# La Carga de la Enfermedad, las Lesiones y los Factores de Riesgo en México 1990- 2013: resultados a nivel Nacional y Estatal

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# Economía y Salud, 1994

# Definición

- El Concepto de *"La Carga"* proviene de una traducción de *"The Burden"* que quiere decir, *"carga, lastre, peso"*

- Entonces se trata de la carga o el peso que las enfermedades, las lesiones y los factores de riesgo le generan al Sistema de Salud.

- Es el lastre con el que se tiene que mover el sistema….

- El estudio de la Carga Mundial de la Enfermedad, es un *esfuerzo científico sistemático* para cuantificar la magnitud comparativa de las pérdidas de salud por enfermedades, lesiones y factores de riesgo; por edad, sexo, zonas geográficas y puntos específicos en el tiempo

# Midiendo la Carga

- Para medir la carga o el peso de la enfermedad se usan indicadores compuestos

- En lugar de contar las muertes y los casos de enfermedad  o discapacidad, QUE NO SE PUEDEN AGREGAR, se calcula el **tiempo** perdido por muerte prematura y el **tiempo** vivido con discapacidad

$$AVISA = APMP + AVD$$

| Pérdida de la salud | Pérdida de la salud debida a muerte prematura | Pérdida de la salud debida a vivir con una discapacidad |

# Fuentes de datos para el GBD por estados

- Para correr los modelos de causas de muerte y casos, se construyó una matriz de covariables de 1990 a 2013. Se requerían 363 y se completó 80% a nivel estatal

- Para calcular los Años perdidos por Muerte Prematura se emplearon las bases de datos de defunciones del INEGI de 1980 a 2013

- Para calcular los resultados no letales se emplearon resultados de las encuestas de salud (1987 a 2012), registros epidemiológicos y estudios epidemiológicos especiales (publicaciones), así como los egresos hospitalarios

- Para calcular la carga atribuible a los factores de riesgo se generaron variables a nivel estatal, regional o nacional para 58 de los 79 factores de riesgo estudiados

# ¿Quienes hicieron los cálculos del estudio de México?

- Los datos que se usaron para los cálculos fueron proporcionados por un grupo de investigadores mexicanos

- Los modelos para generar resultados se realizaron en Seattle (IHME)

- Los resultados publicados derivan de la revisión de los colaboradores del mundo, incluyendo los mexicanos

62 investigadores de los Institutos Nacionales de Salud
INSP 47; INNSZ 2; INPs 2; INGer 2, Censida 2

En Seattle, en la UW se ubican mas de 20 investigadores y 50 analistas
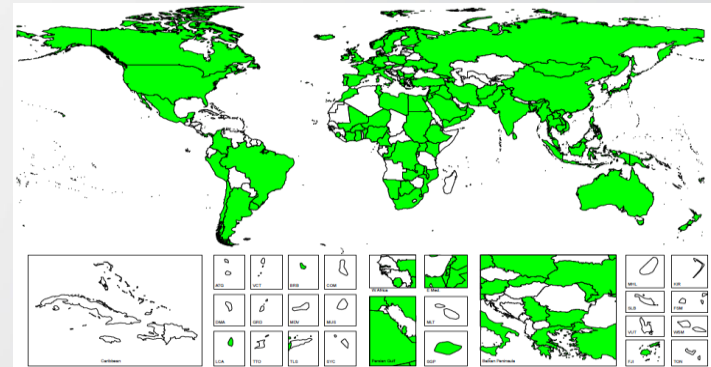


Mas de mil colaboradores en mas de 100 países

# Global, regional, and national cause-specific mortality for 24[...] a systematic analysis for the G[...] Study 2013

*GBD 2013 Mortality and Causes of Death Collaborators\**

## Summary
**Background** Up-to-date evidence on levels and trends fo[...] essential for the formation of global, regional, and natior[...] 2013 (GBD 2013) we estimated yearly deaths for 188 count[...] whether there is epidemiological convergence across coun[...]

**Methods** We estimated age-sex-specific all-cause mortality usi[...] accuracy applied to an updated database of vital registration[...] death as in the GBD 2010. Key improvements included the a[...] an updated verbal autopsy literature review, two new and det[...] Turkey, and Russia. We improved statistical models for ga[...] strategies across the 240 causes; cause of death ensemble m[...] sufficient information. Trends for Alzheimer's disease an[...] prevalence studies. For pathogen-specific causes of diarrhoe[...] approach. We computed two measures of convergence (ineq[...] all pairs of countries (Gini coefficient) and the average absolu[...] we used multiple decrement life-tables to decompose probab[...] 15 years to exact age 50 years, and from exact age 50 years [...] causes. For all quantities reported, we computed 95% uncer[...] within each age-sex-country-year group to sum to all-cause n[...]

**Findings** Global life expectancy for both sexes increased[...] (UI 71·0–71·9) in 2013, while the number of deaths inc[...] (UI 53·6–56·3) over the same interval. Global progress ma[...] differences between countries decreased but relative differe[...] 75 years and for men aged 20–49 years and 65 years an[...] Decomposition of global and regional life expectancy showe[...] rates for cardiovascular diseases and cancers in high-incor[...] lower respiratory infections, and neonatal causes in low-inc[...] sub-Saharan Africa. For most non-communicable causes of death[...] whereas for most non-communicable causes, demographic[...] standardised death rates. Global deaths from injury increase[...] 2013; but age-standardised rates declined over the same peri[...] year in 2013, age-standardised death rates increased between[...] fibrillation and flutter, drug use disorders, diabetes, chronic [...] lower respiratory infections, neonatal causes, and malaria an[...] 5 years. The most important pathogens are rotavirus for di[...] Country-specific probabilities of death over three phases of l[...]

**Interpretation** For most countries, the general pattern of m[...] with a progressive shift towards a larger share of the ren[...] injuries. Assessing epidemiological convergence across co[...] of inequality is used. Nevertheless, age-standardised death [...] the potential for reversals in some countries. Important g[...] for some countries; for example, no national data for Indi[...]

**Funding** Bill & Melinda Gates Foundation.

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# Global, regional, a[...] years lived with d[...] and injuries in 18[...] analysis for the Gl[...]

*Global Burden of Disease Study 2013 Col[...]*

## Summary
**Background** Up-to-date evidence a[...] with disability (YLDs) is an essen[...] Disease Study 2013 (GBD 2013) [...] 188 countries between 1990 and 2[...]

**Methods** Estimates were calculate[...] with some important refinements[...] additions to the analysis. Key im[...] reviews, use of detailed injury cod[...] severity splits for various causes. A[...] cause and impairment during thr[...] data were used and documented to[...] simulation provides estimates for[...] Disability weights were updated w[...]

**Findings** Disease and injury were[...] rose substantially with age and in[...] infectious diseases and short-term[...] disease episodes in 2013, with the[...] incident cases in 2013. Conversely[...] with prevalence estimates for asy[...] respectively. The distribution of th[...] relation between age and disea[...] 764·8 million in 2013 due to pop[...] 114·87 per 1000 people to 110·31[...] pain and major depressive disord[...] major cause groups, indicated the[...] disorders, neurological disorder[...] increasing YLDs in sub-Saharan [...] globally from 21·1% in 1990 to 31[...]

**Interpretation** Ageing of the worl[...] sequelae of diseases and injuries.[...] dimensions of disease and injury[...] fatal outcomes as the dominant s[...] results can guide future health in[...] of variation across countries.

**Funding** Bill & Melinda Gates Fou[...]

## Introduction
The Global Burden of Disease St[...] the first of a series of yearly upda[...] that began with estimates for [...] recently updated to 2010. The 2[...] systematically quantified prevale[...]

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# Global, regional, and[...] of 79 behavioural, e[...] metabolic risks or cl[...] 1990–2013: a syster[...] Disease Study 2013

*GBD 2013 Risk Factors Collaborators\**

## Summary
**Background** The Global Burden of Dis[...] annual updates of the GBD. Risk fac[...] emerging threats to population health[...] to update the comparative risk assessr[...] counterfactual risk distribution.

**Methods** Attributable deaths, years of[...] have been estimated for 79 risks or c[...] explicit evidence criteria were assesse[...] risk exposure, relative risks, and the t[...] hierarchy with blocks of behavioural,[...] hierarchy. The next level in the hierar[...] detail provided at levels 3 and 4 of th[...] handwashing practices, occupational [...] sex, and low glomerular filtration rat[...] regression method, DisMod-MR 2.0, [...] meta-regressions of published cohort [...] combined took into account evidence [...] other risks such as high systolic blood [...]

**Findings** All risks combined account[...] (40·1–43·0) of DALYs. Risks quantifi[...] to a low of 0% for neonatal disorder[...] 2013, six risks or clusters of risks ea[...] deaths and 241·4 million DALYs, hig[...] child and maternal malnutrition for [...] deaths and 143·5 million DALYs, air[...] 4·4 million deaths and 134·0 million [...] In sub-Saharan Africa, the leading ri[...] sanitation, and handwashing. In wo[...] East, and in many other high-incon[...] pressure as the leading risk in most c[...] blood pressure or tobacco use are the [...] Middle East, Europe, and Asia. For [...] South Africa.

**Interpretation** Behavioural, environme[...] and more than one-third of global D[...] attributable burden of high BMI has [...] factors, behavioural and social scien[...] prevention and primary care policy op[...]

**Funding** Bill & Melinda Gates Founda[...]

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# Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition

*GBD 2013 DALYs and HALE Collaborators\**

## Summary
**Background** The Global Burden of Disease Study 2013 (GBD 2013) aims to bring together all available epidemiological data using a coherent measurement framework, standardised estimation methods, and transparent data sources to enable comparisons of health loss over time and across causes, age–sex groups, and countries. The GBD can be used to generate summary measures such as disability-adjusted life-years (DALYs) and healthy life expectancy (HALE) that make possible comparative assessments of broad epidemiological patterns across countries and time. These summary measures can also be used to quantify the component of variation in epidemiology that is related to sociodemographic development.

**Methods** We used the published GBD 2013 data for age-specific mortality, years of life lost due to premature mortality (YLLs), and years lived with disability (YLDs) to calculate DALYs and HALE for 1990, 1995, 2000, 2005, 2010, and 2013 for 188 countries. We calculated HALE using the Sullivan method; 95% uncertainty intervals (UIs) represent uncertainty in age-specific death rates and YLDs per person for each country, age, sex, and year. We estimated DALYs for 306 causes for each country as the sum of YLLs and YLDs; 95% UIs represent uncertainty in YLL and YLD rates. We quantified patterns of the epidemiological transition with a composite indicator of sociodemographic status, which we constructed from income per person, average years of schooling after age 15 years, and the total fertility rate and mean age of the population. We applied hierarchical regression to DALY rates by cause across countries and time to decompose variance related to the sociodemographic status variable, country, and time.

**Findings** Worldwide, from 1990 to 2013, life expectancy at birth rose by 6·2 years (95% UI 5·6–6·6), from 65·3 years (65·0–65·6) in 1990 to 71·5 years (71·0–71·9) in 2013, HALE at birth rose by 5·4 years (4·9–5·8), from 56·9 years (54·5–59·1) to 62·3 years (59·7–64·8), total DALYs fell by 3·6% (0·3–7·4), and age-standardised DALY rates per 100 000 people fell by 26·7% (24·6–29·1). For communicable, maternal, neonatal, and nutritional disorders, global DALY numbers, crude rates, and age-standardised rates have all declined between 1990 and 2013, whereas for non–communicable diseases, global DALYs have been increasing. DALY rates have remained nearly constant, and age-standardised DALY rates declined during the same period. From 2005 to 2013, the number of DALYs increased for most specific non-communicable diseases, including cardiovascular diseases and neoplasms, in addition to dengue, food-borne trematodes, and leishmaniasis; DALYs decreased for nearly all other causes. By 2013, the five leading causes of DALYs were ischaemic heart disease, lower respiratory infections, cerebrovascular disease, low back and neck pain, and road injuries. Sociodemographic status explained more than 50% of the variance between countries and over time for diarrhoea, lower respiratory infections, and other common infectious diseases; maternal disorders; neonatal disorders; nutritional deficiencies; other communicable, maternal, neonatal, and nutritional diseases; musculoskeletal disorders; and other non-communicable diseases. However, sociodemographic status explained less than 10% of the variance in DALY rates for cardiovascular diseases; chronic respiratory diseases; cirrhosis; diabetes; urogenital, blood, and endocrine diseases; unintentional injuries; and self-harm and interpersonal violence. Predictably, increased sociodemographic status was associated with a shift in burden from YLLs to YLDs, driven by declines in YLLs and increases in YLDs in musculoskeletal disorders, neurological disorders, and mental and substance use disorders. In most country-specific estimates, the increase in life expectancy was greater than that in HALE. Leading causes of DALYs are highly variable across countries.

**Interpretation** Global health is improving. Population growth and ageing have driven up numbers of DALYs, but crude rates have remained relatively constant, showing that progress in health does not mean fewer demands on health systems. The notion of an epidemiological transition—in which increasing sociodemographic status brings structured change in disease burden—is useful, but there is tremendous variation in disease burden that is not associated with sociodemographic status. This further underscores the need for country-specific assessments of DALYs and HALE to appropriately inform health policy decisions and attendant actions.

**Funding** Bill & Melinda Gates Foundation.

# Se dio a conocer el 14 de septiembre de 2015

## http://www.healthdata.org/results/data-visualizations

# Importante Progreso en Salud



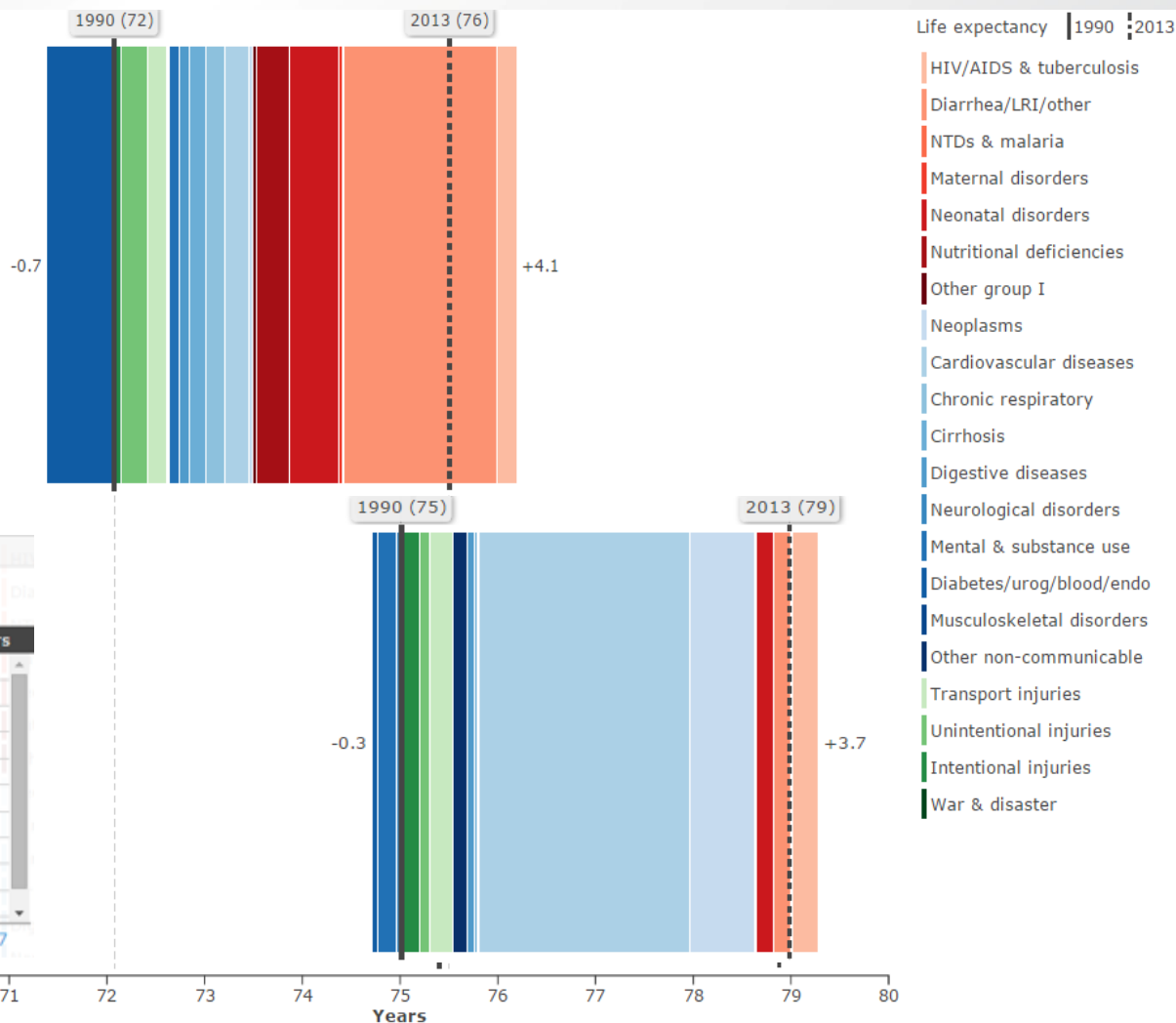Esperanza de Vida al Nacer en ambos sexos
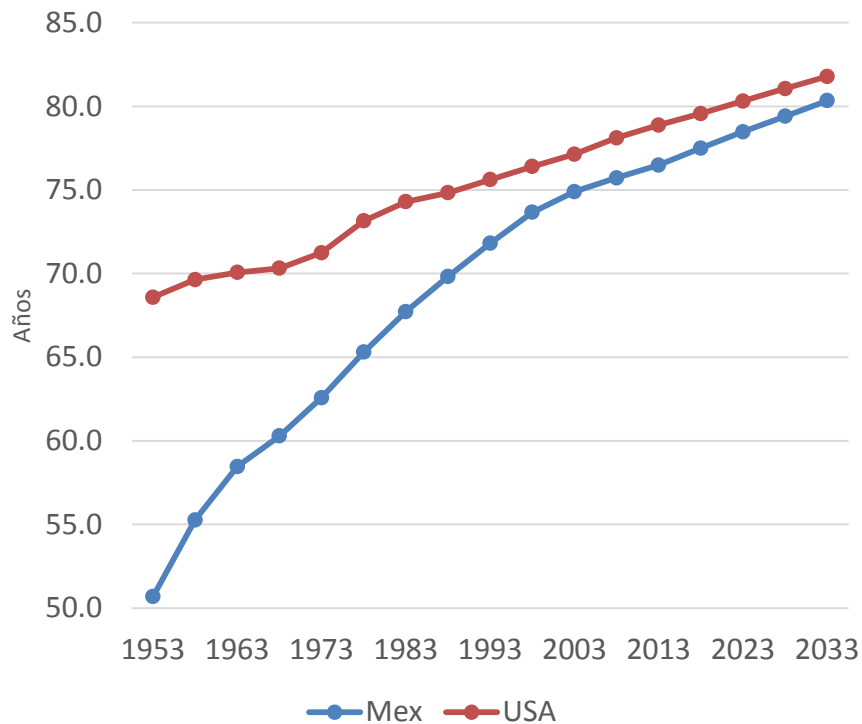
Source: UN. World Population Prospects: The 2015 Revision.

# Descomposición de las causas de muerte que modifican la Esperanza de vida al nacer, México y EUA 1990-2013

Fuente: http://vizhub.healthdata.org/le/

Change in state life expectancy at birth in Mexico: both sexes combined from 1990−2013 by broad cause group
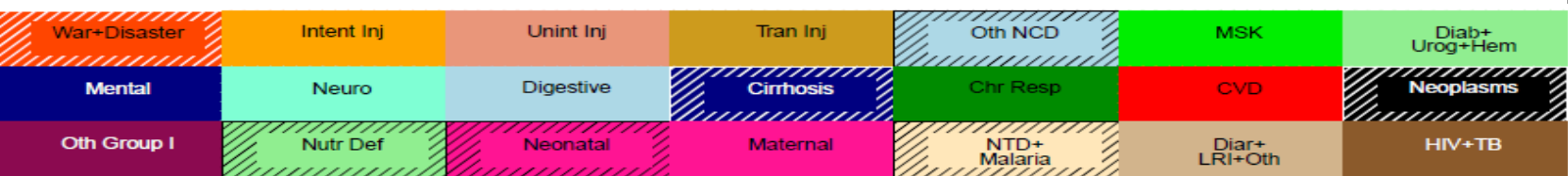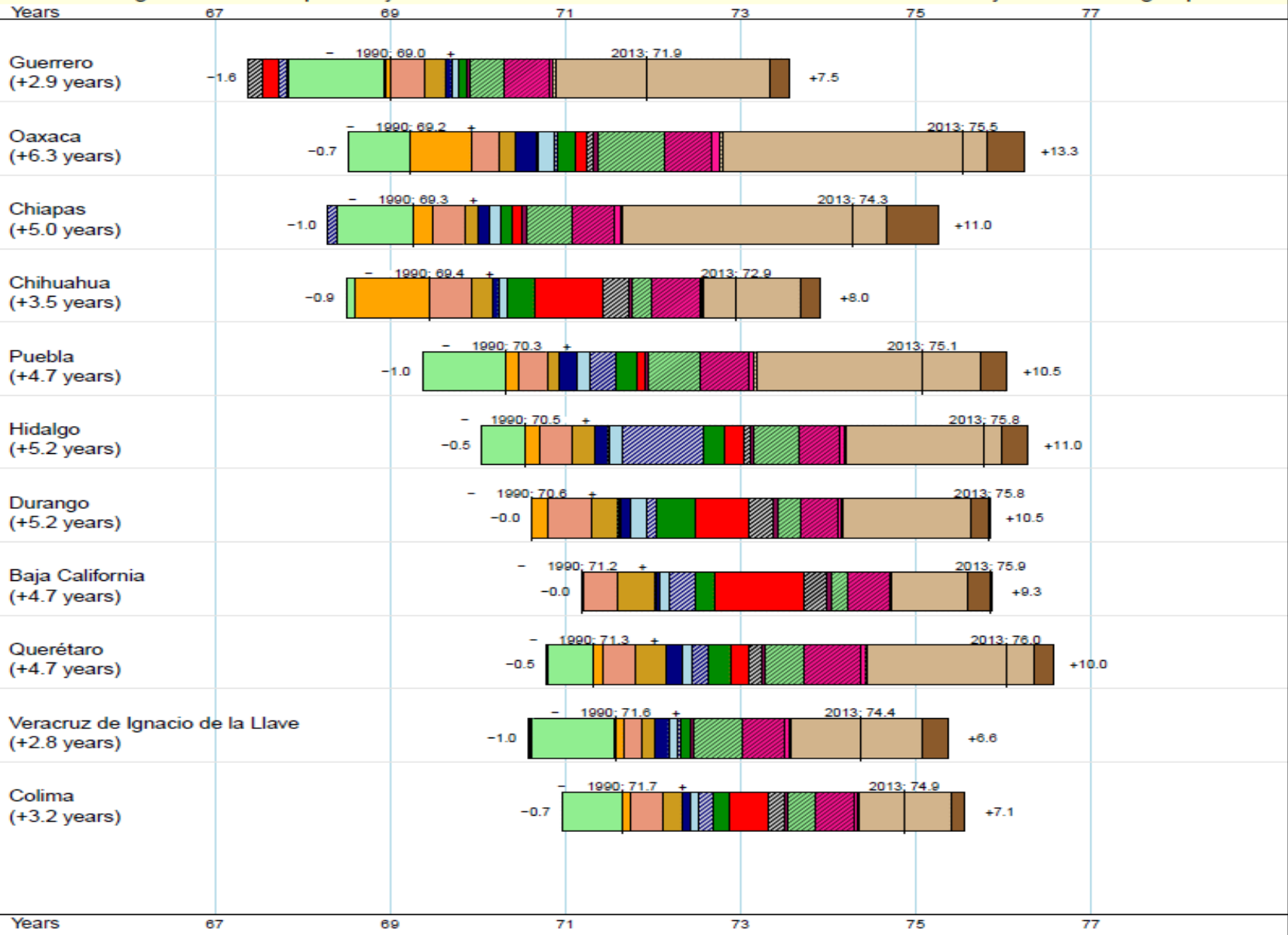
# Determinando prioridades. ¿Qué indicador usar?

| Mortalidad (ajs edad) | % |
|---|---|
| Cardiopatía Isquémica | 14.5 |
| Diabetes mellitus | 9.4 |
| Enf. Renal Crónica | 9.0 |
| Enf. Cerebrovascular | 6.8 |
| Cirrosis | 5.9 |
| Enf. Pulmonar obs. Crónica | 5.5 |
| Enf. de Alzheimer | 4.3 |
| Infecc. Respiratoria baja | 3.6 |
| Ac. de vehículo de motor | 2.9 |
| Homicidios | 2.5 |

| Años Perdidos por Muerte Prematura APMP | % |
|---|---|
| Cardiopatía Isquémica | 9.7 |
| Enf. Renal Crónica | 8.1 |
| Diabetes mellitus | 7.6 |
| Cirrosis | 6.6 |
| Ac. de vehículo de motor | 5.2 |
| Homicidios | 5.1 |
| Anomalías Congénitas | 4.6 |
| Enf. Cerebrovascular | 4.5 |
| Infecc. Respiratoria baja | 3.9 |
| Enf. Pulmonar obs. Crónica | 3.2 |

| Años Vividos con discapacidad AVD | % |
|---|---|
| Depresión | 9.8 |
| Lumbalgia | 8.3 |
| Diabetes mellitus | 6.3 |
| Hipoacusia rel. con la edad | 5.1 |
| Otras enf. Musculo esqueléticas | 4.6 |
| Ansiedad | 3.9 |
| Anemia ferrorpriva | 3.3 |
| Enf. Pulmonar obs. Crónica | 3.3 |
| Dolor de cuello | 3.1 |
| Migraña | 2.8 |

| Años de Vida Saludable perdidos AVISA | % |
|---|---|
| Diabetes mellitus | 7.1 |
| Cardiopatía Isquémica | 6.5 |
| Enf. Renal Crónica | 5.7 |
| Cirrosis | 4.1 |
| Depresión | 3.8 |
| Ac. de vehículo de motor | 3.4 |
| Anomalías Congénitas | 3.4 |
| Enf. Pulmonar obs. Crónica | 3.2 |
| Lumbalgia | 3.2 |
| Homicidios | 3.2 |

Fuente:http://vizhub.healthdata.org/gbd-compare/

# 40% de la carga en 2013 esta asociado a Discapacidad
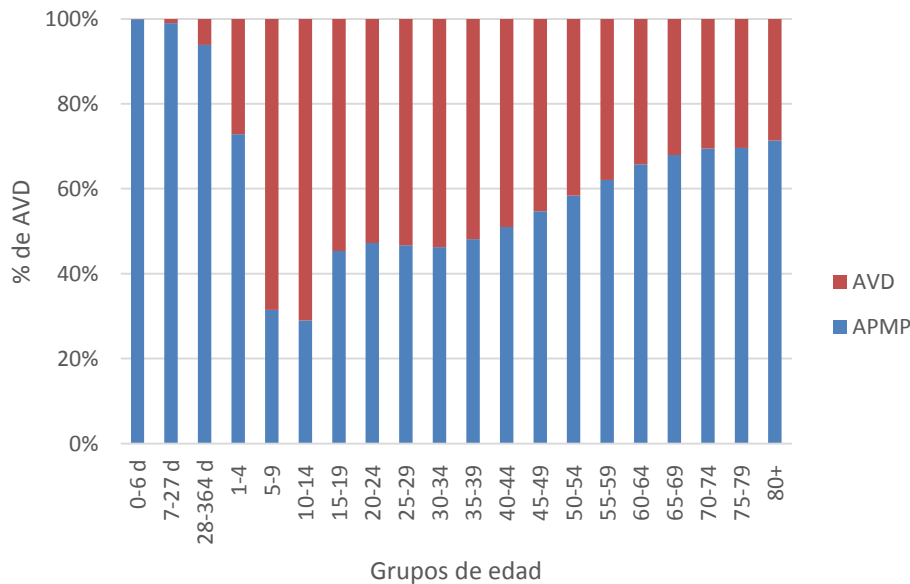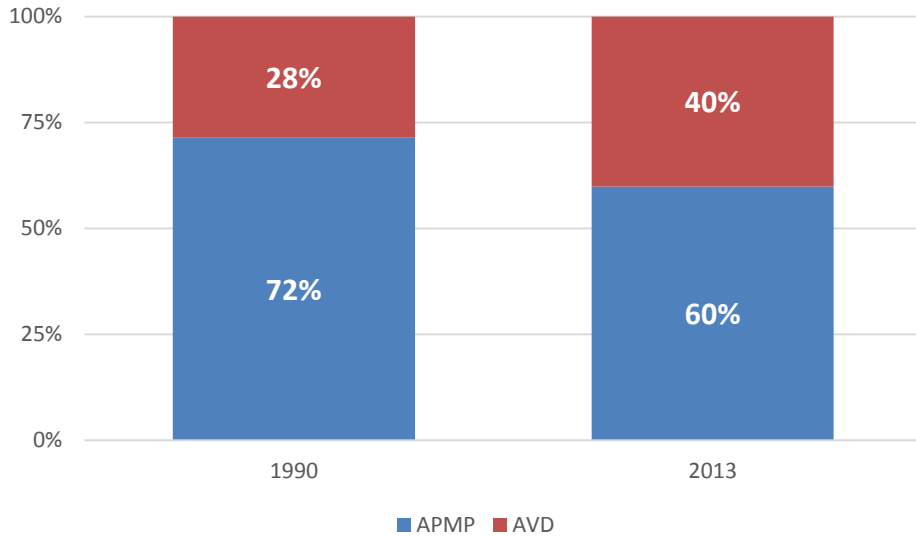


% de AVD en ambos sexos, 2013

42.9 - 45.7
41.2 - 42.8
39.8 - 41.1
< 39.7%
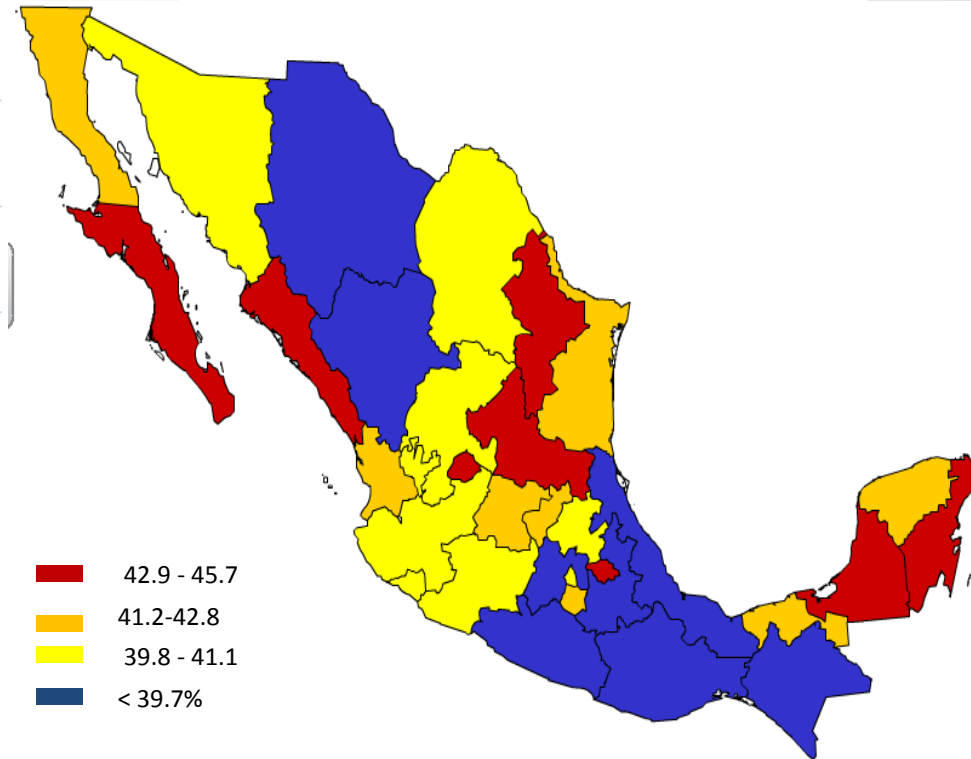
# Disminuir 40% la mortalidad prematura para 2030

## APMP por edad



70+, 18%

<70, 82%

## APMP por edad y Causas



Resto 35%

Rezago 17%

Cardio y Diab 26%

Lesiones 22%
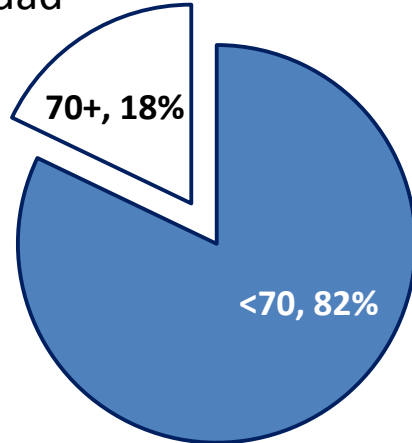
## % de APMP (< 70 años) evitables, 2013



- 58.1 - 62.6
- 62.7 - 63.8
- 63.9 – 66.2
- 66.3 – 70.0

## Principales causas de AVISA perdidos ambos sexos (edad ajses.) 2013
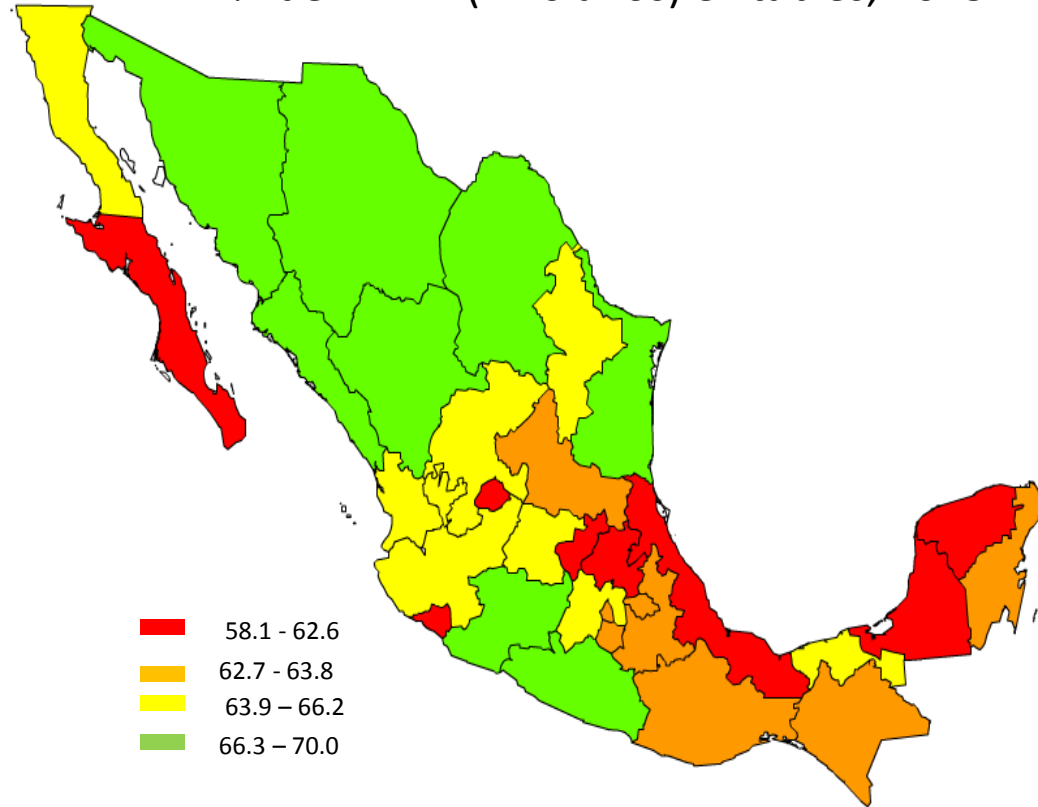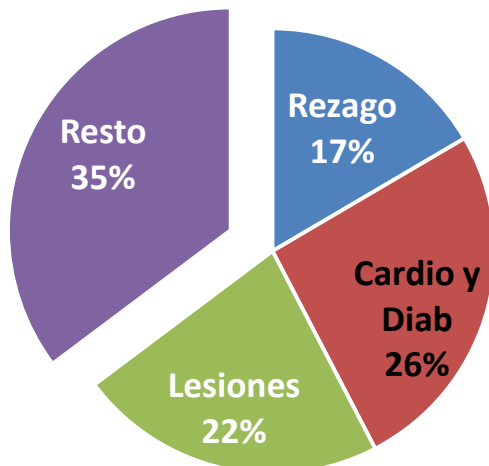
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| RMEX | DIAB | C ISQ | E.R.C. | CIRROS | DEPRE | A.T | CONGE | EPOC | LUMBA | VIOLEN |
| AGS | DIAB | E.R.C. | C ISQ | DEPRE | A.T | EPOC | CONGE | LUMBA | CIRROS | E.R:C: |
| BC | C ISQ | DIAB | E.R.C. | DEPRE | LUMBA | VIOLEN | CIRROS | CONGE | E.C.V. | A.T |
| BCS | C ISQ | DIAB | E.R.C. | A.T | DEPRE | LUMBA | CONGE | EPOC | CIRROS | E.C.V. |
| CAM | DIAB | C ISQ | CIRROS | E.R.C. | DEPRE | LUMBA | A.T | CONGE | EPOC | E.C.V. |
| COAH | C ISQ | DIAB | E.R.C. | DEPRE | LUMBA | A.T | VIOLEN | E.C.V. | CONGE | EPOC |
| COL | DIAB | C ISQ | E.R.C. | CIRROS | A.T | DEPRE | LUMBA | VIOLEN | EPOC | CONGE |
| CHIS | DIAB | C ISQ | E.R.C. | CIRROS | DEPRE | LUMBA | I.R.B. | EPOC | E.C.V. | CONGE |
| CHIH | VIOLEN | C ISQ | DIAB | E.R.C. | A.T | LUMBA | DEPRE | EPOC | CIRROS | E.C.V. |
| DF | DIAB | C ISQ | E.R.C. | DEPRE | CIRROS | LUMBA | CONGE | EPOC | I.R.B. | E.C.V. |
| DGO | C ISQ | DIAB | VIOLEN | E.R.C. | CONGE | DEPRE | A.T | LUMBA | EPOC | PREMAT |
| GTO | DIAB | E.R.C. | C ISQ | A.T | DEPRE | CIRROS | LUMBA | EPOC | CONGE | E.C.V. |
| GRO | VIOLEN | DIAB | C ISQ | E.R.C. | CIRROS | CONGE | E.C.V. | A.T | LUMBA | DEPRE |
| HGO | DIAB | C ISQ | E.R.C. | CIRROS | DEPRE | LUMBA | A.T | CONGE | EPOC | E.C.V. |
| JAL | DIAB | C ISQ | E.R.C. | A.T | CIRROS | DEPRE | EPOC | CONGE | LUMBA | E.C.V. |
| MEX | DIAB | E.R.C. | C ISQ | CIRROS | I.R.B. | CONGE | EPOC | VIOLEN | DEPRE | A.T |
| MICH | DIAB | C ISQ | E.R.C. | A.T | DEPRE | VIOLEN | CIRROS | EPOC | LUMBA | CONGE |
| MOR | DIAB | E.R.C. | C ISQ | LUMBA | CIRROS | DEPRE | VIOLEN | EPOC | CONGE | A.T |
| NAY | DIAB | C ISQ | E.R.C. | A.T | DEPRE | VIOLEN | CONGE | LUMBA | EPOC | CIRROS |
| NL | C ISQ | DIAB | E.R.C. | DEPRE | LUMBA | CONGE | VIOLEN | A.T | E.C.V. | EPOC |
| OAX | DIAB | E.R.C. | CIRROS | C ISQ | DEPRE | VIOLEN | CONGE | LUMBA | E.C.V. | EPOC |
| PUE | DIAB | E.R.C. | CIRROS | C ISQ | DEPRE | CONGE | LUMBA | A.T | EPOC | I.R.B. |
| QRO | DIAB | C ISQ | CIRROS | E.R.C. | A.T | DEPRE | LUMBA | CONGE | EPOC | E.C.V. |
| QROO | DIAB | C ISQ | CIRROS | E.R.C. | DEPRE | LUMBA | A.T | EPOC | CONGE | E.C.V. |
| SLP | DIAB | C ISQ | E.R.C. | DEPRE | CONGE | LUMBA | A.T | EPOC | CIRROS | E.C.V. |
| SIN | C ISQ | DIAB | VIOLEN | DEPRE | A.T | E.R.C. | LUMBA | EPOC | CONGE | E.C.V. |
| SON | C ISQ | DIAB | A.T | E.R.C. | DEPRE | LUMBA | EPOC | CONGE | VIOLEN | E.C.V. |
| TAB | DIAB | E.R.C. | C ISQ | A.T | DEPRE | LUMBA | CONGE | EPOC | CIRROS | E.C.V. |
| TAM | C ISQ | DIAB | E.R.C. | VIOLEN | DEPRE | A.T | LUMBA | CONGE | EPOC | E.C.V. |
| TLAX | DIAB | E.R.C. | CIRROS | DEPRE | C ISQ | LUMBA | A.T | CONGE | EPOC | E.C.V. |
| VER | DIAB | C ISQ | E.R.C. | CIRROS | DEPRE | CONGE | E.C.V. | LUMBA | EPOC | A.T |
| YUC | C ISQ | DIAB | CIRROS | E.R.C. | DEPRE | A.T | E.C.V. | CONGE | EPOC | I.R.B. |
| ZAC | DIAB | C ISQ | A.T | E.R.C. | DEPRE | EPOC | LUMBA | E.C.V. | CONGE | VIOLEN |

| | |
|---|---|
| DIAB | Diabetes Mellitus |
| C ISQ | Cardiopatía Isquémica |
| E.R.C. | Enf. Renal Crónica |
| CIRROS | Cirrosis |
| DEPRE | Depresión |
| A.T | Accidentes de Transito |
| CONGE | Anomalias Congénitas |
| EPOC | Enf. Pulmonar Obs. Crónica |
| LUMBA | Lumbalgia |
| VIOLEN | Violencia |
| E.C.V. | Enf. Cerebrovascular |
| I.R.B. | Inf. Respiratoria Baja |

Fuente:http://vizhub.healthdata.org/gbd-compare/

# 50% de la carga atribuible se concentra en 5 factores de riesgo, en 2013
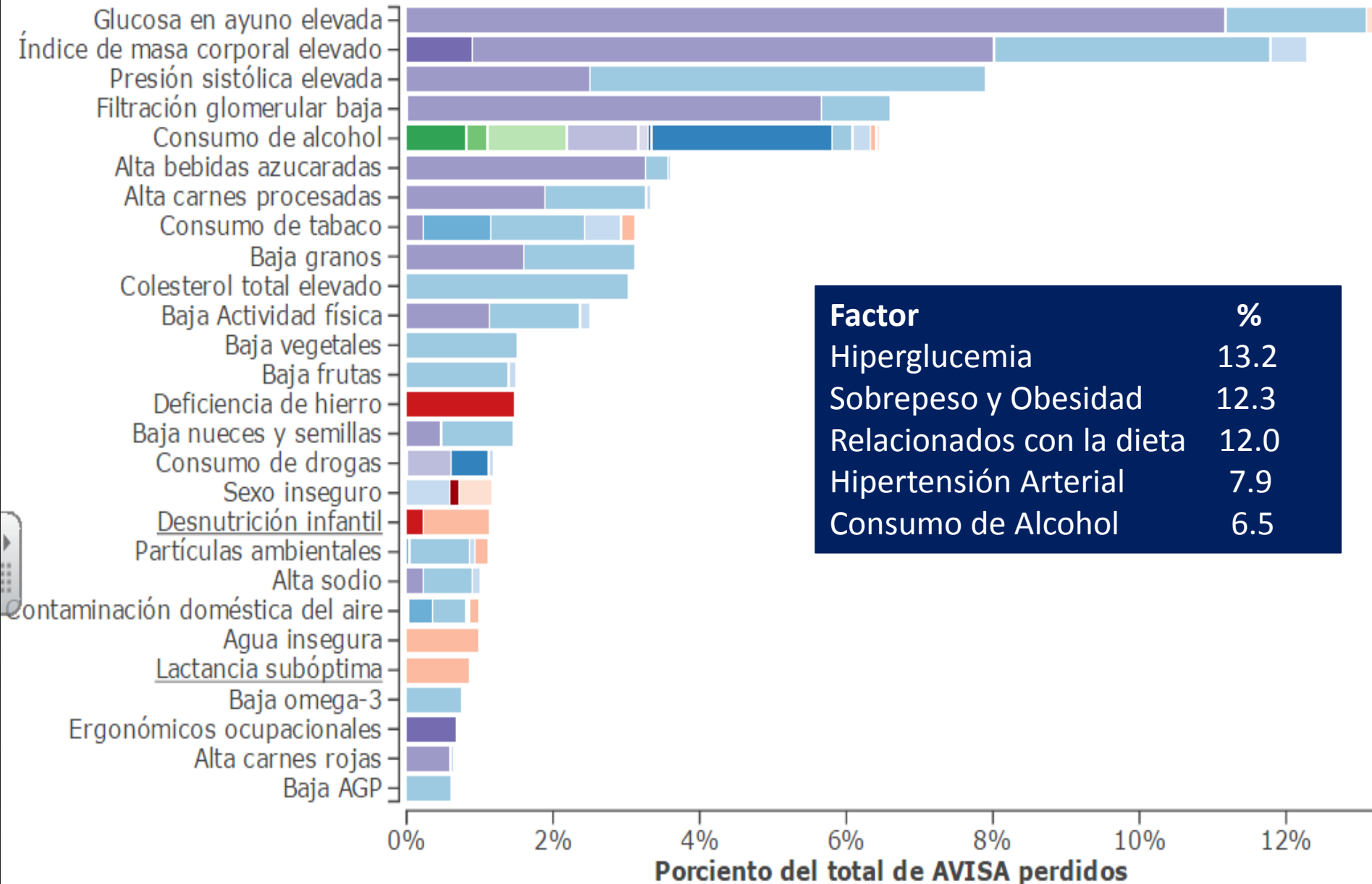


| Factor | % |
| --- | --- |
| Hiperglucemia | 13.2 |
| Sobrepeso y Obesidad | 12.3 |
| Relacionados con la dieta | 12.0 |
| Hipertensión Arterial | 7.9 |
| Consumo de Alcohol | 6.5 |

# Agradecimientos

- El estudio de la Carga Global de la Enfermedad fue desarrollado por el Instituto de la Métrica y Evaluación para la Salud de la Universidad de Washington

  http://www.healthdata.org/



- El Instituto Nacional de Salud Publica de México ha acompañado este ejercicio con la participación de mas de 40 investigadores

  http://www.insp.mx/