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## Mortality in children under 15 years of age due to non-transmissible diseases (México, 2000-2014)

Sonia Fernández Cantón<sup>1</sup>, Ana María Hernández Martínez<sup>2</sup>

<sup>1</sup>Comisión Nacional de Arbitraje Médico, <sup>2</sup>Analista Independiente, México D.F., México

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Generally speaking, mortality due to nontransmissible diseases (NTD) refers to deaths of the population in general or specifically to a group of adults, considering that chronic degenerative causes are those that have registered the highest increase in recent decades for this population. In this sense, and based on the fact that previously the mortality of children < 15 years of age has been addressed in the *Boletín Médico Hospital Infantil de México* both for infectious diseases<sup>1</sup> as well as for those due to violent<sup>2</sup> or accidental<sup>3</sup> causes, the analysis now presented refers precisely to mortality occurring as a result of NTD.

In Mexico, the number of deaths of children < 15 years of age was ~39,000 in 2013 (26% less than in 2000). Of these, 38% occurred as a result of some type of NTD. This proportion has been increasing because in 2000 it accounted for 29% of deaths. This can be explained by the significant progress in the health sector in the scope of infectious diseases despite the fact that they continue to be responsible for more than half of all deaths in this age group (Table 1). In terms of evolutionary rates, these have remained virtually constant over the period analyzed because, during those years, the population remained at ~33-34 million persons < 15 years of age.

For purposes of this communication, information generated by the death statistics of INEGI/SSA<sup>4</sup> have been considered whose most recent final data correspond to the year 2013. The list of *Global Burden of Disease* (GBD) was considered because the ICD-10<sup>5</sup> presents NTD according to ten major subdivisions. According to a description of the demographic aspects of deaths occurring as a result of NTD in the early stages of life, males are most affected (54%), although with slight variations under specific conditions. With regard to age group, taking as a main category persons < 15 years of age, > 60% of deaths from these causes occur before the first year of life, followed by the 1- to 4-year-old age group.

Regarding the structure of mortality and because of its frequency, the majority of deaths are caused by congenital anomalies, comprising 56.7% of deaths of children < 15 years of age due to NTD (Table 2). Next in importance are mainly malignant tumors as well as other types of tumors, with 13% of deaths. These are followed by mental disorders and diseases of the central nervous system (8.3%), cardiovascular diseases (6.2%) and gastrointestinal diseases (5.9%). Specifically, some of the conditions that trigger mortality in early life are mentioned below:

Correspondence: Dra. Sonia B. Fernández Cantón  
E-mail: sonia\_fernandez@prodigy.net

**Table 1 Deaths of children < 15 years of age, 2000-2013**

Year of death	Total deaths	NTD	Mortality rate due to NTD*	Relative weight of NTD	Population < 15 years
2000	52,759	15,337	45.1	29.1	33,986,157
2001	49,668	14,589	42.9	29.4	34,028,914
2002	50,456	14,661	43.0	29.1	34,080,765
2003	47,012	14,186	41.6	30.2	34,120,842
2004	46,017	14,190	41.6	30.8	34,119,853
2005	45,892	14,585	42.8	31.8	34,086,150
2006	43,684	14,378	42.2	32.9	34,039,928
2007	43,068	14,977	44.0	34.8	34,001,325
2008	41,864	14,952	44.0	35.7	33,976,568
2009	41,924	15,110	44.5	36.0	33,944,340
2010	41,007	15,154	44.7	37.0	33,870,805
2011	41,029	14,762	43.7	36.0	33,782,824
2012	40,586	14,861	44.1	36.6	33,695,863
2013	38,969	14,909	44.4	38.3	33,608,276
Total	623,935	206,651	43.5	33.1	475,342,610

NTD, nontransmissible diseases.

\*Per 100,00 inhabitants 15 years and older.

Source: INEGI/SSA Death Statistics (various years). Taken from dynamic cubes at <http://pda.salud.gob.mx/cubos/>.

- a) Under the heading of congenital anomalies are congenital heart malformations (47.9%), anencephaly and similar abnormalities (2.8%), abdominal wall defects (2.6%) and Down syndrome (2.5%). Note that although there is some consensus that it is not possible to assign a specific cause in about half of all deaths from congenital anomalies, some causes or risk factors have been identified for the other 50% whose origin can be structural but also functional, as with metabolic disorders present at birth. Among these causes, malnutrition, both macro- and micronutrient, and exposure to agents or factors that induce or increase the incidence of abnormal prenatal development, particularly alcohol and infections, are mentioned. Advanced maternal age also increases the risk of some chromosomal abnormalities such as Down syndrome. Furthermore, according to various studies, consanguinity between first cousins increases the prevalence of rare congenital anomalies in which there are often intellectual disabilities (Figure 1).
- b) With regard to tumors, leukemias clearly are highlighted which, along with lymphomas and myelomas, account for half of all deaths in this age group (49.5%). The remaining half relates to other tumors because cases are evenly distributed among multiple tumor types. As for causality that determines the appearance of leukemia, there is no certainty. Various factors are mentioned, such as the emission of radiation and certain chemicals. In this sense, children (and adults) who are treated with certain chemotherapy drugs are at increased risk of developing another type of cancer at some point in their lives. Some studies mention a possible link between childhood leukemia and exposure to pesticides in homes, either during pregnancy or during early childhood.
- c) With respect to mental disorders, the most weighted as a specific cause is epilepsy (296) followed by dementia and other degenerative and hereditary disorders (116). In this section there is a group of 766 deaths whose cause is subdivided into various disorders with relatively low frequency. The causes of the emergence of these problems are not easy to identify although there are signs of psychosocial and environmental causes such as a negative life event, an emotional difficulty or high levels of family stress, lack of social support or lack of personal resources for treatment monitoring. This may affect the diagnosis, the process relating to the care of the disease and thus, the consequences and probable prognosis.
- To conclude this brief analysis, we should reflect on the fact that the plight of NTD in the early stages of life beyond the maximum damage is suffered by certain individuals. The population that survives these problems (or at least do not die in the first stage of life) experiences a decrease in quality of life, accompanied in many cases with varying degrees of disability, pain and suffering.

Table 2 Mortality of children &lt; 15 years of age according to subdivision of the GBD with disaggregation of NTD (Mexico, 2000-2013)

Groups of causes according to the GBD list	Year of registry of death														Total
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
I. Transmissible diseases, maternal, perinatal and nutritional	30.337	27.800	28.695	26.217	25.401	25.079	23.046	22.225	21.335	21.039	20.404	20.624	20.080	18.772	331.054
II. NTD	15.337	14.589	14.661	14.186	14.190	14.585	14.378	14.977	14.952	15.110	15.154	14.762	14.861	14.909	206.651
A Malignant tumors	1.654	1.600	1.559	1.591	1.627	1.667	1.632	1.579	1.525	1.522	1.607	1.548	1.468	1.470	22.049
B Other tumors	255	247	216	282	250	269	241	255	253	237	223	276	272	272	3.574
C Diabetes mellitus	59	57	61	54	46	58	49	37	36	50	46	38	44	33	668
D Endocrine, metabolic, hematologic and immunologic diseases	655	580	596	611	560	590	566	691	716	756	685	661	701	750	9.118
E Mental alterations and CNS diseases	1.052	1.102	1.164	1.129	1.049	1.143	1.145	1.227	1.193	1.360	1.195	1.178	1.176	1.185	16.298
F Diseases of sensory organs	4	5	3	1	2	-	4	5	2	2	1	1	4	5	39
G Cardiovascular diseases	696	660	712	669	622	671	671	957	940	1.010	1.020	885	1.034	1.075	11.622
H Respiratory diseases	1.127	975	972	728	827	806	725	1.201	1.285	1.119	1.238	754	786	854	13.397
I Gastrointestinal diseases	759	776	759	795	778	788	754	903	846	905	893	835	889	980	11.660
J Diseases of the genitourinary system	463	444	472	439	437	406	407	427	434	457	366	383	391	428	5.954
K Skin diseases	11	14	10	11	14	12	12	27	24	27	36	39	25	17	279
L Diseases of the musculoskeletal system	54	43	56	56	50	58	64	62	76	52	76	61	57	64	829
M Congenital anomalies	8.546	8.084	8.079	7.818	7.927	8.116	8.102	7.599	7.616	7.613	7.768	8.074	8.007	7.772	111.121
N Diseases of the mouth	2	2	2	2	1	1	6	7	6	-	-	7	3	4	43
III. External causes of morbidity and mortality	6.373	6.507	6.418	5.936	5.768	5.554	5.634	5.072	4.878	5.014	4.623	4.935	4.875	4.539	76.126
IV. Non-well-defined causes	712	772	682	673	658	674	626	794	699	761	826	708	770	749	10.104
General total	52.759	49.668	50.456	47.012	46.017	45.892	43.684	43.068	41.864	41.924	41.007	41.029	40.586	38.969	623.935

GBD, Global Burden of Disease. Source: INEGI/SSA Death Statistics, various years. Taken from dynamic cubes at <http://pda.salud.gob.mx/cubos/>

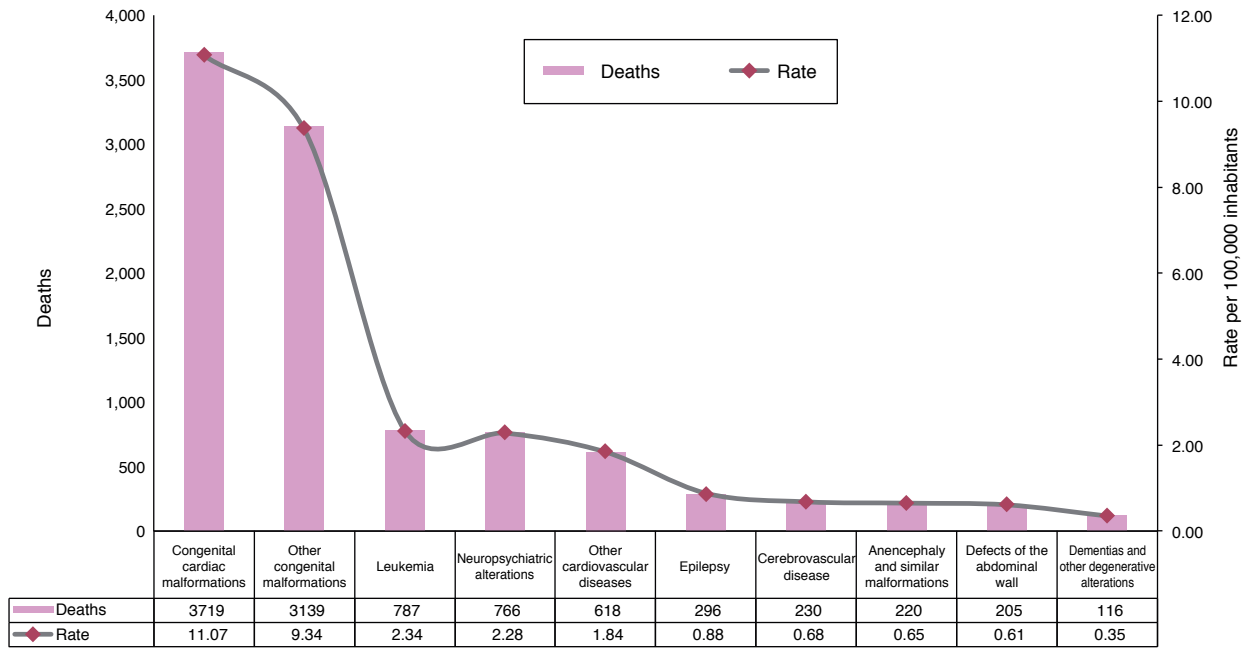


Figure 1 Principal causes of deaths in children <15 years of age due to nontransmissible diseases. México, 2013.

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