR$ ). Also, it is studied the relationship between health public expenditure ( $PE$ ) with the income level per capita ( $GDP_{pc}$ ) and Gini's ( $GINI$ ) income inequity. Variables were transformed with the first differences (in order to avoid spurious coefficients) and logarithms.



# Econometric models

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## Regression Model

$$\Delta(\log(MMR)) = \beta_1 \Delta(\log(GDP_{pe})) + \beta_2 \Delta(\log(GINI)) + \varepsilon_t \quad ec.1$$

$$\Delta(\log(IMR)) = \beta_3 \Delta(\log(GDP_{pe})) + \beta_4 \Delta(\log(GINI)) + \varepsilon_t \quad ec.2$$

$$\Delta(\log(PE)) = \beta_7 \Delta(\log(GDP_{pe})) + \beta_8 \Delta(\log(GINI)) + \varepsilon_t \quad ec.3$$



## Results ec1

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$$MMR = -0.27 \underset{(-1.98)^{***}}{GDP_{pc}(-3)} + 0.52 \underset{(3.55)^{***}}{GINI_{(-1)}} + 0.66 \underset{(7.35)^{***}}{AR(1)} - 0.97 \underset{(-82.07)^{***}}{MA(1)}$$

$$D.W. = 1.95 \quad R^2_{aj} = 0.22 \quad Akaike = -3.26 \quad Schwarz = -2.97$$
$$F = 3.96^*$$

NB: The number of delays is indicated with a sub-index at the end of the estimated variable. Values of the statistic t are reported in parenthesis. Significance: \*\*\*99%; \*\*95%; \*90%.

$GDP_{pc}$  coefficient in relation  $MMR$  presents a negative and a non-elastic value of  $-0.27$ , that is to say, for each 1% that  $GDP_{pc}$  increases,  $MMR$  will decrease 0.27% with three years of delay. This coefficient implies a decrease of 270 mother's death for each 100,000 births, or viceversa, for each 0.27% that  $MMR$  decreases,  $GDP_{pc}$  increases 1%. So, an increment in health levels measured by the  $MMR$  will have positive effects over economic growth. Gini's coefficient in relation to  $MMR$  presents a positive and elastic coefficient of 0.52 with a year's delay, implying that for each 1% of income's inequality,  $MMR$  will increase the following year 0.52%, that is to say, a increment of one per cent of Gini's coefficient results in 520 maternal deaths for each 100,000 births.

## Results ec 2

$$IMR = -0.25 \underset{(-2.27)^{***}}{GDP_{pc}^{(-1)}} + 0.45 \underset{(3.72)^{***}}{GINI} + 0.87 \underset{(12.83)^{***}}{AR(3)} - 0.92 \underset{(-16.55)^{***}}{MA(2)}$$

$$D.W. = 2.18 \quad R^2_{aj} = 0.30 \quad Akaike = -4.39 \quad Schwarz = -4.19$$
$$F = 3.52^*$$

NB: The number of delays is indicated with a sub-index at the end of the estimated variable. Values of the statistic t are reported in parenthesis. Significance: \*\*\*99%; \*\*95%; \*90%.

The  $GDP_{pc}$  coefficient in relation to  $IMR$  presents a value of -0.25 indicating that when  $GDP_{pc}$  increases 10%, children's death rate will decrease a year after in 2.5%, that is to say, that income's increase in 10% would avoid the death of 25 children nationally. Gini's elasticity coefficient in relation to  $IMR$  presents a value of 0.45 positive, that is to say, when the  $GINI$  independent variable increases 10% the  $IMR$  will increase 4.5%. The more unequal the distribution of income, the largest the children's death rate.



## Results ec 3

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$$PE = 0.62 GDP_{pc(-2)} - 0.83 GINI_{(-2)}$$

(-2.15)\*\*\*                      (1.96)\*\*\*

D.W. = 2.02

R<sup>2</sup>aj = 0.28

Akaike = -2.72

Schwarz = -2.62

F = 7.62\*\*\*

NB: The number of delays is indicated with a sub-index at the end of the estimated variable. Values of the statistic t are reported in parenthesis. Significance: \*\*\*99%; \*\*95%; \*90%.

$GDP_{pc}$  elasticity coefficient in relation to  $PE$  presents a significant and elastic value of 0.62, so the increment of  $GDP_{pc}$  in 10% would increase health's public expenditure in 6.2% two years after. Gini's elasticity coefficient in relation to  $PE$  presents elasticity of -0.83 negative, and almost unitary elasticity for each 10% the Gini's coefficient increases,  $PE$  health's public expenditure will decrease -8.3% or viceversa, for each 10%  $PE$  diminishes,  $GINI$  would grow 8.3%, where the health's public expenditure would have, as a consequence, an increment on income's inequality.



## Conclusions

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- The objective of a better functioning of Mexico's health system will not be achieved on the basis of a system that operates under large income inequalities and the diminishing of the health's public expenditure