Dpt. Preventive Medicine & Public Health
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Universidad de Navarra

UNIV 2009

¿Cambian los descubrimientos científicos el comportamiento de las personas?

How scientific knowledge influences population behaviour

MA Martínez-González

Scientific evidence & behavior change

- Cancer
  - Nature or nurture?
  - Vaccine against cancer?
- Cardiovascular prevention
  - Moderate alcohol consumption?
- Diabetes
  - Drugs or behaviour?
- Obesity
  - Anti-obesity drugs?

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Scientific evidence & behavior change

World Health Day - 7 April 2009

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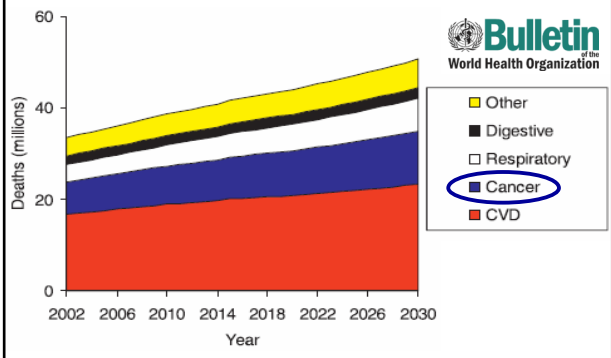


Conclusions

Inherited genetic factors make a minor contribution to susceptibility to most types of neoplasms. This finding indicates that the **environment** has the **principal** role in causing sporadic cancer.

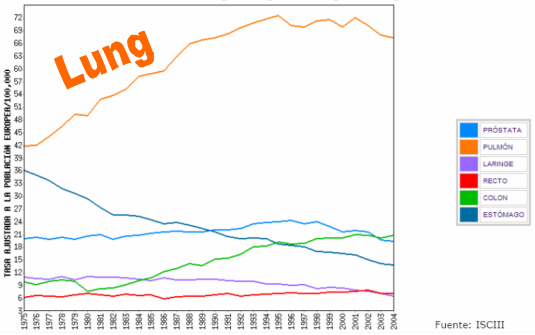
VOLUME 343 JULY 13, 2000 NUMBER 2

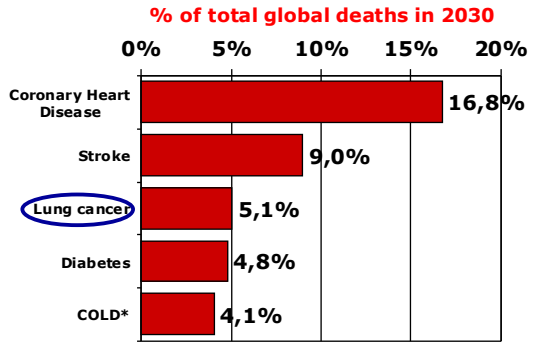
ENVIRONMENTAL AND HERITABLE FACTORS IN THE CAUSATION OF CANCER

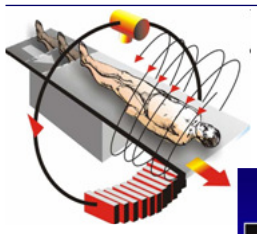
Analyses of Cohorts of Twins from Sweden, Denmark, and Finland

PAUL LICHTENSTEIN, PH.D., NIELS V. HOLM, M.D., PH.D., PIA K. VERKASALO, M.D., PH.D., ANASTASIA ILIADOU, M.SC., JAAKKO KAPRIO, M.D., PH.D., MARKKU KOSKENVUO, M.D., PH.D., EERO PUKKALA, PH.D., AXEL SKYTTHE, M.SC., AND KARI HEMMINKI, M.D., PH.D.

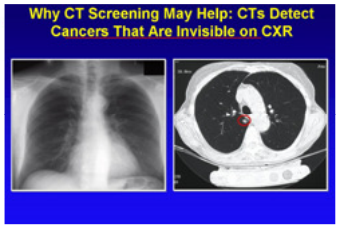
Cancer mortality, Spain (men)







Spiral CT:
early diagnosis & treatment

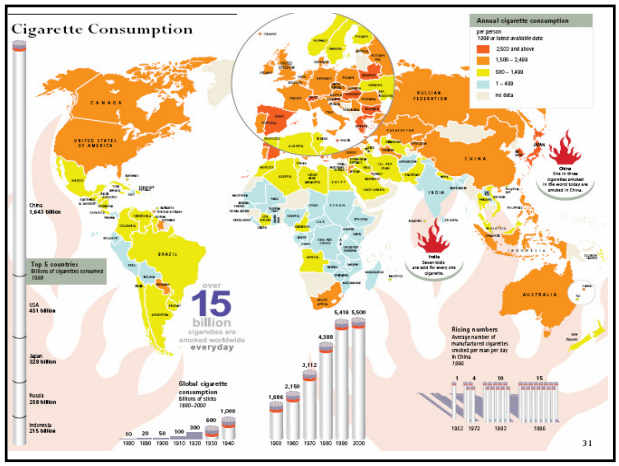


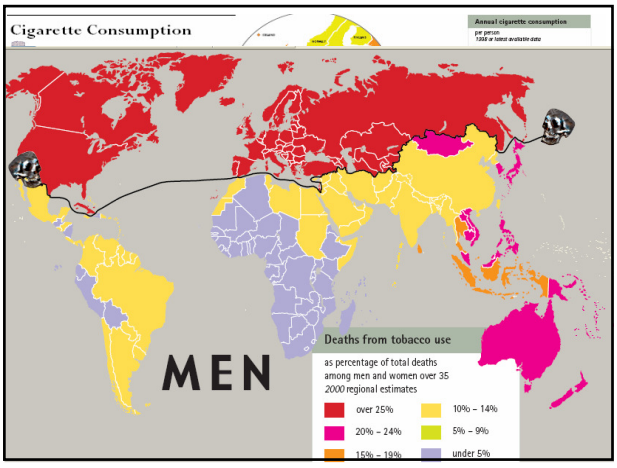
Press Release

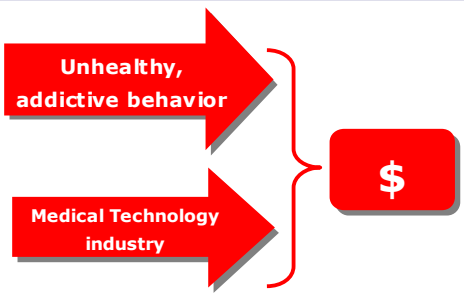
Public being misled by marketing of medical scans: New research reveals

March 30, 2009 | National Office, BC Office | Topic(s): Health, health care system, pharmacare | Publication Type: P

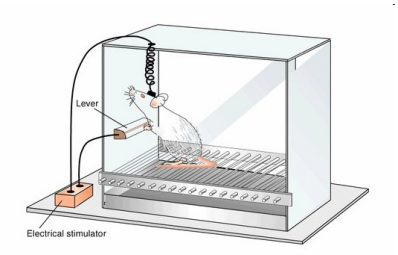
- "Screening healthy people for disease exposes them to risks from excessive **radiation**, and can create a flood of **false positive** findings and
- unnecessary medical tests
- which ultimately increases the workload on the public system."



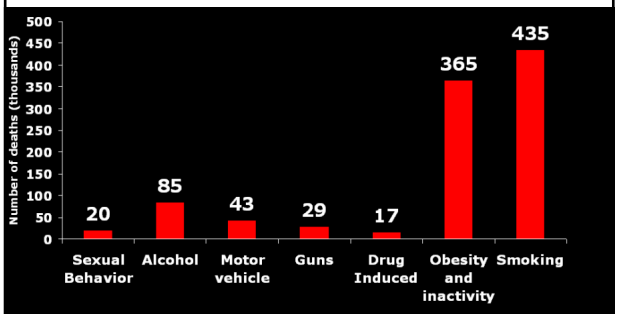




Pleasure & reward



Brain self-stimulation



Schroeder SA. **Shattuck Lecture.**
We Can Do Better — Improving the Health of the American People
N Engl J Med 2007 Sept 20

Schroeder SA.
Shattuck Lecture.
We Can Do Better — Improving the Health of the American People
N Engl J Med 2007 Sept 20

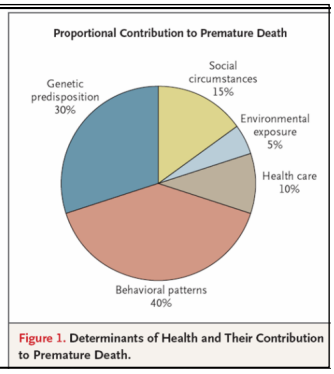
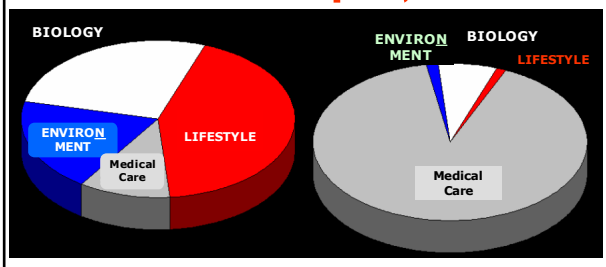


Figure 1. Determinants of Health and Their Contribution to Premature Death.

Lalonde's Report, 1974



Causes **Investment- Expenses**

Scientific evidence & behavior change

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  - Vaccine against cancer?
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- Diabetes
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- Obesity
  - Anti-obesity drugs?

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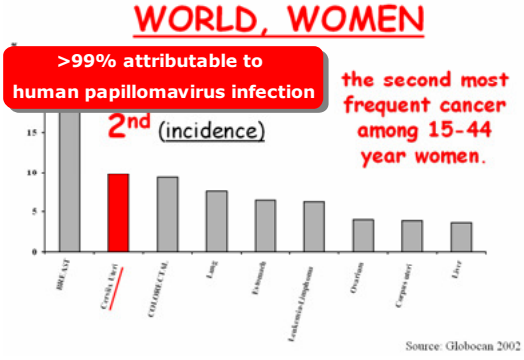
WORLD, WOMEN

>99% attributable to human papillomavirus infection

2nd (incidence)

the second most frequent cancer among 15-44 year women.



The New England Journal of Medicine

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VOLUME 347 NOVEMBER 21, 2002 NUMBER 21

A CONTROLLED TRIAL OF A HUMAN PAPILLOMAVIRUS TYPE 16 VACCINE

LAURA A. KOUTSKY, PH.D., KEVIN A. AULT, M.D., COSETTE M. WHEELER, PH.D., DARRON R. BROWN, M.D., ELIAV BARR, M.D., FRANCES B. ALVAREZ, R.N., LISA M. CHACCHIERINI, PH.D., AND KATHRIN U. JANSEN, PH.D., FOR THE PROOF OF PRINCIPLE STUDY INVESTIGATORS

2392 young women (16 to 23 years of age) – 17.4 months

- **The incidence of persistent HPV-16 infection was**
  - **3.8 per 100 woman-years at risk in the placebo group**
  - **0 per 100 woman-years at risk in the vaccine group**

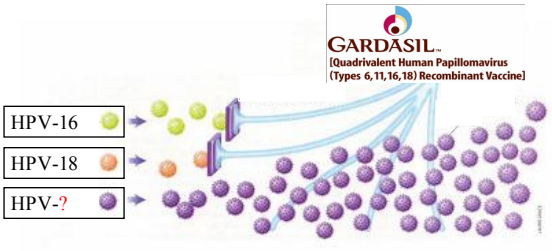
100 percent efficacy

(95 %CI, 90 to 100; P<0.001).

- **All nine cases of HPV-16-related cervical intraepithelial neoplasia occurred among the placebo recipients.**

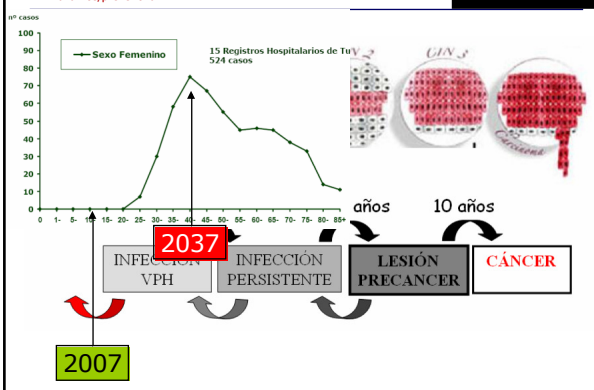
Ecological niche

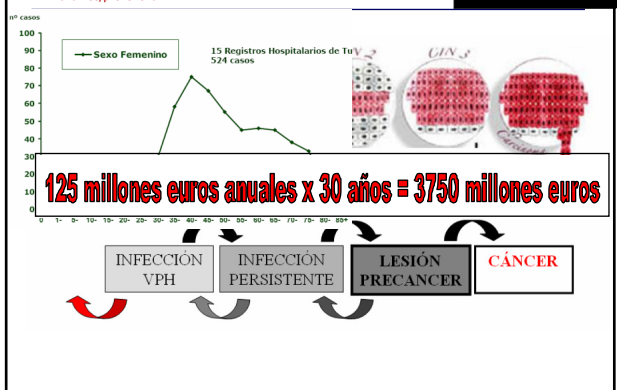
Ecological niche



Ecological niche

- Types of a microorganism
  - They either coexist in a delicate balance
  - or one of them displaces others because of competition for the ecological niche
- If HPV-16 & HPV-18 are suppressed, will there be selective pressure on the remaining stranis to **replace** those which were eliminated





www.unav.es/preventiva

sociedad **El País, 6-11-2007** Salud

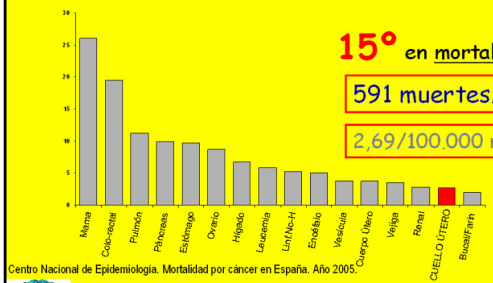
Posible moratoria para la vacuna del papiloma

Prever … te … ro … tado … euros

>1 million vaccinees, 4 severe cases of seizures

MORTALIDAD ESPAÑA

Tasa mortalidad /100000



15º en mortalidad

591 muertes/año

2,69/100.000 mujeres

Centro Nacional de Epidemiología. Mortalidad por cáncer en España. Año 2005.

www.unav.es/preventiva

ARTÍCULO ESPECIAL

Vacuna contra el virus del papiloma humano: razones para el optimismo y razones para la prudencia

Localizador web Artículo 294.084

Miguel Ángel Martínez-González, Silvia Carlos y Jokin de Irala

Departamento de Medicina Preventiva y Salud Pública. Facultad de Medicina-Clínica Universitaria. Universidad de Navarra. Pamplona. Navarra. España.

EDITORIALS

Human Papillomavirus Vaccination — Reasons for Caution

Charlotte J. Haug, M.D., Ph.D.

Despite great expectations and promising results of clinical trials, we still lack sufficient evidence of an effective vaccine against cervical cancer. Several strains of human papillomavirus (HPV) can cause cervical cancer, and two vaccines directed against the currently most important oncogenic strains (i.e., the HPV-16 and HPV-18 serotypes) have been developed. That is the good news. The bad news is that the overall effect of the vaccines on cervical cancer remains unknown. As Kim and Goldie[1] point out in this issue of the *Journal*, the real impact of HPV vaccination on cervical cancer will not be observable for decades.

Resolving the first essential questions will require decades of observation of large numbers of women. The last question may be answered sooner. Published reports of trials show an increasing trend of precancerous cervical lesions caused by HPV serotypes other than HPV-16 and HPV-18.[2,4,6] The results were not statistically significant, however, possibly because there were too few clinically relevant end points in the observation periods reported. If randomized, controlled trials involving vaccinated and unvaccinated women continue for a few more years, we will most likely be able to tell whether this is a true trend. If so, there is rea-

ARTÍCULO ESPECIAL

Vacuna contra el virus del pa… razones para el optimismo y … para la prudencia

Miguel Ángel Martínez-González, Silvia Carlos

Departamento de Medicina Preventiva y Salud Pública. F… Universidad de Navarra. Pamplona. Navarra. España.

Cuestiones no resueltas sobre la vacuna contra el virus del papiloma humano

1. Se desconoce la eficacia y la seguridad de la vacuna en un plazo mayor de 5 años
2. Se ignora si deberán usarse dosis de recuerdo
3. Se desconoce el mínimo valor de anticuerpos requerido para obtener protección
4. Falta información sobre la inmunogenicidad cruzada con otros tipos de VPH
5. Se desconoce si otros VPH ocuparán el nicho ecológico del VPH-16 y VPH-18
6. En niñas de 9-14 años no hay ensayos con lesiones (neoplasia intraepitelial cervical/adenocarcinoma in situ) como resultado
7. No hay todavía evidencia científica de reducción del cáncer invasivo
8. No se ha presentado la eficacia estratificada por conducta sexual
9. No hay datos de eficacia en mujeres con más de 4-5 parejas sexuales
10. Hacen faltan ensayos en mujeres mayores de 26 años
11. No se dispone de ensayos de eficacia en varones
12. No hay ensayos en lugares con mayor prevalencia, como África
13. Se ignora si la infección por el virus de la inmunodeficiencia humana, la desnutrición, etc., modifican la eficacia
14. Hay dudas sobre su prioridad frente a otras vacunas o estrategias preventivas
15. Se desconoce el impacto de la vacuna en los programas de cribado
16. Se ignora si la vacunación masiva perjudicará a los patrones de conducta
17. No está resuelta la financiación en los países que más necesitan la vacuna
18. Falta valorar mejor la aceptabilidad poblacional de la vacuna en España
19. Hay dudas al extrapolar la eficacia a un país de bajo riesgo como España
20. Se desconoce si las 2 vacunas existentes son intercambiables

Risk compensation: once feeling protected against 1 health risk, they engage in other risky behaviors → ↑↑ risk

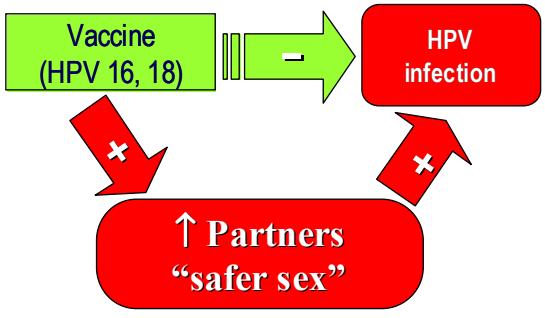
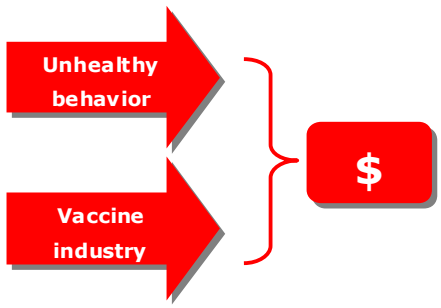


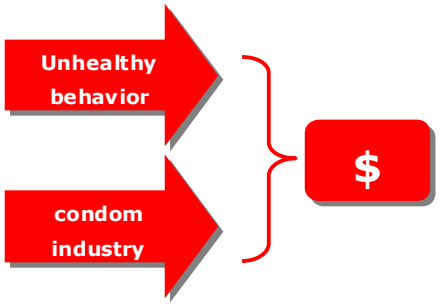
TABLE 3. Hazard ratios for the association between incident human papillomavirus infection and behavioral risk factors during the past 12 months in a population of women in Washington State, 1990–2000

Risk factor	Adjusted* HR†	95% CI†	Infections/person-years at risk
Cumulative sex partners (continuous)	1.1	1.03, 1.1	168/1,056
Condom use with new partners			
Always	0.8	0.5, 1.2	144/938
Not always	1.0		24/118
Sex partner's no. of other partners‡			
None	1.0		79/790
≥1	5.2	1.3, 21.2	80/250
Unknown	8.0	1.8, 36.5	9/18
Time having known partner before sex (months)			
≥8	1.0		58/151
<8	1.8	1.2, 2.7	110/906
Current smo			
No			135/931
Yes			33/126
Currently us			
No			76/553
Yes			92/503

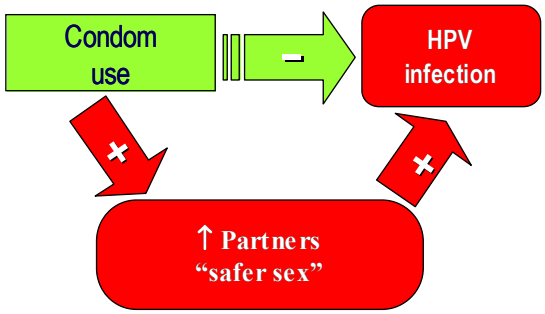
* Each adjusted for whether a new partner was reported in the last 12 months (yes/no) and for all other

3 MAJOR RISK FACTORS
- **Age of first sex**
- **# partners**
- **# Partners of the male partner**





Risk compensation



Director, Harvard AIDS Prevention Research Project

The Pope May Be Right, By Edward C. Green
WASHINGTON POST, Sunday, March 29, 2009

- **in truth, current empirical evidence supports him.**
- 2003: Norman Hearst and Sanny Chen (Univ. California)
  - condom effectiveness study for UNAIDS
  - **no evidence** of condoms **working** as a primary HIV-prevention measure in **Africa**.
  - UNAIDS quietly disowned the study.
- Since then, major articles in **Lancet**, **Science** and **BMJ** have confirmed that
  - condoms **have not worked** as a primary intervention in the population-wide epidemics of Africa
- "**Risk compensation**":
  - when people think they're **made safe by using condoms** at least some of the time, they actually engage in **riskier sex**.

CONDOMS IN PREVENTING STIs

No magic bullet

The data from Alberta reported by Genuis (massive promotion of condoms followed by upsurges in gonorrhoea and chlamydia) are mirrored in Spain.[1]

Spain, together with Greece, stands out as the European country with the highest levels of condom use among young people, with 90% of sexually active young people reporting using a condom the last time they had sexual intercourse.[2] Nevertheless, the rates of sexually transmitted infections (STIs) are increasing year after year, despite more than a decade of intensive official educational campaigns transmitting the message to young people that condoms and only condoms are the magic bullets to prevent all STIs and unintended pregnancies.[3]

BMJ

Feb 09, 2008

when one uses a risk-reduction 'technology' such as condoms, one often loses the benefit (reduction in risk) by '**compensating**' or taking greater chances than one would take without the risk-reduction technology

Scientific evidence & behavior change

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Vomitorium

Un 'macrobotellón' convocado por Internet reúne a miles de jóvenes en Sevilla

La policía y la Guardia Civil cortan el tráfico en el Charco de la Pava

Agentes de la policía y de la Guardia Civil han cortado esta tarde el tráfico en la zona del Charco de la Pava, a las afueras de Sevilla, debido a la presencia de miles de jóvenes que, convocados por la red social Tuenti, en Internet , celebran un *macrobotellón*. Pasadas las ocho de la tarde, el número de congregados era de 14.000, y las autoridades locales prevén que puedan alcanzar los 70.000.

Jóvenes asistentes al 'botellón' en Sevilla

- JAVIER BARBANCHO - 27-03-2009

Is not **alcohol** beneficial for your CV health?

Yes, but only in **moderate** amounts

El Doctor dijo...
una copa al día solamente...

The doctor said only **one drink** a day

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Available online at www.sciencedirect.com
SCIENCE DIRECT®
Preventive Medicine 38 (2004) 613–619
Preventive Medicine
www.elsevier.com/locate/ypmed

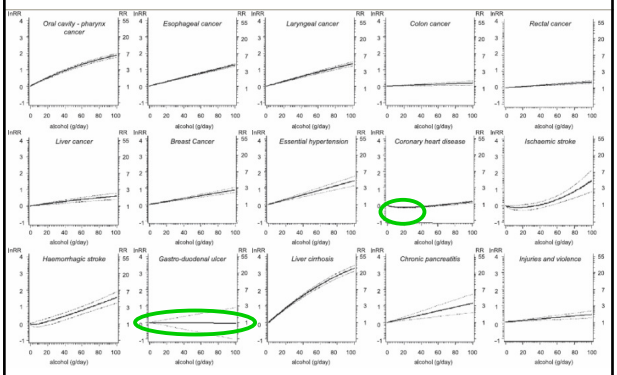
A meta-analysis of alcohol consumption and the risk of 15 diseases

Giovanni Corrao, Ph.D.,[a] Vincenzo Bagnardi, Sc.D.,[a] Antonella Zambon, Sc.D.,[a] and Carlo La Vecchia, M.D.[b,c,*]

[a]Dipartimento di Statistica, Università di Milano-Bicocca, Milan, Italy
[b]Istituto di Statistica Medica e Biometria, Università di Milano, Milan, Italy
[c]Istituto di Ricerche Farmacologiche "Mario Negri", Milan, Italy

Cancer
1 Mouth-larynx
2 Esophagus
3 Larynx
4 Colon
5 Rectum
6 Liver
7 Breast

Other
1 Hypertension
2 Myocardial Inf.
3 Ischem. Stroke
4 Haemorr. Stroke
5 G-D ulcer
6 Liver Cirrhosis
7 Pancreatitis
8 Injury



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Display AbstractPlus Show 20 Sort by Send to

All: 1 Review: 0

1: Alcohol Clin Exp Res. 2005 Apr;29(4):683-91.

Early postnatal exposure to alcohol reduces the number of neurons in the occipital but not the parietal cortex of the rat.

CONSUMO MODERADO Y CONTINUO

El alcohol atrofia el cerebro

- Pruebas de imagen a 1.839 personas muestran que la bebida merma el encéfalo

Actualizado martes 14/10/2008 00:10 (CET)

CRISTINA DE MARTOS

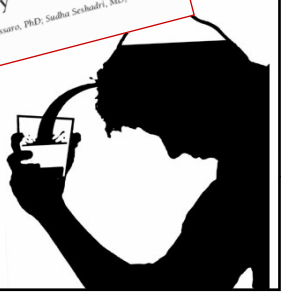
MADRID.- Puede que una co... comidas sea bene... claro que ... pér... las ... es g... más ...

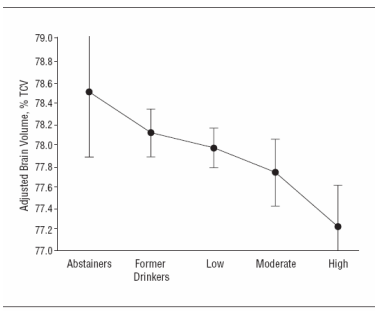
ORIGINAL CONTRIBUTION

Association of Alcohol Consumption With Brain Volume in the Framingham Study

Carol Ann Paul, MS; Rhoda Au, PhD; Lisa Fredman, PhD; Joseph M. Massaro, PhD; Sudha Seshadri, MD; Charles DeCarli, MD; Philip A. Wolf, MD

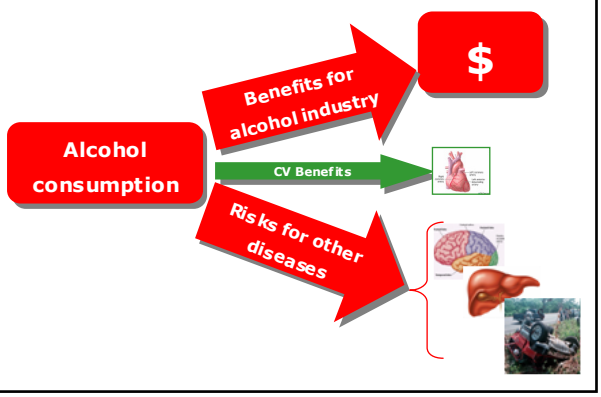
Por ma... vida sana el paso del tiempo ...erable, así como sus consecuencias sobre nuestro organismo. Una de ellas, que ni el 'Brain Training' puede evitar, es la **pérdida de volumen cerebral, que disminuye un 1,9% cada década**, según las estimaciones de los expertos. Junto a la atrofia, aparece un creciente número de lesiones en la sustancia blanca encefálica. Las personas que padecen ciertos problemas, como las demencias, suelen acusar más ambos fenómenos.





Arch Neurol 2008;65:1363-7

Figure 1. Mean total cranial brain volume, including confidence intervals illustrated as error bars, adjusted for age, sex, body mass index (calculated as weight in kilograms divided by height in meters squared), and Framingham Stroke Risk Profile (slope=−0.25; $P<.01$; $R^2=0.96$). TCV indicates total cranial volume; low, 1 to 7 drinks per week; moderate, 8 to 14 drinks per week; and high, more than 14 drinks per week.



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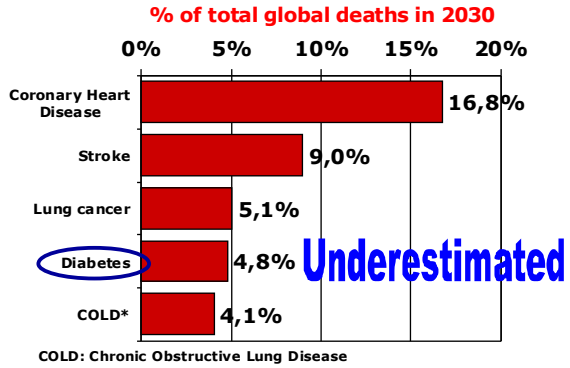
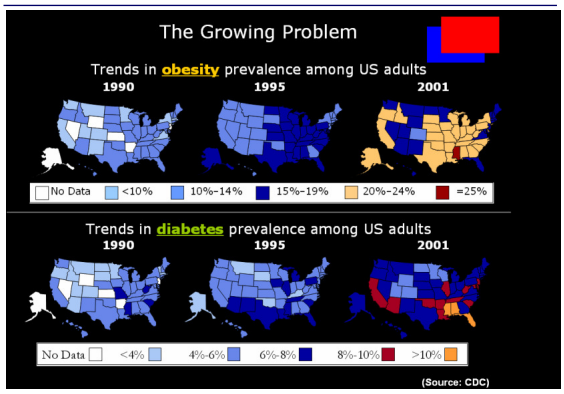


COLD: Chronic Obstructive Lung Disease

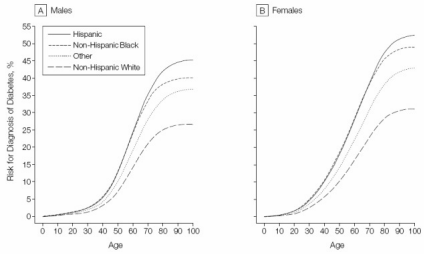


Lifetime Risk for Diabetes Mellitus in the United States

JAMA, 2003;290:1884

K. M. Venkat Narayan

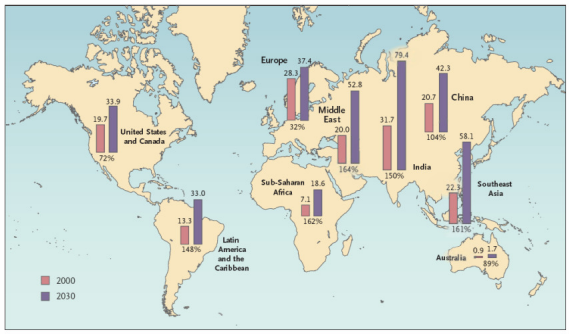
Figure. Cumulative Lifetime Risk for Diagnosis of Diabetes



Results The estimated lifetime risk of developing diabetes for individuals born in 2000 is 32.8% for males and 38.5% for females. Females have higher residual lifetime risks

Obesity and Diabetes in the Developing World — A Growing Challenge

N Engl J Med, 18-Jan-2007

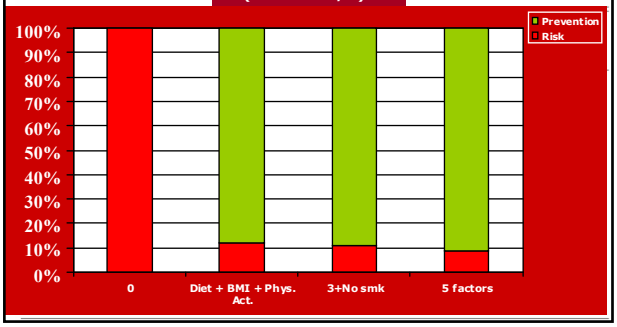


Millions of Cases of Diabetes in 2000 and Projections for 2030, with Projected Percent Changes.

Hu et al.
N Engl J Med
2001;345:790

1.- Healthy diet
2.- BMI<25 kg/m2
3.- Phys. Activ. (>= 30 min/d)

4.- No smoking
5.- Moderate alcohol intake



Good news!!

- Diabetes is largely PREVENTABLE

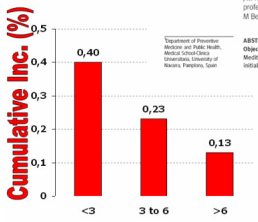
BMJ

RESEARCH

June, 2008

Adherence to Mediterranean diet and risk of developing diabetes: prospective cohort study

83% REDUCTION



MeDiet Score	3-6	>6
age- & sex-adj. IRR	0.41 (0.19-0.87)	0.17 (0.04-0.75)
multivariate adj. IRR	0.40 (0.18-0.90)	0.17 (0.04-0.72)

Adherence to the MeDiet

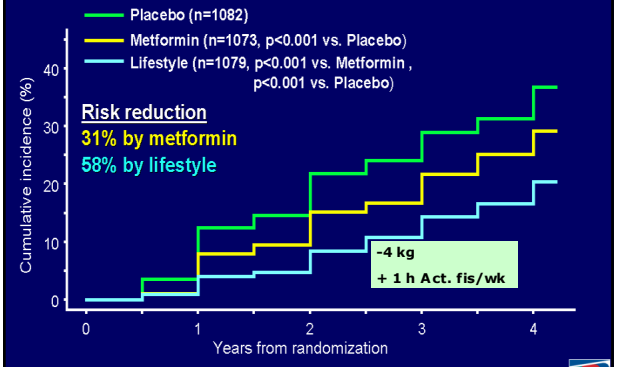
Demonstrational trials: the best evidence

(Diabetic Medicine 2007;356:214)

Study	Intervention	*n*	Relative risk reduction of T2DM vs. placebo (%)	Duration (years)
Malmö [23]	Lifestyle	181	63	6
Da Qing [24]	Lifestyle	577	42	6
DPS [17,25]	Lifestyle	522	58	3
DPP [18]	Lifestyle	3234	58	3
Japanese study [54]	Lifestyle	458	67	4
Indian study [28]	Lifestyle	531	28	3
DPP [18]	Metformin	3234	31	3
Indian study [28]	Metformin	531	26	3
Indian study [28]	Metformin + lifestyle	531	28	3
TRIPOD [31]	Troglitazone	266	55	2.5
DPP [18]	Troglitazone	3234	75	1
STOP-NIDDM [29]	Acarbose	1429	25	3
XENDOS [34]	Orlistat	3305	37	4
DREAM [32]	Rosiglitazone	5269	60	3

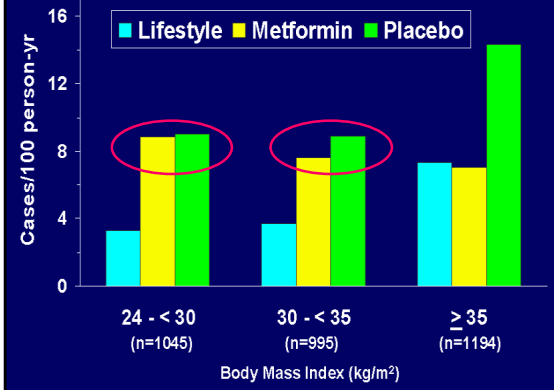
DPP, Diabetes Prevention Program; DPS, Diabetes Prevention Study; STOP-NIDDM, Study to Prevent Non-Insulin-Dependent Diabetes Mellitus; T2DM, Type 2 diabetes mellitus; TRIPOD, Troglitazone in Prevention of Diabetes; XENDOS, XENical in the Prevention of Diabetes in Obese Subjects.

Incidence of Diabetes



The DPP Research Group, *NEJM 346*:393-403, 2002

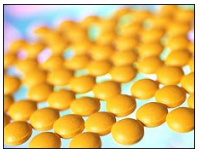
Diabetes Incidence Rates by BMI



The DPP Research Group, *NEJM 346*:393-403, 2002

Drugs vs. lifestyle

- It is easier to provide a **pill** than to modify behaviors
- A pill enjoys the glamour of "**hi-tech**"



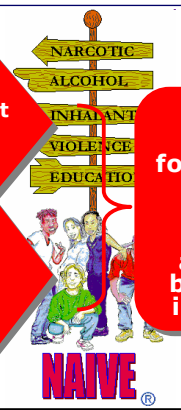
Drugs vs. lifestyle

- It is easier to provide a **pill** than to modify behaviors
- A pill enjoys the glamour of "**hi-tech**"

But…

- A **modest** improvement in behavior gets substantially greater benefits than "medicalized" preventive approaches
- Medicalized technologies simply **don`t work** in sizeable segments of the population

Don`t be naïve...



"behavior is not modifiable"

Use a hi-tech medicalized alternative

$ for hig-tech industry & addictive behaviors' industries

NAIVE®

Scientific evidence & behavior change

- Cancer
  - Nature or nurture?
  - Vaccine against cancer?
- Cardiovascular prevention
  - Moderate alcohol consumption?
- Diabetes
  - Drugs or behaviour?
- Obesity
  - Anti-obesity drugs?

UNIV FORUM

www.univforum.org

THE LANCET

Volume 363, Number 9411.

Lancet 2004 Mar 6;363:745.

The catastrophic failures of public health

This threat is not the emergence of new infectious diseases, such as SARS or avian influenza, and it is not the potential for exposure to chemical o biological weapons. It is much simpler and less glamorous, but arguably much more difficult to combat. People are getting fatter and less physically active, and are therefore more prone to killer chronic illnesses...

Needs = 2,200 Kcal **Sellings = 3,800 Kcal**

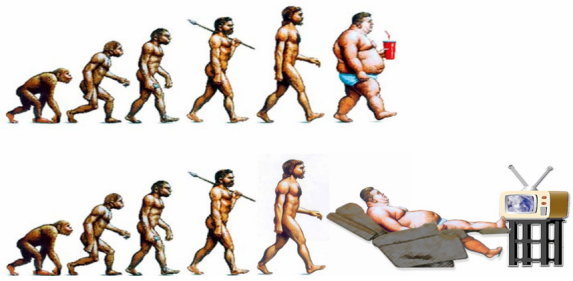
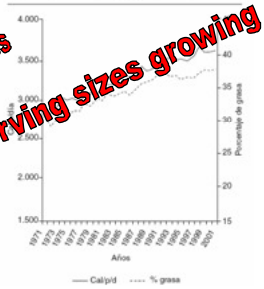


Figura 2. Vehículos turismos por 10.000 habitantes y minutos promedio de visionado de TV por persona y día. España, 1987-2002.

Figura 1. Ingesta media de calorías por persona y día (cal/p/d) y porcentaje de esa ingesta debida a grasas. España, 1970-2001.



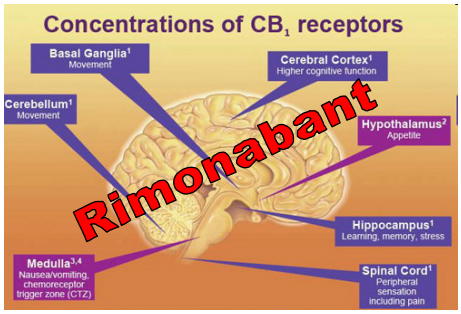
Increasing sedentary lifestyles

Serving sizes growing

---- Turismo por 10.000 habitantes — Minutos de TV/p/día — Cal/p/d ---- % grasa

Gac Sanit. 2006;20(Supl 1):48-54

How to eat all what I like and avoid obesity?



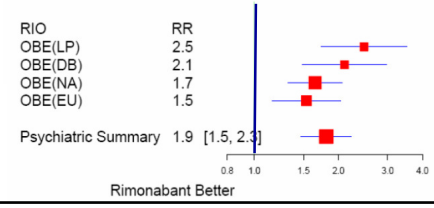
elmundo.es SALUD

ESPAÑA | INTERNACIONAL | ECONOMÍA | CULTURA | CIENCIA | TECNOLOGÍA | DEPORTES | SALUD | COMUNICACIÓN | TV | MADRID | BCN | IB | CVA | CYL |

PROBLEMAS PSIQUIÁTRICOS

Europa pide la 'suspensión temporal' del adelgazante rimonabant

Figure 3: Relative Risk of Psychiatric Adverse Event - Rimonabant 20 mg vs. Placebo - RIO studies



www.unav.es/preventiva

Eat less!

Within each diet group, some participants achieved much better weight loss than others. Participants who lost more weight attended more counseling sessions and adhered more closely to the prescribed dietary composition. These observations led Sacks et al. to conclude that behavioral factors rather than macronutrient composition are

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIALS

26 Febr 2009

Weight-Loss Diets for the Prevention and Treatment of Obesity

Martijn B. Katan, Ph.D.

It is obvious by now that weight losses among participants in diet trials will at best average 3 to 4 kg after 2 to 4 years[10] and that they will be less among people who are poor or uneducated, groups that are hit hardest by obesity.[9] We do not need another diet trial; we need a change of paradigm.

A little-noticed study in France may point the way.[11] A community-based effort to prevent overweight in schoolchildren began in two small towns in France in 2000. Everyone from the mayor to shop owners, schoolteachers, doctors, pharmacists, caterers, restaurant owners, sports associations, the media, scientists, and various branches of town government joined in an effort to encourage children to eat better and move around

The time has come for common ground on preventing sexual transmission of HIV

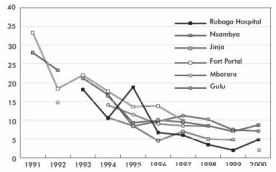
Zero-grazing

consensus Lancet. Nov 2004

Lancet 2004;364:1913-5

community-based approaches involving religious organisations, women's and men's associations, care groups, youth organisations, health workers, local media, and both traditional and governmental leadership can foster new norms of sexual behaviour, as for example occurred with the successful zero-grazing strategy (fidelity and partner reduction) in Uganda.[1,8,12,16,17]

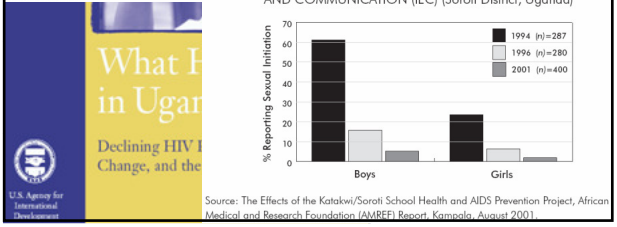
HIV PREVALENCE AMONG 15-19-YEAR-OLD PREGNANT WOMEN



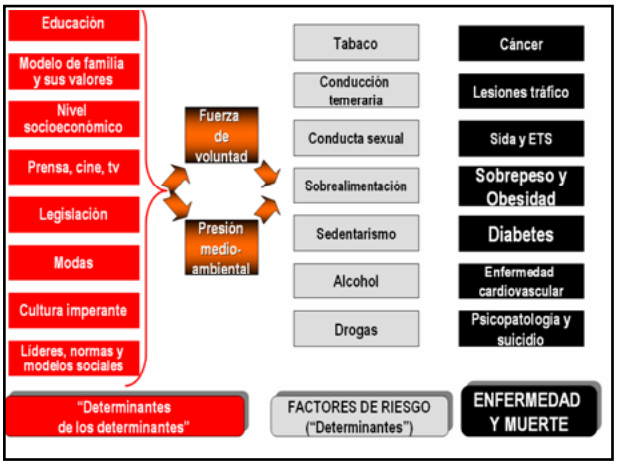
Source: HIV/AIDS Surveillance Report, STD/AIDS Uganda, June 2000.

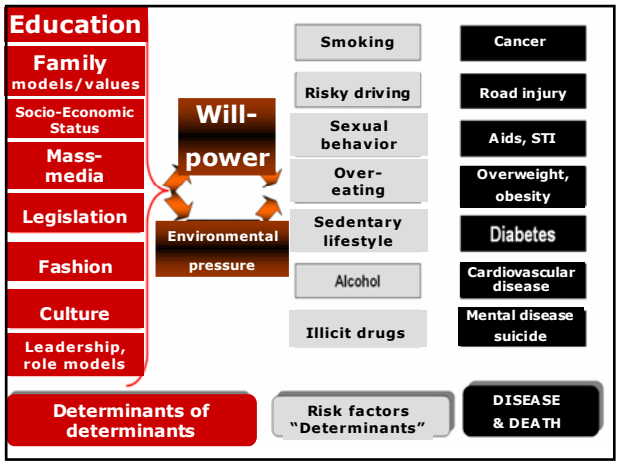
- *Intersectorial, environmental approach*
- *Delayed sexual debut*

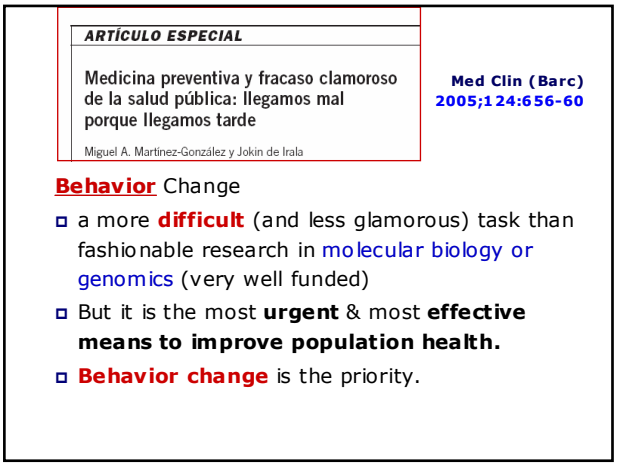
DELAYED SEXUAL DEBUT AMONG PRIMARY SCHOOL PUPILS (13–16 YEARS) FOLLOWING INFORMATION EDUCATION AND COMMUNICATION (IEC) (Soroti District, Uganda)



Source: The Effects of the Katakwi/Soroti School Health and AIDS Prevention Project, African Medical and Research Foundation (AMREF) Report, Kampala, August 2001.







ARTÍCULO ESPECIAL

Medicina preventiva y fracaso clamoroso de la salud pública: llegamos mal porque llegamos tarde

Miguel A. Martínez-González y Jokin de Irala

Med Clin (Barc) 2005;124:656-60

Behavior Change

- a more **difficult** (and less glamorous) task than fashionable research in molecular biology or genomics (very well funded)
- But it is the most **urgent** & most **effective means to improve population health.**
- **Behavior change** is the priority.