Evaluation of the Health and Economic impact of Trans-fats reduction policies in Argentina

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TFAs and CHD

- TFAs are created from partially hydrogenated vegetable oils (PHVO) that provide physical and chemical properties attractive to food manufacturers in terms of higher stability and lower costs

- Use of PHVO has increased since the 1950s because of these commercial advantages and from the 1960s because of public health recommendations to replace saturated fats with alternatives .

- Industrial TFA consumption adversely affects lipids: raises levels of LDL-C, reduces levels of HDL-C , increases the ratio of TC/HDL-C and also raises more TG and LP(a), as compared to other fats.

- Incidence of CHD due to TFA intake reported in prospective studies has been greater than predicted only by changes in lipids, suggesting that TFA may also influence CHD through other pathways. An increase of 2% in %E TFA may increase CHD risk by up to 23%.

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Different Policies to reduce TFA

- A number of approaches have been implemented:
  - Voluntary reformulation by industry to remove TFAs
  - Nutrition guidelines
  - Public awareness
  - Mandatory labeling of TFA content
  - Heath claims on the adverse effect
  - Agricultural policies to produce healthy alternatives to trans fats
- Legislation and regulations on food standards to make industry remove TFA

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The Policies to reduce TFA in Argentina

- Voluntary cooperation of industry began after year 2004. This initiative was followed by regulations enforcing mandatory labeling of TFA in foods from 2006 (if ≥0.2g/serving)
- Boosted by the PAHO declaration of Río de Janeiro in 2008 the Argentine ministry of health (MoH) initiated a dialogue with industry that led to agreements to eliminate TFA
- A change to the country's Food Code was set in 2010 restricting industrially-produced TFA in food stuff to less than 2 percent of total fats in vegetable oils and margarines for direct consumption and 5 percent of total fats in other foods by the end of 2014.

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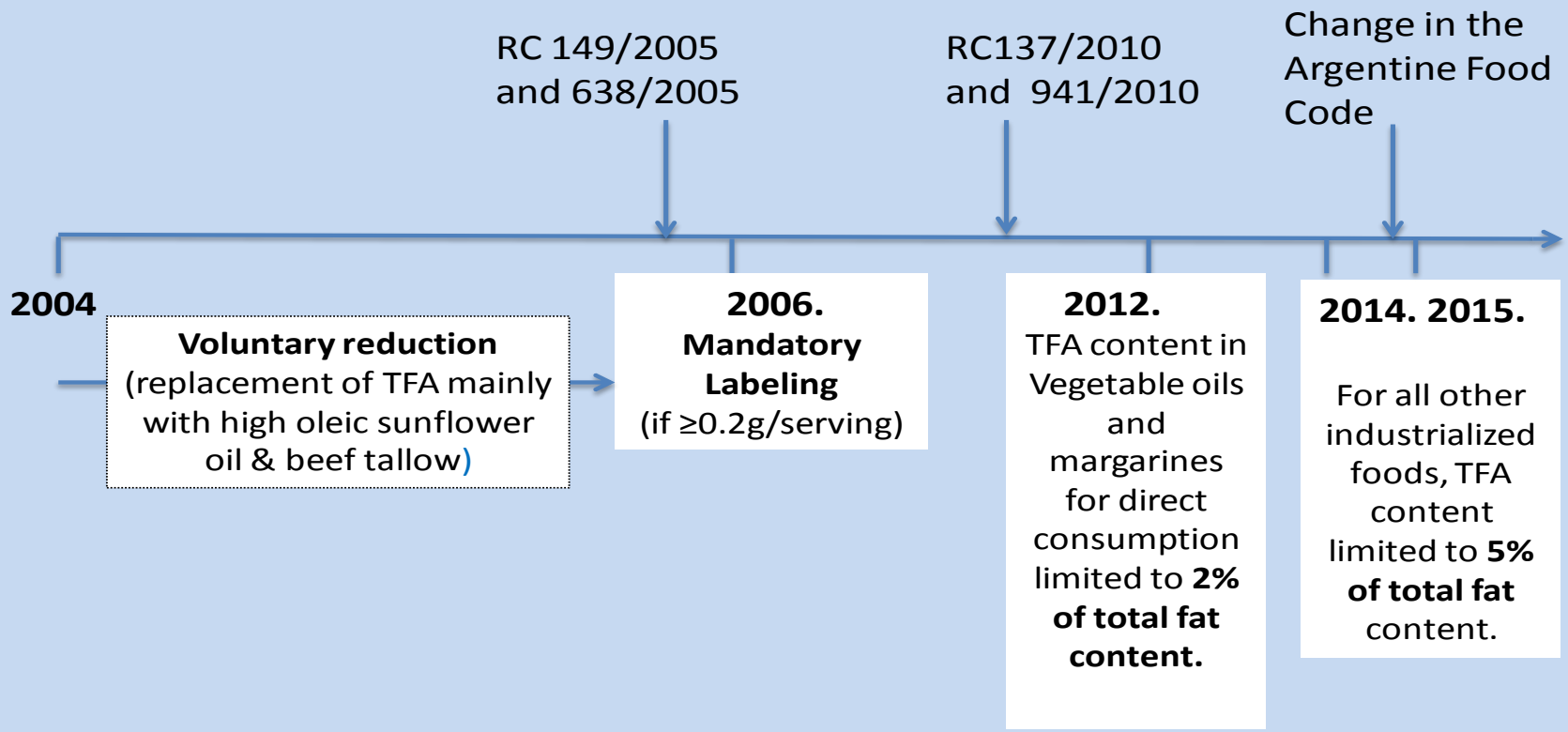
TFA Regulations in Argentina 2004-2014



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Building a policy model to evaluate the impact of TFA reduction in Argentina

- In Argentina CHD is the first cause of mortality, representing about 10% of total deaths. Thus, the potential effect of reducing TFA can be significant.

- Elucidating these effects is crucial to understand the potential impact of such a policy on mortality, disability, and health care utilization.

- **We aimed to build a policy model to estimate the impact of the current national policy to eliminate TFA by the end of 2014 on reduction of annual fatal and non-fatal CHD events, DALYs averted and costs saved**.

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Main Inputs for the Policy Model

10 years of implementation of the policy (Y 2004 to Y 2014)

- Baseline intake of TFA before 2004, when voluntary reformulation by the food industry began
- Types of alternative oils/fats used to replace PHVO (main source of TFA)
- Clinical effect of the substitution of PHVO for these other oils/fats, based on changes in cholesterol levels and other lipid biomarkers, on estimated CHD risk in a population-based sample of adults in Argentina
- Costs and DALYs saved due to averted fatal and nonfatal CHD events

Estimating the baseline intake of TFA and PHVO replacements used by food industry

- A systematic literature review was performed using MEDLINE, EMBASE, LILACS, and official documents from government, academia, industry and other public and private organizations involved in food analysis to identify estimates of baseline TFA intake in Argentina and the different fats/oils used for replacement between 2004 and 2014.

- This search was complemented by a consensus panel of local experts and decision makers including officials from the Ministry of Health, epidemiologists, food engineers, nutritionists, and cardiologists who convened for a half-day face-to-face meeting.

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Estimating the baseline intake of TFA and PHVO replacements used by food industry

Variables	Base case	Minimum	maximun
TFA Intake as a %E (before Yr 2004)	1.5	1.0	3.0
Ruminant TFA (%)	33.0	15.0	60.0
TFA content in PHVO (%)	40.0	30.0	50.0
% of replace by High-oleic Sunflower Oil	42.0	33.6	50.4
% of replace by Interesterified fats	18.0	14.4	21.6
% of replace by Beef Tallow	12.0	9.6	14.4
% of replace by Palm Oil	10.8	8,6	12.9
% of replace by Lauric Fats	10.8	8.6	12.9
% of replace by High Stearic sunflower Oil	3.5	2.8	4.2
% of replace by Sunflower Oil/Soy Oil	3.0	2.4	3.6

Calculating the effects of TFAs replacements on changes in lipids and CHD risk

- Through changes in the TC/HDL-C ratio and other lipid biomarkers such as APO B/A1, LP (a), per each 1% energy of isocaloric replacement of PHVO by the different mix of fats and oils used in Argentina, based on meta-analyses of controlled dietary feeding trials

- Based on associations between usual consumption of dietary fats and CHD outcomes, depending on basal intake and type of replacement used, to take into account the pleiotropic effects of TFA seen in prospective cohort studies .

Estimating the % of CHD risk reduction
First step

1-Estimates of "CURRENT" absolute risk of CHD

The intervention effect
Is reflected by the change
in the TC / HDL-C ratio

CESCAS I Subject	Age	Sex	SMK	DBT	LVH	SBP	TC mg/dl	HDL mg/dl	Ratio TC/HDL	10 years CHD risk
0101010	54	1	0	1	0	125	125	40	3,125	0,08
0102034	60	0	1	1	0	130	202	31	6,666	0,10
0102999	72	1	1	0	1	150	295	35	8,57	0,18

-Study population: CESCAS I (sex, age, TBQ, DBT, LVH, SBP, TC, HDL)
CT/HDL ratio for 35-74 years (calculation of the function of the ratio to include other age groups (>75 yo)
-Weighted by 2010 age-sex census data and NSRF 2009.

Estimating the % of CHD risk reduction

- **1-The "CURRENT" absolute risk of CHD event (2011-2012)**

…AND TAKING INTO ACCOUNT THE POINT ESTIMATE FROM THE START-OUT IN 2004 TO THE CHANGE IN THE ARGENTINE FOOD CODE IN 2015…) WHERE DOES THE INDUSTRY STAND TODAY REGARDING IMPLEMENTATION? (FROM 0 IN YEAR 2004 TO 100% IN YEAR 2015)

Expert consensus: 75%

- **2-The "PAST RISK" of CHD** (before starting the replacement of TFA by food industry)

-Past: ↑TFA consumption >TC/ HDL ratio

- **3-The "FUTURE RISK" of CHD** (when industrial TFA were eliminated and replaced

- Future: ↓TFA consumption < TC/ HDL ratio

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Model calibration with Argentine deaths statistics

We assumed that:

- Δ of reduction of CHD events is equal to the risk reduction of CHD deaths.
- Δ of 10 year-CHD risk is equally distributed in each year of the decade,
- hence:
- Δ of CHD risk predicted by the model in 10 years was applied to annual coronary deaths reported in 2010 by age and sex

- To calculate total CHD events (fatal and non-fatal CHD), we estimated case-fatality rate of CHD from different local registries and GBD data for the Southern Cone. All data were standardized to the Argentine population

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Calculation of DALYs and Costs

- DALYs were estimated according to GBD Study considering individual equations for YLL and YLD.
- Costs were calculated from local sources using a Micro costing approach in local currency (AR$ 2012)
- Cost CHD acute events (AMI and unstable angina) and annual follow-up were estimated from a health system perspective (follow-up costs were discounted at a 5% rate per year)
- Cost of the implementation of the regulations were included considering a micro costing estimation from the National MoH
- Costs of industry food reformulation were excluded

3 Different Scenarios to estimate the effect of TFA elimination policy on CHD reduction

- Only through lipid changes (TC/HDL)
- Including other biomarkers (APO B/A1, LP (a), CRP)
- Adjusting for risk estimates obtained from prospective cohort studies and attributed to the pleiotropic effects of TFA (i.e reduction of inflammation and endothelial dysfunction)

Results: CHD in Argentina: Annual deaths, mortality, case-fatality and incidence rates

		POP at risk > 34 yo (millions)	Deaths (n)	Death rate per 100.000	Case-fatality rate (%)	Total Events (n)	CHD rate per 100.000
Men	AMI		10.414	133,20	44,0%	23.669	302,71
	Total	7.81	14.422	184,45	31,2%	46.185	590,68
Women	AMI		7.527	83,63	38,0%	19.809	220,08
	Total	9.12	10.453	116,14	27,8%	37.645	418,24
TOTAL	AMI		17.942	106,67	41,3%	43.478	258,49
	Total	16.819.854	24.875	147,89	29,7%	83.830	498,40

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Annual CHD deaths, events and DALYs averted, and costs savings after full implementation of the policy

BASE CASE 1,5% TFA (1-3%)	CHD deaths averted	MI averted	Total CHD averted	Reduction of events (%)	DALYs saved	Total costs (including costs of CHD follow-up (million USD))
TC/HDL-C	301 (233-432)	572 (443 – 823)	1.066 (875-1623)	**1.26** (1.03-1.92)	5.237 (4.461 -8.282)	$17,4
Including other biomarkers	878 (652 - 1.328	1.668 (1.238-2.523)	3.109 (2.442-4.978)	**3.67** (2.89-5.88)	15.271 (12.459 - 25.395)	$50,52
Estimated from prospective cohort studies	1.517 (1.118-2.285)	2.884 (2.124 - 4.343)	5.373 (4.191 - 8.568)	**6.35** (4.95-10.1)	26.394 (21.376 - 43.713)	$87.31

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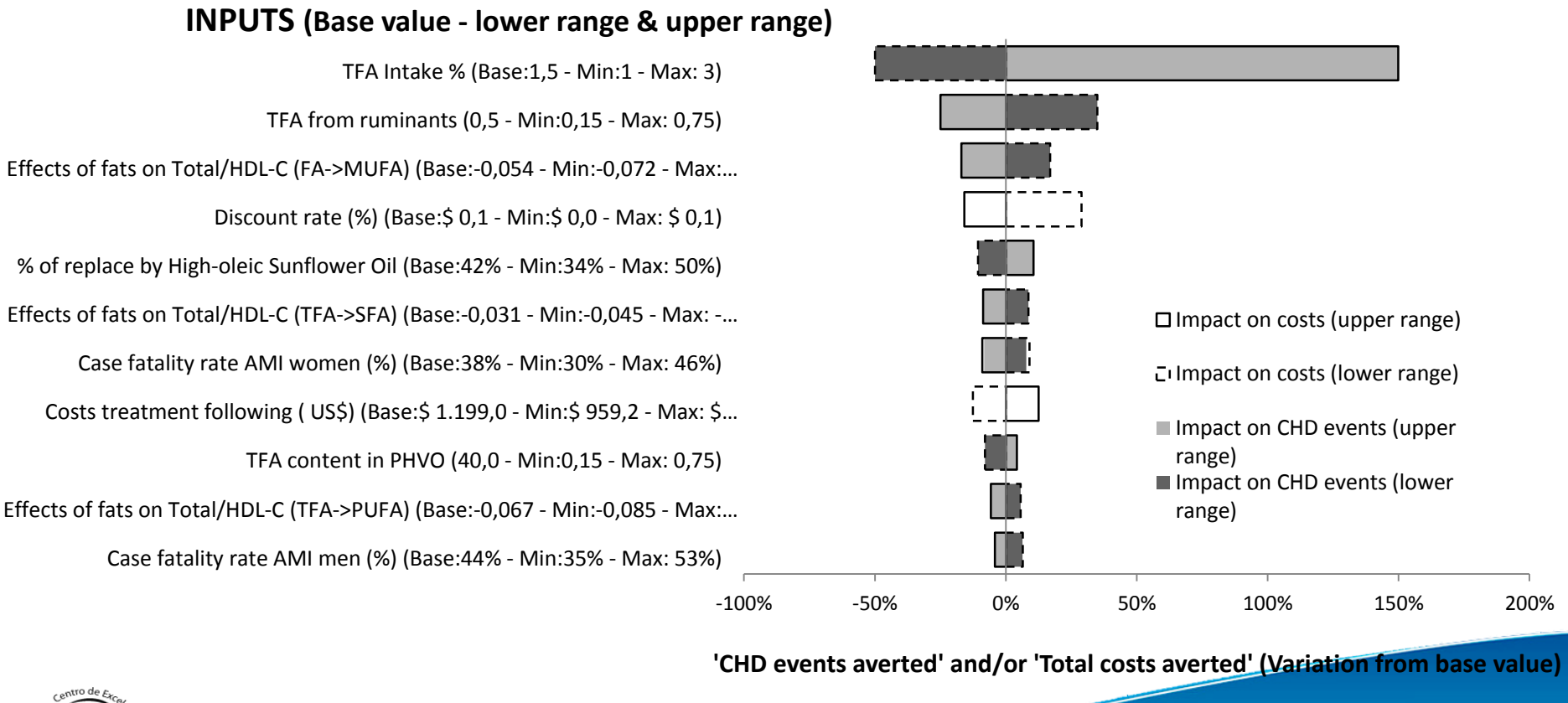
CHD=Cardiovascular Health Disease; MI= Myocardial infarction DALY: Disability-adjusted life years

Deterministic Sensitivity Analysis



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Conclusions

- Given the estimated 84 000 annual CHD events in Argentina, at an annual incidence rate of almost 5 cases per 1 000 adults over 34 years old, the current policy of near elimination of industrial TFA might avert between 1.3% to almost 6.6% of CHD events each year, saving almost US$100 million.

- In other countries or in low-income population within countries, where TFA intake is probably higher, the effect could be much larger

Conclusions

- Although removal of industrial TFAs from the food supply has been identified by WHO as a “best-buy” public health intervention for LMIC, most developing countries have not yet included the restriction of TFAs intake as a policy or monitoring target because of concerns about the feasibility, achievability and public health effect of removing them from the food supply
- Other countries in Latin America such as Brazil, Chile, Costa Rica and Mexico are introducing policy and surveillance systems to monitor the content of TFA in foods.
- Argentina is, to our knowledge, one the first developing countries worldwide that have implemented a national policy to restrict industrial TFA

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Cuatro claves de estos ácidos grasos
Son muy empleados en la industria alimentaria

1 ¿Cómo se forman?
Los aceites vegetales pasan por un proceso químico llamado hidrogenación, que los transforma en sólidos y con las mismas propiedades que la grasa saturada animal

2 ¿Para qué se usan?
Para elaborar margarinas vegetales, bollería y pastelería industrial, productos precocinados, grasas para frituras de bares y restaurantes y coberturas

3 ¿Qué efectos tienen?
Aumentan el colesterol LDL o "malo" y reducen el colesterol HDL o "bueno", además de que su exceso tiende a adherirse y a engrosar las paredes de las arterias y los vasos sanguíneos

4 ¿Cómo detectarlos?
Hay que leer las etiquetas de los ingredientes de los alimentos. Donde dice "grasas trans" deberá indicar cero

SALUD | EL CAMBIO DEL CÓDIGO EMPEZARÁ A REGIR EL LUNES

Se acerca el fin de las grasas trans para los alimentos argentinos

Según un estudio, la prohibición evitará 5000 eventos cardiovasculares y 1500 muertes por año; los productos de panadería y los alfajores, entre otros, tienen esta sustancia

Fabiola Czubaj
LA NACION

En la cuenta regresiva de la entrada en vigor de la prohibición de producir y comercializar alimentos con grasas trans, cuyo consumo sostenido amenaza la salud cardiovascular, un estudio del Instituto de Efectividad Clínica y Sanitaria (IECS) sobre esta modificación del Código Alimentario Argentino proyecta que la medida permitirá evitar anualmente más de 5000 complicaciones cardiovasculares y 1500 muertes por enfermedad coronaria.

Con eso, el equipo liderado por el doctor Adolfo Rubinstein calcula que el sistema sanitario se ahorraría cada año hasta 100 millones de dólares o unos 860 millones de pesos en tratamiento y control de esos pacientes.

Los resultados de este trabajo, que es el primero en su tipo en un país en desarrollo, muestran también que el reemplazo de esas grasas con aceites "más amigables" para el corazón, como el de oliva o girasol, permitiría prevenir casi 3000 infartos y más de 1000 casos de angina inestable en un país con 100.000 eventos cardiovasculares por año en la población adulta.

"La eliminación de las grasas trans tendría un gran impacto en la salud pública e implica un importante ahorro de dinero para el sistema de salud. En poblaciones de nivel socioeconómico más bajo, donde el consumo de grasas trans es mayor, este efecto podría ser mucho más grande", aseguró Rubinstein, que hoy presentará los resultados a la prensa internacional acreditada en el país. Además, continuó, "es una medida sumamente efectiva porque es universal y llegará a toda la población, incluidos los chicos."

Actualmente, los cinco grupos de alimentos con mayor contenido de grasas trans son los baños de repostería, los productos de panadería, los alfajores, las barritas de cereales, las galletitas y los platos precocidos. Así lo demuestra un los datos preliminares de un relevamiento de 528 productos en las góndolas de una de las principales cadenas de supermercados que realizó la Fundación Interamericana del Corazón (FIC) Argentina.

Eso coincide no sólo con los datos que obtuvo la misma organización el año pasado en 878 alimentos de otras dos cadenas de supermercados, sino también con los que el Instituto Nacional de Alimentos presentó la semana pasada en la jornada "Argentina 2013 Libre de Grasas Trans", organizada por el Ministerio de Salud con todos los sectores involucrados. Eso incluye a las entidades profesionales, los investigadores y las ONG que insisten en destacar la necesidad de que, una vez implementada la medida, realizar un control sostenido de su cumplimiento para ayudar a las empresas, como las pymes, que les cueste incorporar las modificaciones y comprar los insumos necesarios.

"Estas grasas trans tienen efectos adversos para la salud: la evidencia científica vincula el consumo de ácidos grasos trans de origen industrial con alteraciones del metabolismo de lípidos en la sangre, inflamación vascular y desarrollo de enfermedades cardíacas, cerebrovasculares y renales", explicó el Ministerio de Salud a través de un comunicado de prensa en el que, también, se atribuyó la investigación del IECS sin haber participado ni mencionar a sus autores.

Sin sorpresas

La norma no toma por sorpresa a la industria alimentaria. Hace cuatro años, una modificación del Código Alimentario fijó los límites máximos permitidos de grasas trans, que se desarrollaría como un reemplazo saludable (por su origen vegetal) de las grasas de origen animal. Luego, se comprobó que también eran peligrosas. Hoy se sabe que el consumo de 5 gramos diarios es suficiente para elevar un 25% el riesgo cardiovascular.

Desde la Coordinadora de las Industrias de Productos Alimenticios (Copal), acompañaron la iniciativa "de trabajo conjunto entre el sector público y privado para lograr alimentos que contribuyan a beneficiar la salud, previniendo las enfermedades crónicas no transmisibles", indicó la directora de la entidad, Mercedes Nimo, a través de un comunicado.

Para la proyección, el IECS revisó todas las publicaciones sobre el consumo de grasas trans del período 2003-2004 (equivalía a 1,5% de las 2000 calorías diarias), consultó con especialistas en el proceso de reconversión industrial, epidemiólogos, médicos y nutricionistas, y con los datos del estudio Cescas I sobre la población adulta argentina, estimó el riesgo cardiovascular. Los valores de consumo de grasas trans y el efecto de su eliminación en el riesgo sirvieron para estimar el impacto económico. Esa información la calibraron con los datos de mortalidad de la Dirección Nacional de Estadísticas e Información de Salud. "Estimamos el escenario más conservador", dijo Rubinstein sobre el modelo construido con el economista Ulises Garay y la nutricionista Natalia Elorriaga.

"La Argentina es el primer país en desarrollo que verdaderamente elimina las grasas trans de productos como política de salud pública", dijo el doctor Marcelo Tavella, docente e investigador de la Escuela Superior de Ciencias de la Salud de la Unicen. "Tendrían que empezar a verse en un año los resultados, y de 4 a 5 años los efectos completos. Ahora, el desafío es aumentar la producción de aceite de girasol alto oleico para satisfacer la demanda interna y, también internacional, que es alta." La doctora Verónica Schoj, directora ejecutiva de FIC Argentina, aclaró que la norma rige para los productos elaborados a partir del lunes próximo. "Celebramos lo logrado, pero vamos por la fiscalización e implementación completa de la norma con asistencia técnica a las pymes", indicó. Para los consumidores, aconsejó empezar a leer las etiquetas, donde dice "grasas totales y grasas trans. "Que elijan ya las que dicen cero". ●

Fuegos artificiales
Fue conocido su trabajo en los Juegos Olímpicos de Pekín. El 24 de enero de 2015 encenderá Vuelta de Rocha, en La Boca

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Eliminating artificial trans fatty acids in Argentina: estimated effects on the burden of coronary heart disease and the costs

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Objective To estimate the impact of Argentine policies to reduce trans fatty acids (TFA) on coronary heart disease (CHD), disability-adjusted life years (DALYs) and associated health care costs.

Methods We estimated the baseline intake of TFA before 2004 to be 1.5% of total energy intake. We built a policy model including baseline intake of TFA, the oils and fats used to replace artificial TFAs, the clinical effect of reducing artificial TFAs and the costs and DALYs saved due to averted CHD events. To calculate the percentage of reduction of CHD, we calculated CHD risks on a population-based sample before and after implementation. The effect of the policies was modelled in three ways, based on projected changes: (i) in plasma lipid profiles; (ii) in lipid and inflammatory biomarkers; and (iii) the results of prospective cohort studies. We also estimated the present economic value of DALYs and associated health care costs of coronary heart disease averted.

Findings We estimated that projected changes in lipid profile would avert 301 deaths, 1066 acute CHD events, 5237 DALYs, and 17 million United States dollars (US$) in health care costs annually. Based on the adverse effects of TFA intake reported in prospective cohort studies, 1517 deaths, 5373 acute CHD events, 26 394 DALYs and US$ 87 million would be averted annually.

Conclusion Even under the most conservative scenario, reduction of TFA intake had a substantial effect on public health. These findings will help inform decision-makers in Argentina and other countries on the potential public health and economic impact of this policy.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

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