Prevenzione oncologica e "interception": verso la medicina personalizzata

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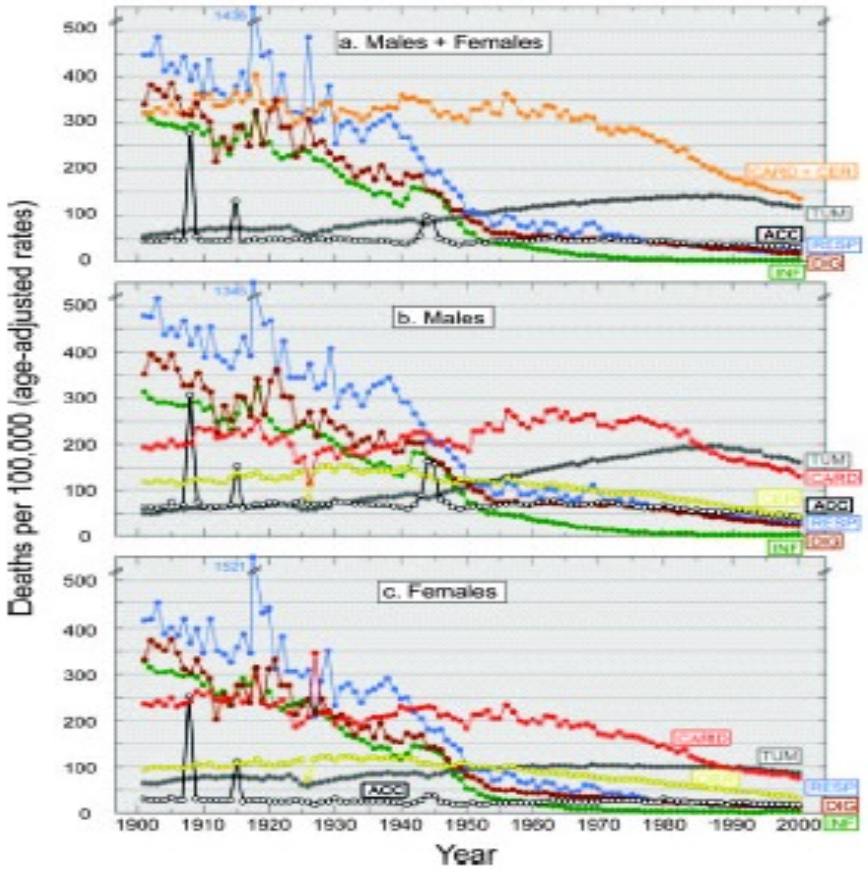
La rivoluzione epidemiologica del Millennio



- La rivoluzione
- Epidemiologica

Del Novecento

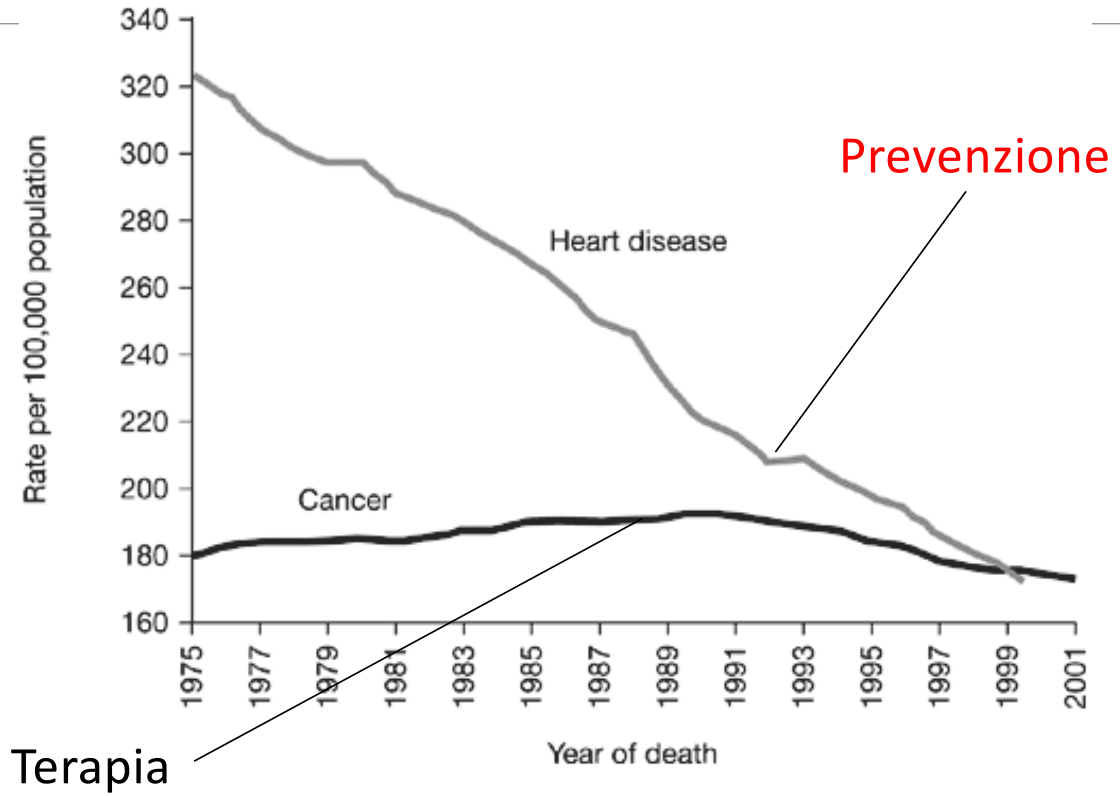
Tasso di mortalità 1901 al 2000 e principali

Malattie infettive (INF), tumori (TUM), cardiovascolari (CARD), cerebrovascolari (CER), respiratorie e influenzali (RESP), apparato digerente (DIG) e incidenti (ACC).

LA MORTALITà PER MOLTE CAUSE è DIMINUITA E L'ASPETTATIVA DI VITA AUMENTATA

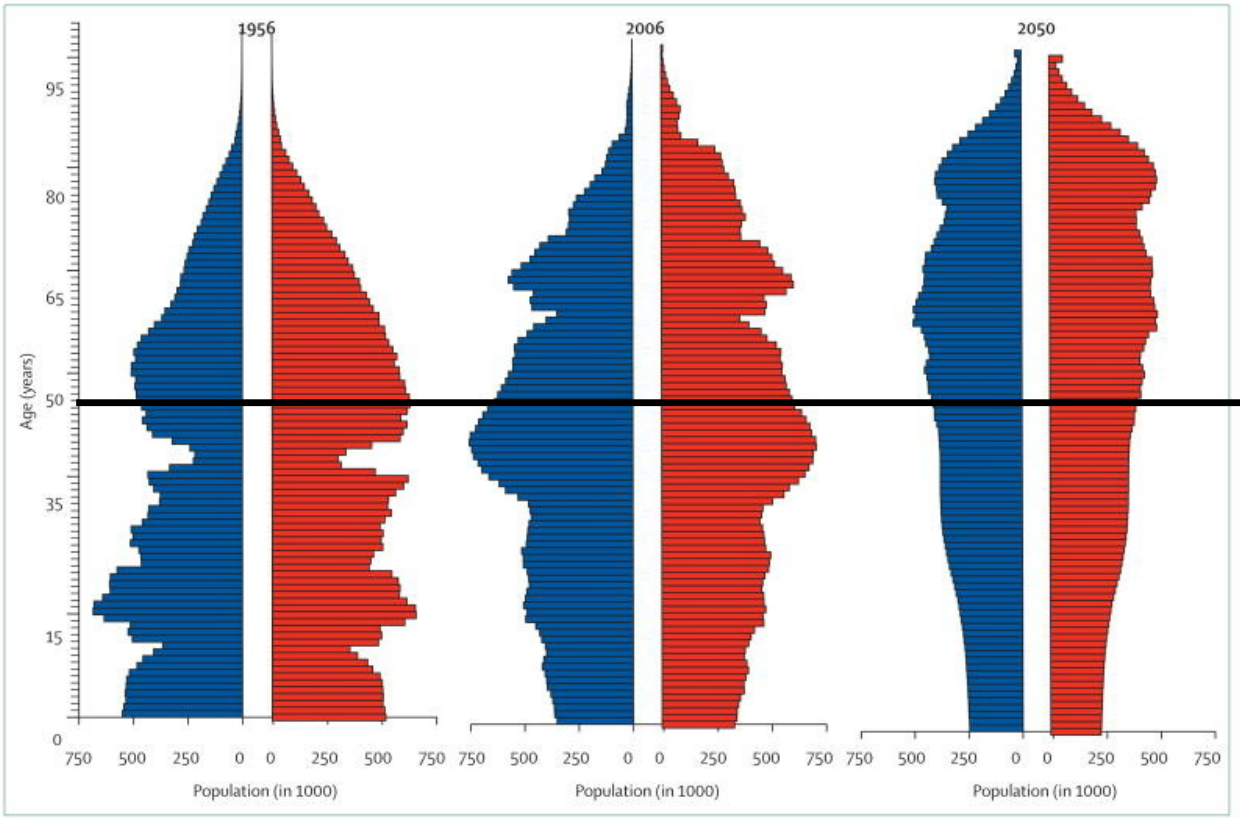
De Flora S. et al. Faseb J, Vol 8:892-7

Prevenzione vs Terapia

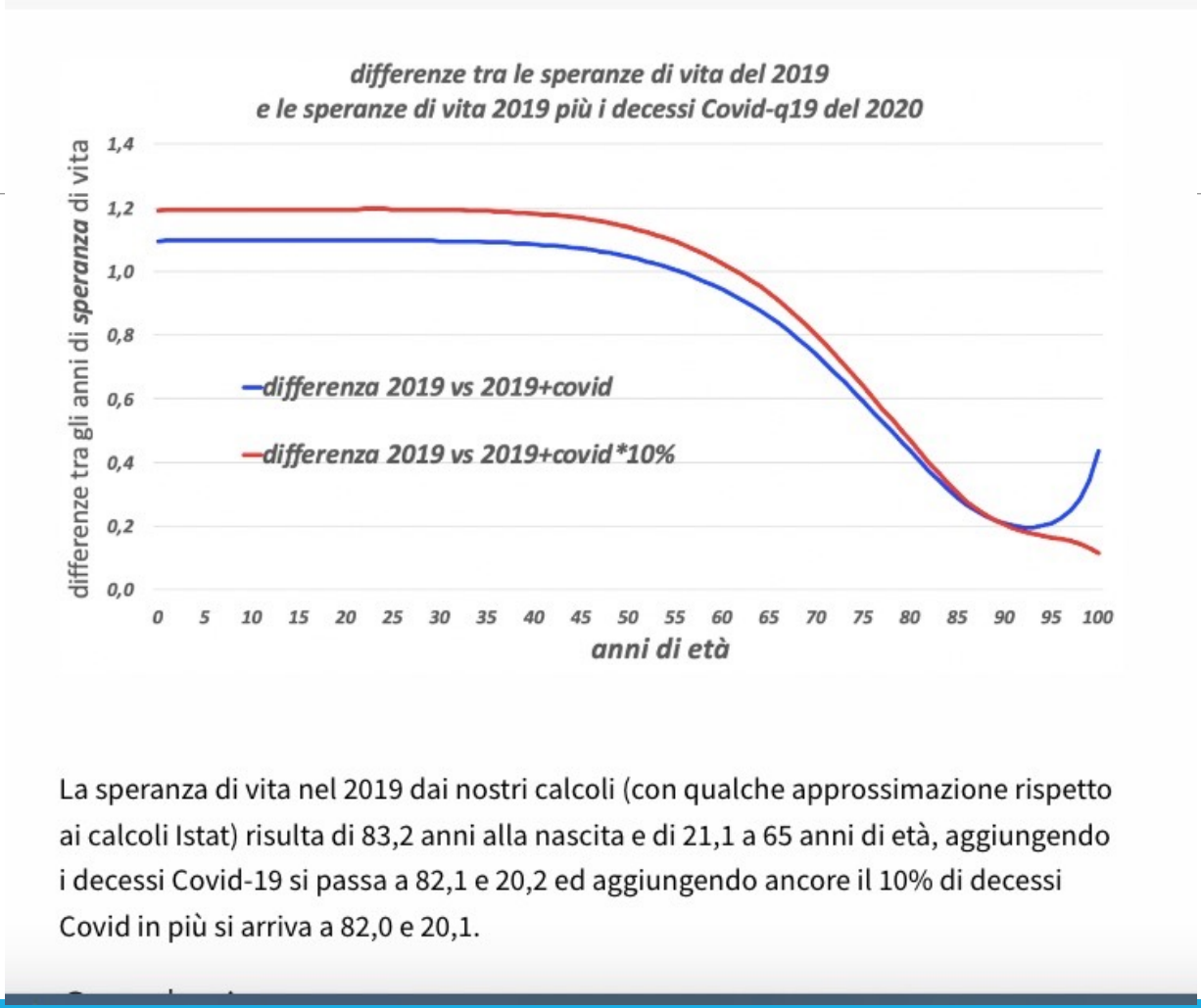


Jemal A *et al*. Cancer statistics,. *CA Cancer J Clin* 54

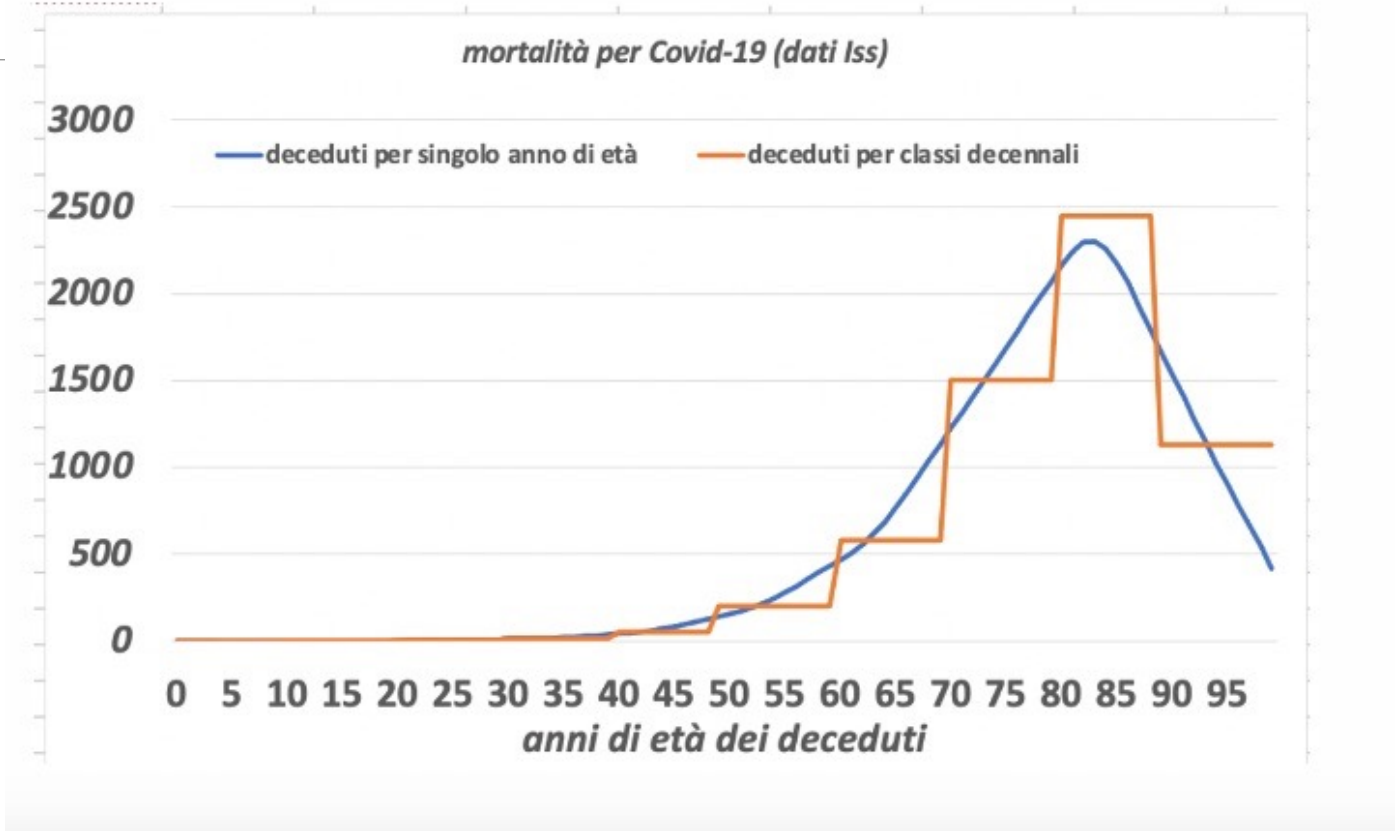
L’aspettativa di vita aumenta e dunque cresce la fascia di popolazione anziana. In particolare, vivono mediamente più a lungo le **Donne** rispetto agli **Uomini.**



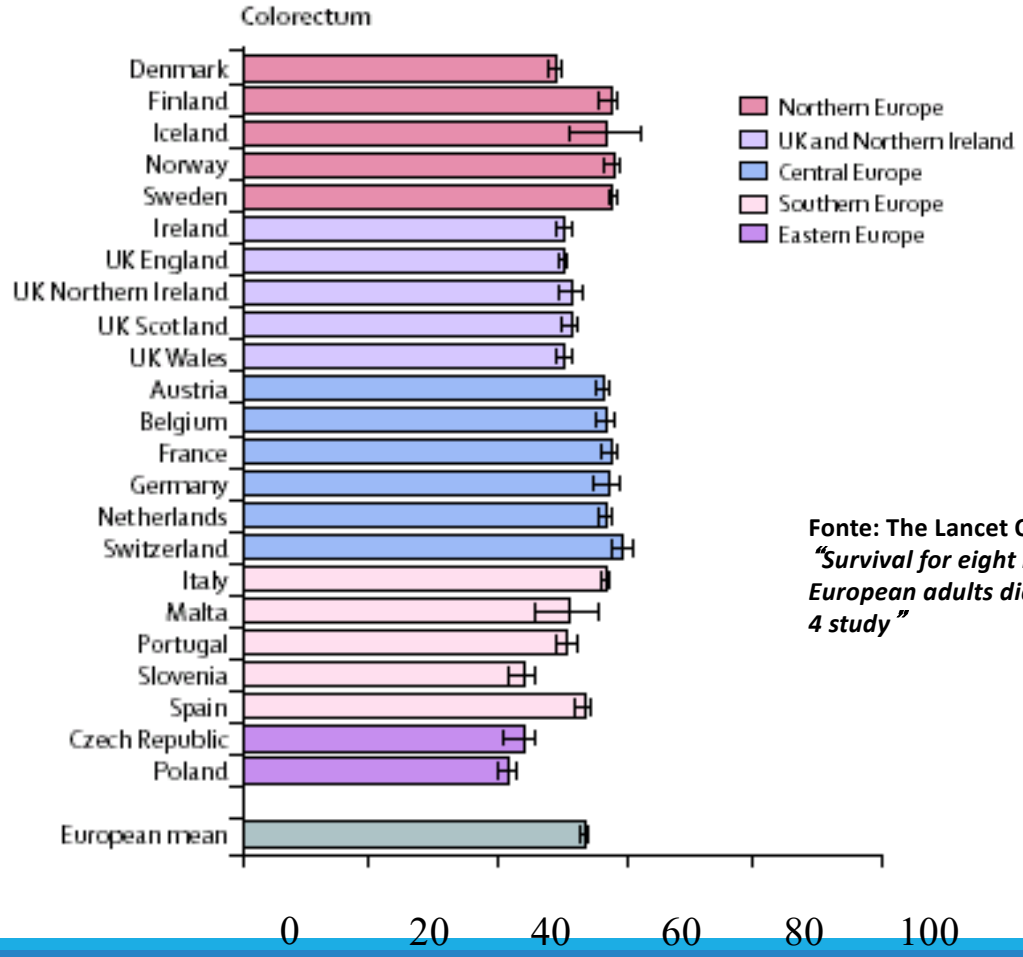
Christensen K, *et al* Lancet. Oct 3;374(9696):1196-208.



La speranza di vita nel 2019 dai nostri calcoli (con qualche approssimazione rispetto ai calcoli Istat) risulta di 83,2 anni alla nascita e di 21,1 a 65 anni di età, aggiungendo i decessi Covid-19 si passa a 82,1 e 20,2 ed aggiungendo ancore il 10% di decessi Covid in più si arriva a 82,0 e 20,1.

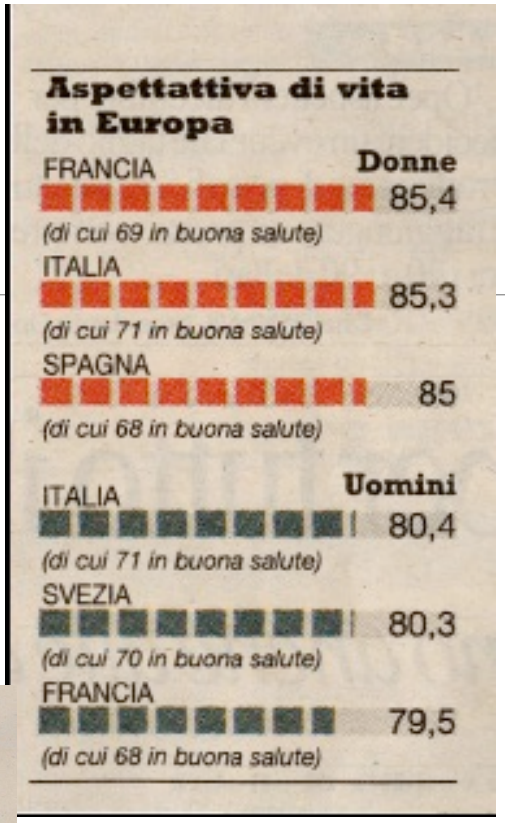

mortalità per Covid-19 (dati Iss)
deceduti per singolo anno di età
deceduti per classi decennali
3000
2500
2000
1500
1000
500
0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95
anni di età dei deceduti

Sopravvivenza media relativa a 5-anni per tipo di tumore (uomini e donne) in diversi Paesi Europei



Fonte: The Lancet Oncology, Berrino Franco et al.
"Survival for eight major cancers and all cancers combined for European adults diagnosed in 1995–99: results of the EUROCARE-4 study"

La Repubblica
(Sull'aumentata speranza Di vita)



Gli italiani i più longevi d'Europa

Classifica di Lancet. E gli esperti confermano: "Qui si vive meglio"

(segue dalla prima pagina)

ELENA DUSI

ANCHE se le donne sono leggermente sopravanzate dalle francesi (85,4 anni contro i nostri 85,3), nel complesso si conferma che il nostro è il paese dove i giorni sono più lunghi.

Lo studio europeo che esce oggi sulla rivista medica *The Lancet* si sofferma sulle ragioni di questo primato. E lo fa in un momento che sembra studiato apposta per farci riflettere. Trai 25 paesi europei, infatti, si vive più a lungo e si invecchia con meno acciacchi laddove il livello di istruzione è più elevato, il sistema sanitario pubblico è meglio finanziato e le politiche a favore degli anziani sono più supportate da fondi. La correlazione fra ricchezza, educazione e durata della vita è molto stretta, sottolinea la curatrice dello studio, Carol Jagger dell'università inglese di Leicester. E nell'Europa a 25 il nucleo centrale dei quindici offre panorami nettamente migliori rispetto ai dieci paesi arrivati dopo con economie più traballanti.

Livello di istruzione elevato, buon sistema sanitario e aiuti agli anziani

Per Antonio Golini, che insegna Demografia alla Sapienza ed è membro dell'Accademia dei Lincei, il primato italiano ha cause note come dieta, un sistema sanitario che funziona bene nonostante qualche scandalo e una generale condizione di salute che si trasmette per via genetica di padre in figlio. «Siamo abituati ad accentuare i lati negativi della nostra condizione, ma in Italia godiamo di un buon sistema di vita e abbiamo il vantaggio di non avere grandi metropoli. Nelle città medie e piccole che caratterizzano il nostro paesaggio la qualità dell'esistenza è molto migliore».

L'idillio fra The Lancet e l'Italia dura però solo un capitolo. In un paese che invecchia (così come tutto il continente) e ha un pil privo di grinta non esiste altra soluzione — sostengono la Jagger e i suoi ricercatori — che mettere in atto una raccomandazione avanzata dal Consiglio Europeo: portare al 50 per cento il livello di occupazione dei lavoratori con più di 55 anni e far slittare gradualmente l'età pensionabile verso i 70 anni. «È ovvio che la fase di attività di un individuo debba andare di pari passo con l'allungamento della sua vita» dice Golini. Anche perché l'indice della salute — che indica l'età media in cui si presentano i primi acciacchi invalidanti — oltrepassa in Italia l'asticella dei 70 anni.

Con il nostro pil si pone il problema delle pensioni e dovremo lavorare fino a 70 anni

Per ogni anno che passa, al giorno d'oggi, la nostra aspettativa di vita aumenta di almeno tre mesi. «È come se ogni anno durasse per noi quindici mesi» spiega Golini. «Dodici ci sono dati subito, gli altri tre vengono in un certo senso depositati in banca: ne usufruiremo sotto forma di allungamento della vecchiaia. Ma non è giusto che a pagarne i costi siano solo i giovani e i lavoratori attivi in genere. Anche perché negli ultimi quindici anni l'Europa è cresciuta a un ritmo mediamente doppio rispetto all'Italia, mentre India e Cina ci hanno sopravanzato di circa dieci volte. La strada persa si recupera soltanto lavorando di più, non solo nel corso della settimana ma anche in quello della vita». Sembra sia il modo migliore per arrivare a cent'anni.

Aspettattiva di vita in Europa
FRANCIA Donne 85,4 (di cui 69 in buona salute)
ITALIA 85,3 (di cui 71 in buona salute)
SPAGNA 85 (di cui 68 in buona salute)
ITALIA Uomini 80,4 (di cui 71 in buona salute)
SVEZIA 80,3 (di cui 70 in buona salute)
FRANCIA 79,5 (di cui 68 in buona salute)

Quali sono i fattori di rischio dei tumori?

Le cause note delle alterazioni del DNA nella genesi del cancro sono di vari ordini: si ipotizzano cause di tipo ambientale, genetiche, infettive, legate agli stili di vita e *fattori casuali*. La quota di tumori attribuibili ai vari fattori di rischio è riportata nella Tabella 1: negli USA il fumo di tabacco da solo è responsabile del 33% delle neoplasie; un altro 33% è legato ai cosiddetti *stili di vita* (dieta, sovrappeso, abuso di alcool e inattività fisica).

Fattore di rischio	Quota di tumori attribuibili a vari fattori di rischio	
	USA, 2012*	Regno Unito, 2010**
	%	%
Tabacco	33	19
Dieta	5	19
Sovrappeso, obesità	20	5
Inattività fisica	5	1
Abuso di bevande alcoliche	3	4
Fattori occupazionali	5	4
Infezioni	8	3
Radiazioni ionizzanti e esposizione a raggi UV	2	5
Inquinamento ambientale	2	–

TABELLA 1. Quota di tumori attribuibili a vari fattori di rischio

*American Association for Cancer Research, 2013.

** Parkin DM. The fraction of cancer attributable to lifestyle and environmental factors in UK in 2010. Br J Cancer, 2011.

Numero di morti evitabili per tumori attribuibili a stili di vita individuali in Italia

Fattore di rischio	Maschi	Femmine
Fumo	33.569	9.922
Consumo elevato di bevande alcoliche	8.031	4.811
Fattori nutrizionali	6.328	4.323
Eccesso ponderale	3.808	3.173
Inattività fisica	392	606
Combinato*	44.083	20.385

I NUMERI DEL CANCRO
IN ITALIA 2020

Leading Sites of New Cancer Cases and Deaths – 2022 Estimates

Figure 3. Leading Sites of New Cancer Cases and Deaths – 2022 Estimates

Estimated New Cases

Male			Female		
Prostate	268,490	27%	Breast	287,850	31%
Lung & bronchus	117,910	12%	Lung & bronchus	118,830	13%
Colon & rectum	80,690	8%	Colon & rectum	70,340	8%
Urinary bladder	61,700	6%	Uterine corpus	65,950	7%
Melanoma of the skin	57,180	6%	Melanoma of the skin	42,600	5%
Kidney & renal pelvis	50,290	5%	Non-Hodgkin lymphoma	36,350	4%
Non-Hodgkin lymphoma	44,120	4%	Thyroid	31,940	3%
Oral cavity & pharynx	38,700	4%	Pancreas	29,240	3%
Leukemia	35,810	4%	Kidney & renal pelvis	28,710	3%
Pancreas	32,970	3%	Leukemia	24,840	3%
All sites	**983,160**		**All sites**	**934,870**	

Estimated Deaths

Male			Female		
Lung & bronchus	68,820	21%	Lung & bronchus	61,360	21%
Prostate	34,500	11%	Breast	43,250	15%
Colon & rectum	28,400	9%	Colon & rectum	24,180	8%
Pancreas	25,970	8%	Pancreas	23,860	8%
Liver & intrahepatic bile duct	20,420	6%	Ovary	12,810	4%
Leukemia	14,020	4%	Uterine corpus	12,550	4%
Esophagus	13,250	4%	Liver & intrahepatic bile duct	10,100	4%
Urinary bladder	12,120	4%	Leukemia	9,980	3%
Non-Hodgkin lymphoma	11,700	4%	Non-Hodgkin lymphoma	8,550	3%
Brain & other nervous system	10,710	3%	Brain & other nervous system	7,570	3%
All sites	**322,090**		**All sites**	**287,270**	

Estimates are rounded to the nearest 10, and cases exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder. Estimates do not include Puerto Rico or other US territories. Ranking is based on modeled projections and may differ from the most recent observed data.

MAMMELLA	
Incidenza	Si stima che nel 2019 verranno diagnosticati in Italia circa 53.000 nuovi casi di carcinomi della mammella femminile (dati AIRTUM).
Mortalità	Anche per il 2016 il carcinoma mammario ha rappresentato la prima causa di morte per tumore nelle donne, con oltre 12.000 decessi (dati ISTAT).
Sopravvivenza a 5 anni	Risulta in Italia essere pari a 87%.
Sopravvivenza a 10 anni	La sopravvivenza dopo 10 anni dalla diagnosi è pari a 80%.
Fattori di rischio	Le donne sopra i 50 anni d'età hanno un maggior rischio di sviluppare un tumore mammario. Sono stati identificati altri fattori di rischio legati a **fattori riproduttivi** (menarca precoce e una menopausa tardiva; nulliparità,una prima gravidanza a termine dopo i 30 anni, il mancato allattamento al seno), **fattori ormonali** (terapia ormonale sostitutiva assunta durante la menopausa), **fattori dietetici e metabolici** (elevato consumo di alcol e di grassi animali e basso consumo di fibre vegetali), **pregressa radioterapia** (a livello toracico e specialmente se prima dei 30 anni d'età) e **precedenti displasie o neoplasie mammarie**. Inoltre, il 5-7% dei tumori mammari risulta essere legato a **fattori ereditari**,1/4 dei quali determinati dalla mutazione di due geni, BRCA1e/o BRCA2.
Diagnosi	Leggere i paragrafi sottostanti. Per ulteriori approfondimenti consultare *Linee Guida AIOM* nel sito **www.aiom.it**
Trattamento	

PROSTATA	
Incidenza	Il tumore della prostata è la neoplasia più frequente tra i soggetti di sesso maschile (19%). Per il 2019 sono attesi 37.000 nuovi casi.
Mortalità	Nel 2016 si sono osservati 7.540 decessi per cancro prostatico (ISTAT).
Sopravvivenza a 5 anni	La sopravvivenza a 5 anni degli uomini con tumore della prostata in Italia è pari a 92%. Per i pazienti in vita dopo 1 e 5 anni l'aspettativa di vita si mantiene stabile.
Sopravvivenza a 10 anni	La sopravvivenza a 10 anni degli uomini con tumore della prostata in Italia è pari a 90%.
Fattori di rischio	L'emergere di forme clinicamente silenti e biologicamente non aggressive ha infatti reso più difficile l'interpretazione degli studi eziologici e la valutazione della diversa distribuzione dei fattori di rischio in passato correlati all'insorgenza di questa malattia, tra i quali il consumo elevato di carne e latticini, dieta ricca di calcio (con conseguente elevata concentrazione di IGF-lematico) e alti livelli di androgeni nel sangue. La malattia appare per altro legata a fattori ereditari in una minoranza di casi (<15%).
Diagnosi	Leggere i paragrafi sottostanti. Per ulteriori approfondimenti consultare *Linee Guida AIOM* nel sito **www.aiom.it**
Trattamento	

Proposal For a common Risk Scorecard

Two "Scorecards" for Risk Assessment for either Cardiovascular Disease or Cancer

	Established Scorecard for Cardiovascular Risk (European Society of Cardiology)	Proposed New Scorecard for Cancer Risk
Personal and Lifestyle Components	Age and sex	Age and sex
	Smoking	Smoking
		Exercise
		Dietary habits
		Obesity
		Reproductive history
Genetic Analysis	Family history	Family history
		Oncogene/tumor suppressor mutations
		Metabolic activity polymorphisms
Laboratory Measurements	Mean LDL cholesterol	DNA adducts
	Mean HDL cholesterol / LDL:HDL ratio	DNA oxidative damage score
	Mean systolic blood pressure	Proteomics score:
	Indications of diabetes	Tissue proteomics
		Serum proteomics
		Microbiopsy dysplasia score
		hormone status
		Chronic infection (*e.g. H. pylori*)
		Any new biochemical markers that will be developed

Albini A and Sporn M Nature Reviews Cancer

IRCCS MultiMedica

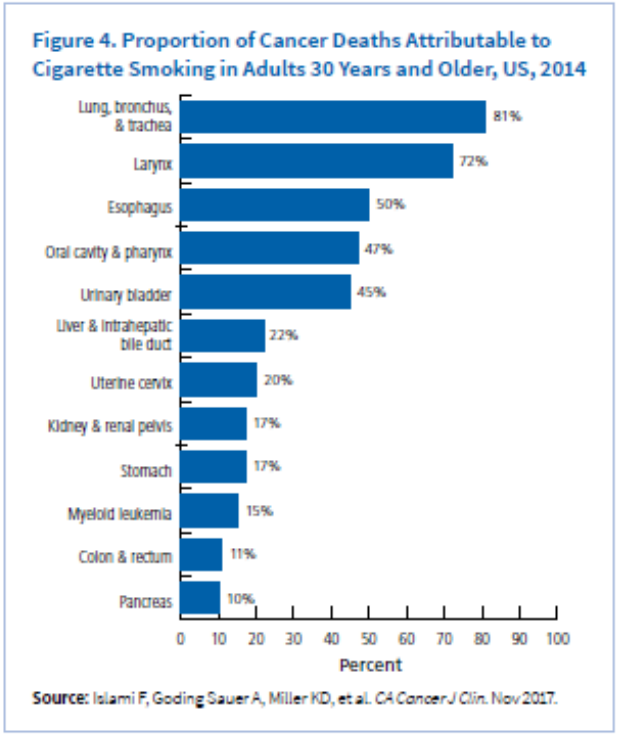
Fattori di rischio per tumore

Fattori di rischio non modificabili	Fattori di rischio modificabili	Fattori di rischio trattabili
Età	Tabacco	Infiammazione cronica
Genetica	Sovrappeso ed obesità	Infezioni virali
Mutazioni ereditarie e somatiche	Nutrizione	Infezioni batteriche
Sesso	Attività fisica	Diabete
Etnia	Esposizione ad agenti cancerogeni	Irradiazione
Anamnesi familiare	Alcool	Stato ormonale
Anamnesi personale	Allattamento*	
Storia riproduttiva*,†		
Regione del mondo†		

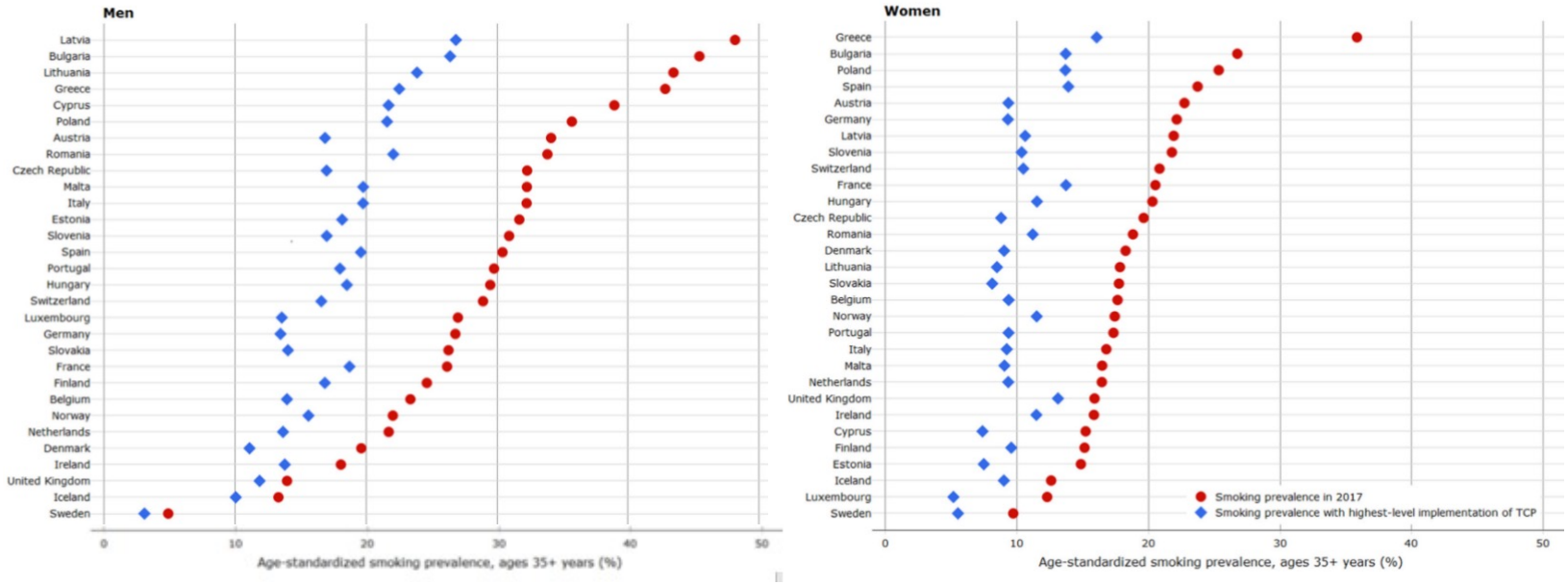
- Per donne.
- †In alcuni casi, le persone possono scegliere la propria storia riproduttiva e la propria regione mondiale; per altri, questa non è una scelta specifica.

- Strategies to Prevent "Bad Luck" in Cancer. Albini A, Cavuto S, Apolone G, Noonan DM. J Natl Cancer Inst. 2015 Aug 4;107(10). pii: djv213. doi: 10.1093/jnci/djv213. Print 2015 Oct.

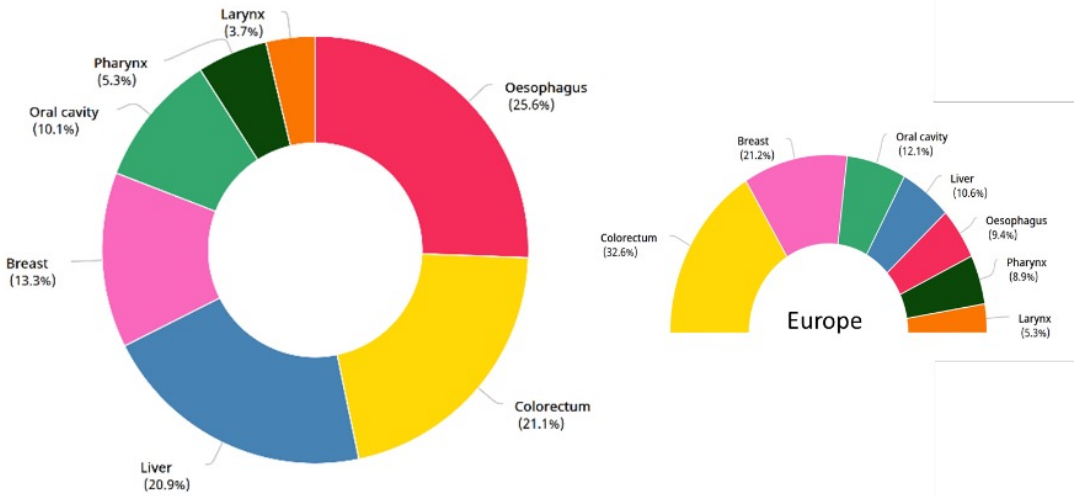
Non fumare: molti tumori (non solo polmonari aumentano col fumo di sigaretta)



Age-standardised smoking prevalence in 2017 and estimated hypothetical prevalence with the highest-level of tobacco control policies (TCP) implementation (measured by the Tobacco Control Scale), by sex and country.



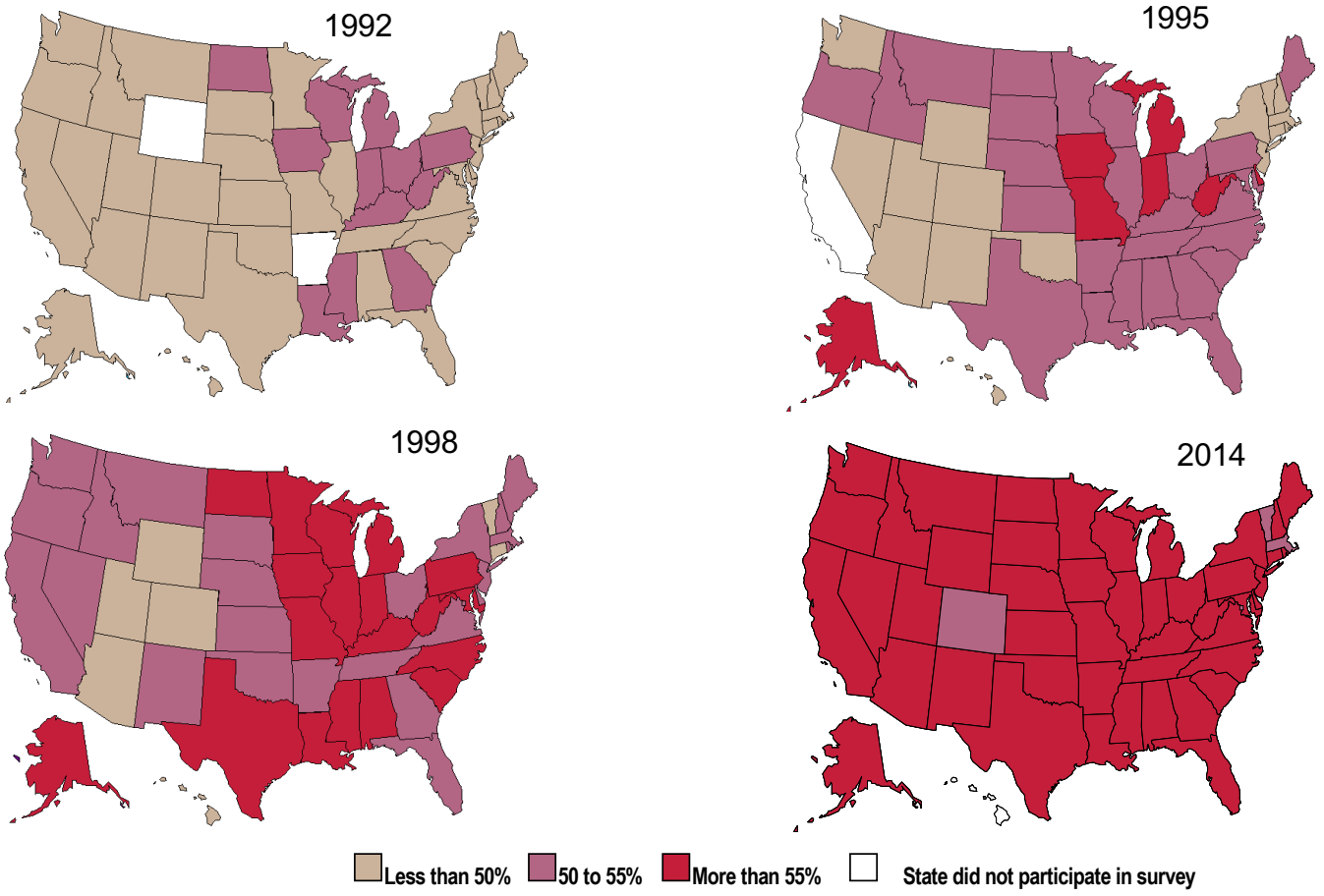
Estimated number of new cancer cases in 2020 attributable to alcohol drinking worldwide and in Europe in both sexes



Data source: Rumgay H et al. (2021)
Graph production: Global Cancer Observatory (http://gco.iarc.fr/)

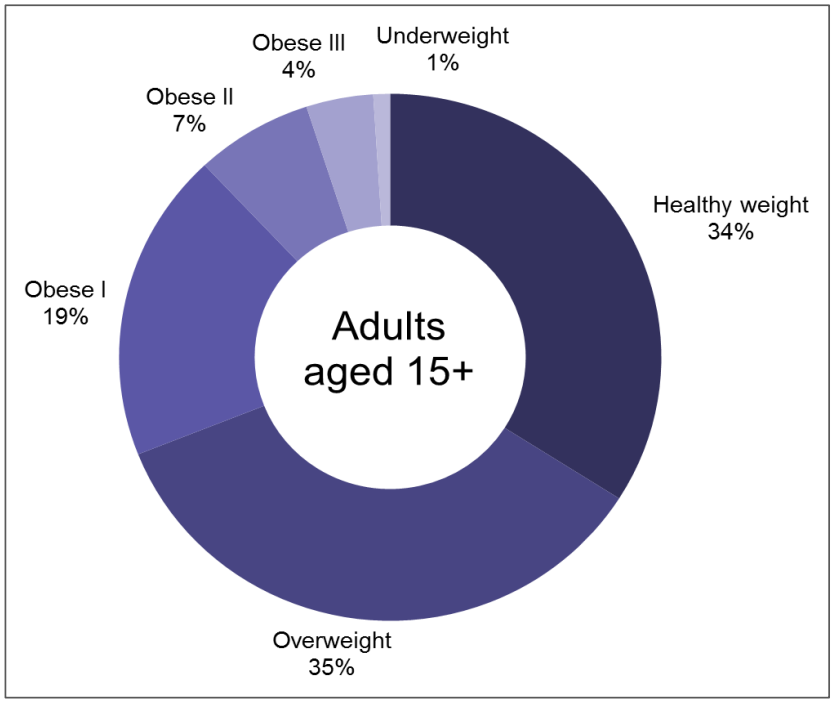
International Agency for Research on Cancer
World Health Organization

Aumento della Percentuale di persone in sovrappeso USA negli ultimi venti anni



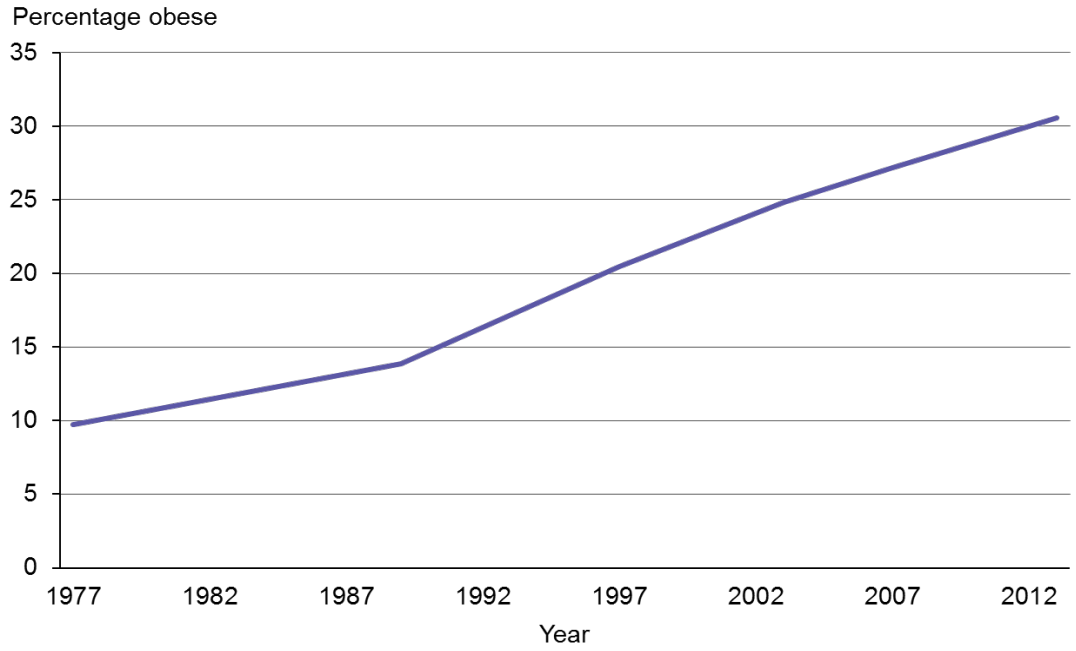
*Body mass index of 25.0 kg/m^{2}or greater. Source: Behavioral Risk Factor Surveillance System, CD-ROM (1984-1995, 1998) and Public Use Data Tape (2004), National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 1997, 2000, 2005.

Ci sono più persone sovrappeso che persone con un peso “sano” o normale



Proportion of adults in each BMI category,

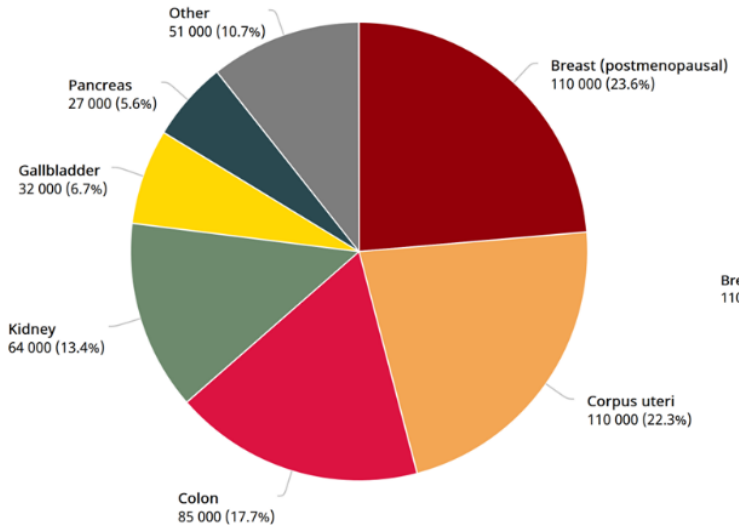
L’ obesità è in crescita nel mondo occidentale

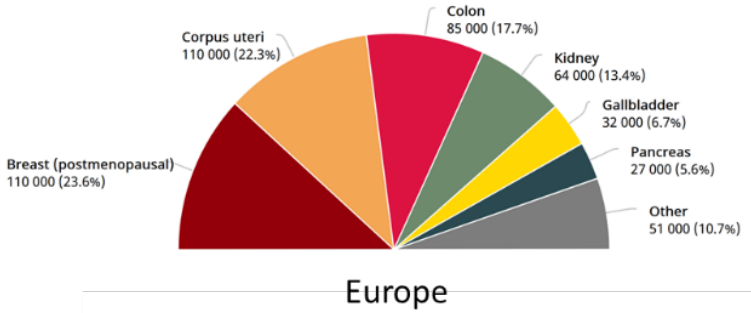


Adult obesity rate, 1977*–2012/13

Ministry of Health. 2015. Understanding excess body weight. NZ Health Survey.

Estimated number of new cancer cases in 2012 attributable to obesity worldwide and in Europe in both sexes





Europe

Obesity reduction is also beneficial to cancer prevention

Adapted from "An Equity-Oriented Prevention Framework", National Academy of Medicine, 2017

The scheme might it be beneficial for cancer prevention & screening to more closely align with prevention & screening for other diseases (e.g., obesity cardiovascular, metabolic, diabetes)

Some points in prevention and screening

- Learning from reducing HPV-associated cancer
- Alignment between prevention & screening for cancer
- Screening for additional types of cancer and new approaches for cancer screening
- Working on life style
- Health disparities and technology

Interventions against cervical cancer: Opportunities at each step of the process

HPV vaccination	***Primary prevention***
Cervical cancer screening	***Secondary prevention***
Treatment of invasive cervical cancer	***Tertiary prevention***

Prevention, screening, and early detection: HPV-associated cancer

Good news: We can do a tremendous amount for primary & secondary prevention

Bad news: The tools are underutilized

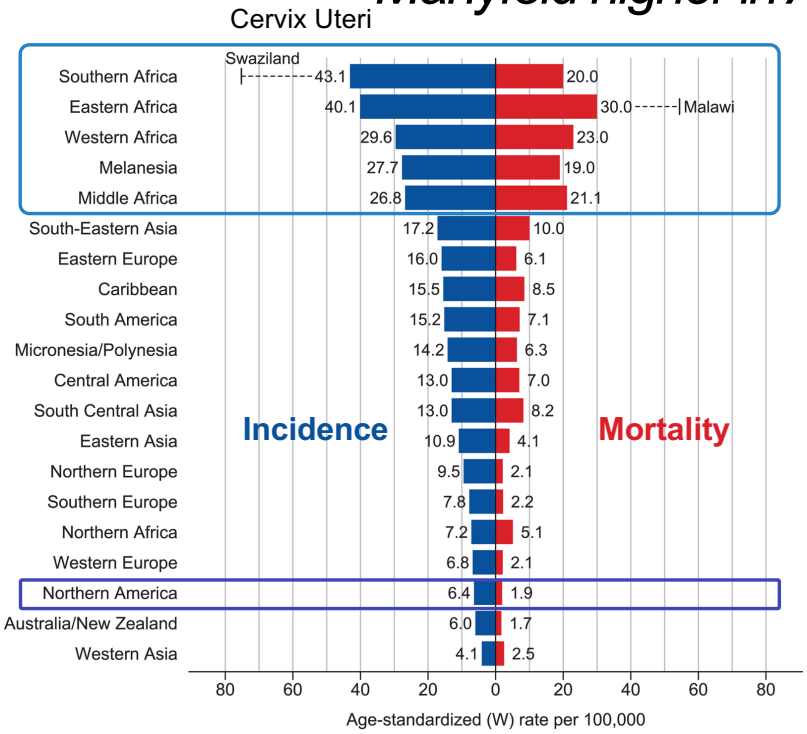
We need to figure out how to better utilize vaccinations and screening

We can't stop at the "what" (interventions).

We need to work on the "how" (implementation, delivery)

Global Disparities in Cervical Cancer Cases & Deaths:

Manyfold higher in Africa than in U.S.



Low- and middle-income countries:

~90% of cervical cancer *cases* and *deaths*
(projected to increase by 2% each year)

Africa vs. North America:

- **>4-fold difference in incidence rate**
- **>8-fold difference in mortality rates**

Cervical cancer represents 90% of HPV-associated cancer

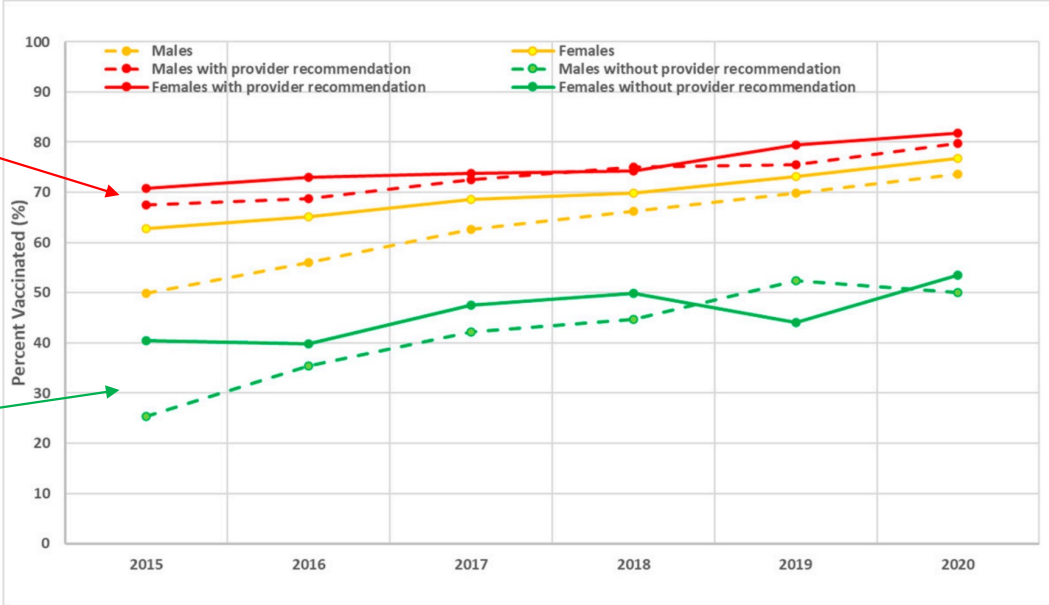
Great opportunity for prevention, screening, and early detection – through technology.

Bray et al, Global cancer statistics 2018, Cancer 2018.

Health care provider recommendation associated with increased HPV vaccine uptake

Health care provider recommendation for HPV vaccination

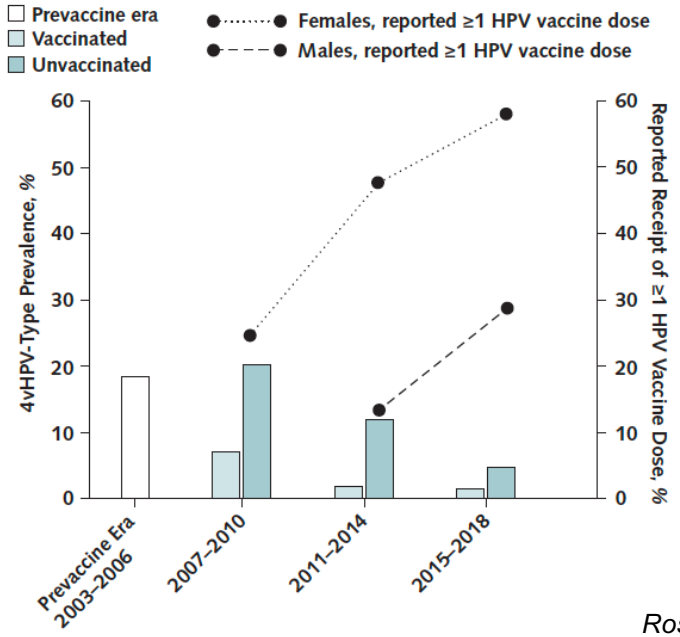
No provider recommendation



Source: Lu et al, Human papillomavirus vaccination trends among adolescents: 2015 to 2020. Pediatrics, 2022.

Herd protection in 14-24 year-old women

12 years after HPV vaccine introduction in the U.S.



Rosenblum et al, Annals Int. Med. 2022

Some important clinical results against HPV types targeted by the HPV vaccine

Vaccine has very high efficacy (>95%) **& long duration of protection** (>10 years)

Vaccine confers sterilizing immunity

Prevents infection in most vaccinees

Vaccine induces herd immunity even with sub-optimal vaccine uptake

Learning from reducing HPV-associated cancer

Schiller & Lowy, *Vaccine*, 2018; Hildesheim et al, *American Journal of Obstetrics and Gynecology*, 2016; Rosenblum et al, *CDC Morbidity and Mortality Weekly Report (MMWR)*, 2021

Cost-effective, high quality “See and Treat” approach for cervical cancer screening

Undergoing international large-scale clinical trials for low- and middle-income AND high-income countries

Rapid, inexpensive, on-site HPV DNA test

On-site automated visual evaluation of cervix with smartphone and AI algorithm (HPV-positive women)

On-site thermal ablation

For more: Desai et al, Int J Cancer, 2022: “Redesign of a rapid, low-cost HPV typing assay to support risk-based cervical screening and management” and "The development of “automated visual evaluation” for cervical cancer screening”

Efforts to expand screening

PREVENZIONE E “INTERCETTAZIONE”:
UNA NUOVA ERA NELLA CHEMOPREVENZIONE

Perspective

Clinical Cancer Research

Cancer Prevention and Interception: A New Era for Chemopreventive Approaches

Adriana Albini[1], Andrea DeCensi[2], Franco Cavalli[3], and Alberto Costa[4]

Table 1. A potential "to do" list in cancer prevention and preventive interception

	Prevention	Interception
1	Do not smoke.	-Quit smoking (often requires a multitask, structured intervention). Take low-dose aspirin or other chemoprevention measures.
2	Avoid chemical carcinogens in the environment and at work place. Make your environment smoke free.	-Fight for your rights: receive attention if you have been exposed to asbestos, PAH, and other carcinogens in the work place or environment.
3	Avoid physical carcinogens, example: overexposure to sunlight and other sources of UV.	-Do periodic screening for premalignant skin lesions.
4	Avoid biologic carcinogens. Vaccines for virally induced cancer (example: HPV).	-Antibiotics for bacterial-associated cancer (example: *Helicobacter pylori*). Do periodic screening for premalignant lesions in the uterine cervix
5	Avoid overweight and obesity, eat properly	-Lose weight, change dietary habits
6	Avoid foods that might be potentially carcinogenic	-Limit salt, red and processed meat; avoid soft drinks
7	Limit alcohol. Do not overcome 1 glass per day in women and 2 glasses in men	-Cut back or quit drinking
8	Keep your gut flora and your microbiota "healthy"	-Restore your intestinal flora with a healthy life style and diet. Near future: dietary supplements containing "healthy" microbiome components
9	Avoid a sedentary lifestyle, be physically active	-Get on an exercise program
10	Control risk factors: inflammation, metabolic syndrome	-With low level risk conditions, take some chemopreventive strategies with few side effects: aspirin, metformin, flavonoids, curcumin
11	Prefer breast feeding your children rather than using formula	-Monitor changes in your body (e.g., breast lumps).
12	If there are familial cases of cancer, get genetic counseling and do relevant chemoprevention for the cancers at risk.	-Do periodic screening for premalignant lesions for breast, colon and prostate. With high risk consider a chemoprevention trial. Near future: precision prevention.

Abbreviations: PAH, polycyclic aromatic hydrocarbons; UV, ultraviolet light.

Clin Cancer Res; 22(17) September 1, 2016

Precision Medicine and Prevention

Interventions to prevent, screen, diagnose, or treat a disease (e.g., cancer), based on a molecular and mechanistic understanding of the causes, pathogenesis, and/or pathology of the disease

Precision medicine can be better than traditional approaches in cancer prevention

- **Evidence is required** to determine that a precision approach is superior to a more traditional approach

A theoretical advantage of precision medicine over traditional approaches:

Potential for conceptually-based improvements, while traditional approaches depend mainly on empiricism

MC(E)Ds: Multicancer “early” detection tests

Current goal: Detect asymptomatic cancer stages I-III

Some critical differences from traditional cancer screening:

1) Not specific for cancer at particular site
2) Not geared mainly to identify pre-cancer or stage I cancer
3) Is geared to identify several stages of cancer

prevention.cancer.gov

Some current MC(E)D issues

Will MCDs **reduce mortality** rates?

Will MCDs be **useful for all cancer stages** (I-III) for which they screen?

Will advances in cancer **treatment** increase, decrease, or have no **impact** on the utility of MCD tests?

Will **benefits clearly outweigh harms**?

- Will it be possible for **people with limited insurance to get tested** and, if their result is positive, to have **appropriate diagnostic evaluation and treatment**?

Imaging Advances

Cancer Detection and Staging

- Diagnosis at earlier stage
- Clearer picture of disease spread
- Helps patients get optimal treatment
- Permits more limited, minimally invasive surgical techniques

Response Assessment

- Informs treatment continuation or discontinuation

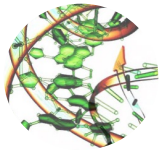
- Digital mammograms
- PET scanning
- Low-dose CT
- Enhanced MRI technologies

Cancer Genomics in screening and prevention

- Advent of the “precision medicine” era
- But cancer’s biology is far more complex than we had imagined

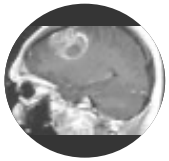
2000

Hallmarks of Cancer published



2005

The Cancer Genome Atlas (TCGA) launches



2010-2014

Genetic subtypes of glioblastoma, gastric and other cancers identified via TCGA research

2022

Precancer Genome Atlas

CancerProgress.Net

Image Source: TCGA

Alimentazione e salute

Alcuni alimenti (**verdure**, **frutta**, **spezie**, **bevande**, **condimenti**)

Contribuiscono alla nostra salute prevenendo:

- Malattie Cardiovascolari
- Diabete
- Tumori
- Malattie neurodegenerative

Un importante concetto emergente utile per aiutarci a stare in salute con i cibi è che gli **schemi dietetici** e le associazioni fra cibi possono essere nel loro insieme protettivi

Epigallocatechina 3-gallato

Antocianine

Acidi Grassi Omega- 3

Capsaicina

Sulforafano Isotiocianati

Epicatechine

Esperidina e Vitamine B e C

Catechine

Acido Ellagico

NUTRACEUTICA

Allil-derivati

Quercetina

Acido caffeico

Sulforafano Isotiocianati

I cibi contengono molecole terapeutiche: la farmacia in tavola

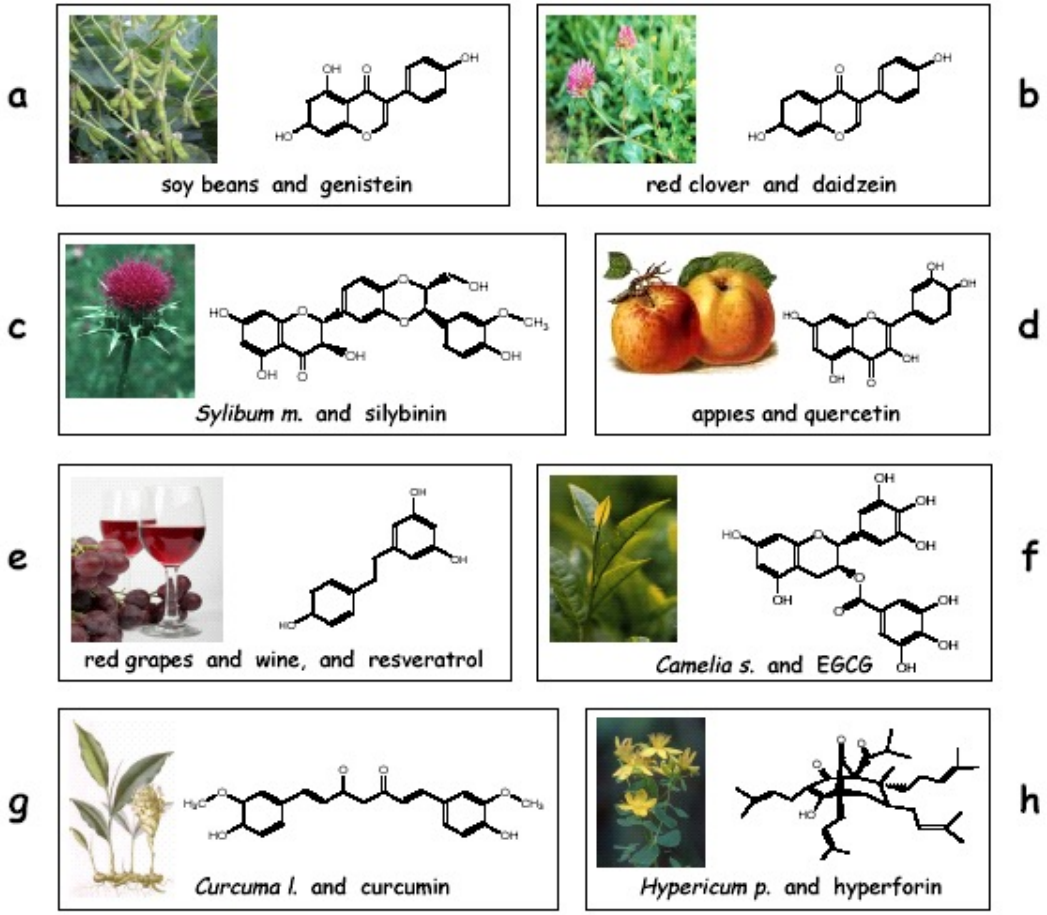
Curcumina

Resveratrolo

Acidi fenolici

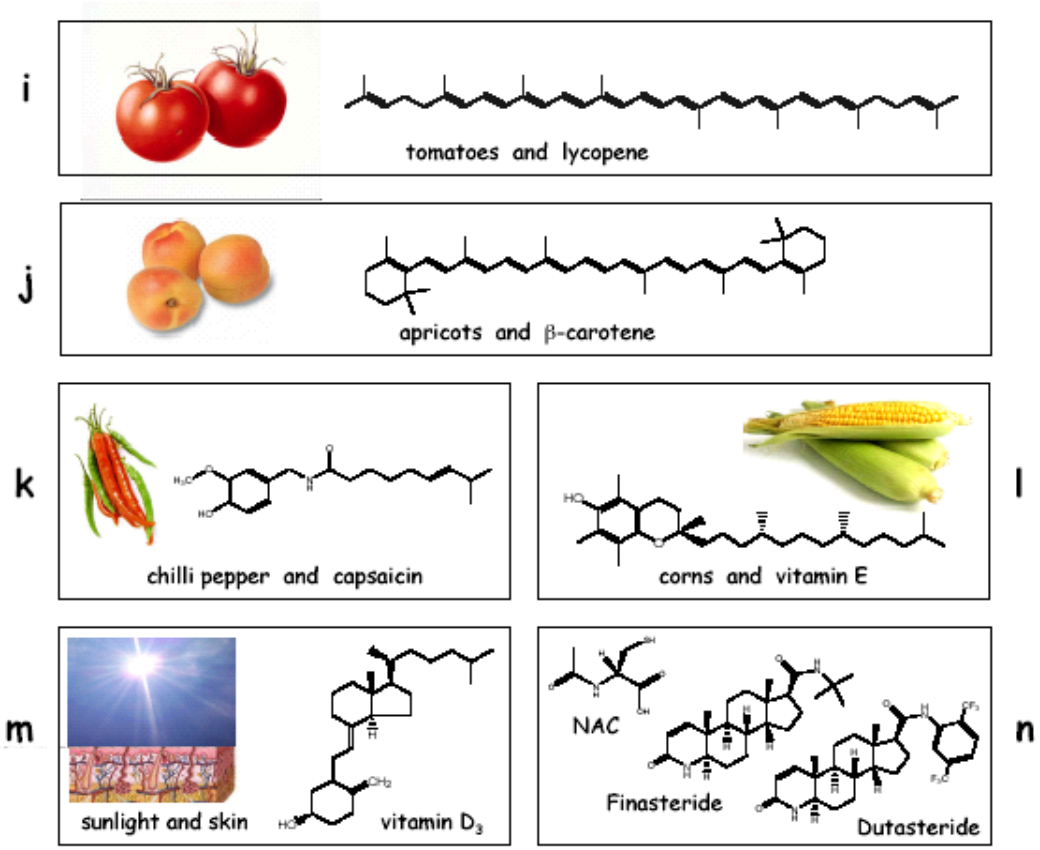
Licopene

Molti componenti della dieta hanno proprietà protettive per la salute



Fonte: Araldi et al. Albini A. *Current Cancer Drug Target*, 8:146-155

Molti componenti della dieta hanno proprietà chemiopreventive



Fonte: Araldi et al. Albini A. *Current Cancer Drug Target*, 8:146-155

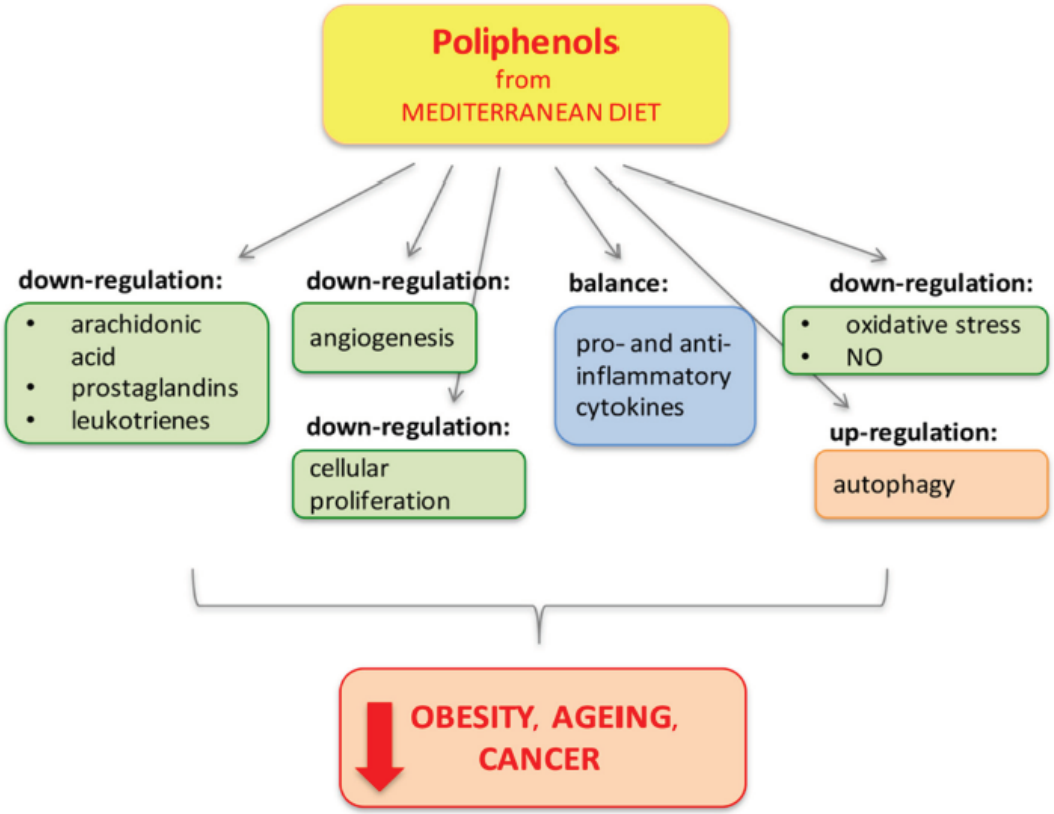
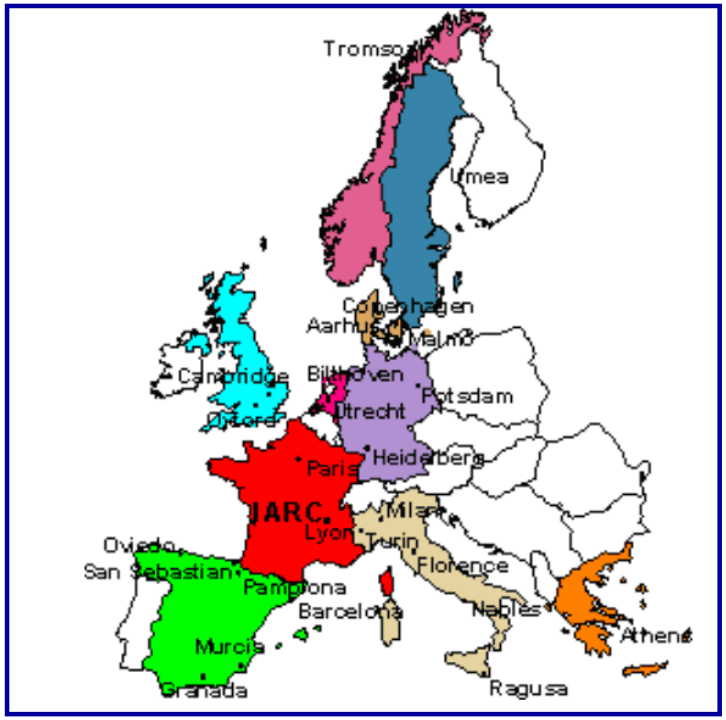


Figure 2: Polyphenols from Mediterranean Diet. Polyphenols protect and reduce inflammation by different pathways (through mechanisms of down-regulation, balance and up-regulation) preventing obesity, cancer and age-related diseases, in which inflammation has an important pathological role [240].

Lo studio EPIC

European Prospective Investigation into Cancer and nutrition



~ 520,000 volontari reclutati in 10 Paesi Europei

OBIETTIVO: studiare il ruolo dei fattori alimentari e legati allo stile di vita nell'eziologia dei tumori e di altre malattie cronico-degenerative.

Raccolta dei dati

- Questionario anamnestico → stile di vita
- FFQ → dieta
- Misure antropometriche
- Prelievo

EPIC Italia: ~ 47,000 volontari in 5 centri

Da dove vengono I dati scientifici che provano che con la corretta alimentazione si prevengono I tumori? Lo studio EPIC

Epidemiological and Large Population Studies, like for instance the EPIC Study

Italian Mediterranean Index and risk of colorectal cancer in the Italian section of the EPIC cohort

Claudia Agnoli[1], Sara Grioni[1], Sabina Sieri[1], Domenico Palli[2], Giovanna Masala[2], Carlotta Sacerdote[3,4], Paolo Vineis[4,5], Rosario Tumino[6], Maria Concetta Giurdanella[6], Valeria Pala[1], Franco Berrino[7], Amalia Mattiello[8], Salvatore Panico[8] and Vittorio Krogh[1]

Int. J. Cancer: **132**, 1404–1411 (2013) © 2012 UICC

La dieta mediterranea riduce l'incidenza di tumori:EPIC

Mediterranean dietary pattern and cancer risk in the EPIC cohort

E Couto[1,2], P Boffetta*[,1,3,4], P Lagiou[5], P Ferrari[6], G Buckland[7], K Overvad[8], CC Dahm[9], A Tjønneland[10], A Olsen[10], F Clavel-Chapelon[11,12], M-C Boutron-Ruault[11,12], V Cottet[11,12], D Trichopoulos[4,13,14], A Naska[5], V Benetou[5], R Kaaks[15], S Rohrmann[15], H Boeing[16], A von Ruesten[16], S Panico[17], V Pala[18], P Vineis[19,20], D Palli[21], R Tumino[22], A May[23], PH Peeters[23], HB Bueno-de-Mesquita[24,25], FL Büchner[24,26], E Lund[27], G Skeie[27], D Engeset[27], CA Gonzalez[7], C Navarro[28,29], L Rodríguez[30], M-J Sánchez[28,31], P Amiano[28,32], A Barricarte[28,33], G Hallmans[34], I Johansson[35], J Manjer[36], E Wirfärt[37], NE Allen[38], F Crowe[38], K-T Khaw[39], N Wareham[39], A Moskal[1], N Slimani[1], M Jenab[1], D Romaguera[19], T Mouw[19], T Norat[19], E Riboli[19] and A Trichopoulou[4,5]

Br J Cancer (2011) 104, 1493 – 1499

Table 3 Hazard ratios for all cancers associated with categories of the Mediterranean diet score

Score	Cohort members	Cases	HR[a] (95% CI)
Both sexes			
0–3	154 052	10 349	1.00
4	105 936	6849	0.96 (0.93–0.99)
5	99 672	6225	0.92 (0.89–0.95)
6–9	118 818	7308	0.93 (0.90–0.96)
		P for trend = 0.00001	
Men			
0–3	43 161	3044	1.00
4	30 770	2121	0.99 (0.93–1.04)
5	29 766	2049	0.97 (0.92–1.03)
6–9	38 908	2455	0.93 (0.88–0.99)
		P for trend = 0.02	
Women			
0–3	110 891	7305	1.00
4	75 166	4728	0.95 (0.91–0.98)
5	69 906	4176	0.90 (0.87–0.94)
6–9	79 910	4853	0.93 (0.89–0.96)
		P for trend = 0.0001	

Meno tumori con L'adesione alla dieta Mediterraneanea

JAMA Network Open

Original Investigation | Oncology

Role of Diet in Colorectal Cancer Incidence

Umbrella Review of Meta-analyses of Prospective Observational Studies

Sajesh K. Veettil, PhD; Tse Yee Wong, B Pharm; Yee Shen Loo, B Pharm; Mary C. Playdon, PhD; Nai Ming Lai, MRCPCH; Edward L. Giovannucci, MD, ScD; Nathorn Chaiyakunapruk, PharmD, PhD

Associazione tra il ruolo della dieta e l'aumento dell'incidenza del cancro del colon-retto

Alimento o regime dietetico	Evidenza Statistica*
Carne Rossa	+++
Carne lavorata	+++
Uova	+++
Dieta occidentale	++
Consumo di alcool	++
Birra	++
Alimentazione non sana	+
Carne di maiale	+
Ferro eme	+/-

*AMSTAR-2: Strumento di misurazione per valutare le revisioni sistematiche

da: Sajesh K. Veettil et al. JAMA Network Open. 2021;4(2):e2037341. doi:10.1001/jamanetworkopen.2020.37341

Associazione tra il ruolo della dieta e la riduzione dell'incidenza del cancro del colon-retto

Alimento o regime dietetico	Evidenza Statistica*
Fibra alimentare totale	+++
Latticini	+++
Cereali integrali	+++
Verdura	+++
Frutta	+++
Calcio alimentare	++
Yogurt	++
Alimentazione sana	++
Latte non fermentato	++
Zinco	++
Dieta Pesco-vegetariana	+
Dieta semi-vegetariana	+
Integrazione di Calcio	+
Legumi	+
Fibre di cereali	+
Multivitamine	+
Vitamina A	+
Vitamina B_6	+
Acido Folico	+
Vitamina D	+
Vitamina E	+
Magnesio	+/-

*AMSTAR-2: Strumento di misurazione per valutare le revisioni sistematiche

da: Sajesh K. Veettil et al. JAMA Network Open. 2021;4(2):e2037341. doi:10.1001/jamanetworkopen.2020.37341

Proceedings of the Nutrition Society (2022), **81**, 190–198 doi:10.1017/S0029665121003748

First published online 27 October 2021

The Nutrition Society Summer Conference 2021 was held virtually on 6–8 July 2021

Conference on 'Nutrition in a changing world'
Plenary Lecture

Plant-based diets and long-term health: findings from the EPIC-Oxford study

Timothy J. Key*, Keren Papier and Tammy Y. N. Tong
Cancer Epidemiology Unit, Nuffield Department of Population Health, University of Oxford, Richard Doll Building, Roosevelt Drive, Oxford OX3 7LF, UK

Clinical Nutrition 41 (2022) 1977–1990

Contents lists available at ScienceDirect

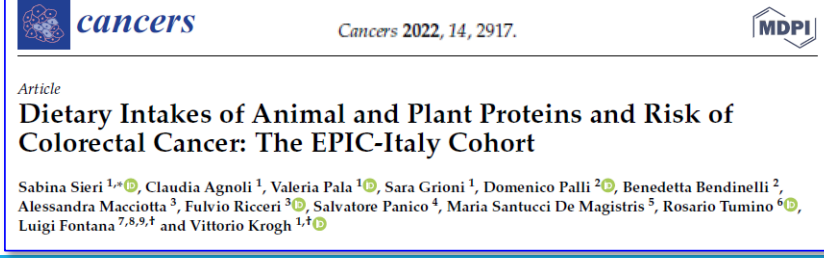
Clinical Nutrition

journal homepage: http://www.elsevier.com/locate/clnu

Original article

Circadian clock gene variants and their link with chronotype, chrononutrition, sleeping patterns and obesity in the European prospective investigation into cancer and nutrition (EPIC) study

Esther Molina-Montes [a, b, c, d], Miguel Rodríguez-Barranco [c, d, e, *], Ana Ching-López [c, d, e], Reyes Artacho [a], José María Huerta [d, f], Pilar Amiano [d, g, h], Cristina Lasheras [i], Conchi Moreno-Iribas [d, j, k], Ana Jimenez-Zabala [d, g, h], María-Dolores Chirlaque [d, f], Aurelio Barricarte [d, j, l], Leila Luján-Barroso [m], Antonio Agudo [m], Paula Jakszyn [m], José Ramón Quirós [n, 1], María José Sánchez [c, d, e, o, 1]



cancers Cancers **2022**, *14*, 2917.

Article

Dietary Intakes of Animal and Plant Proteins and Risk of Colorectal Cancer: The EPIC-Italy Cohort

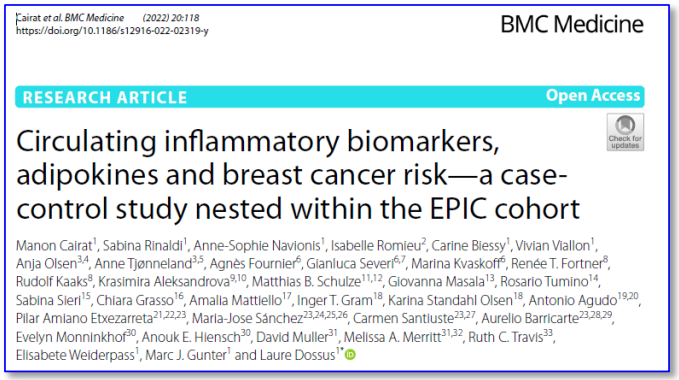
Sabina Sieri [1,*], Claudia Agnoli [1], Valeria Pala [1], Sara Grioni [1], Domenico Palli [2], Benedetta Bendinelli [2], Alessandra Macciotta [3], Fulvio Ricceri [3], Salvatore Panico [4], Maria Santucci De Magistris [5], Rosario Tumino [6], Luigi Fontana [7,8,9,†] and Vittorio Krogh [1,†]

nutrients Nutrients **2022**, *14*, 3085.

Article

Adherence to the Western, Prudent and Mediterranean Dietary Patterns and Colorectal Cancer Risk: Findings from the Spanish Cohort of the European Prospective Investigation into Cancer and Nutrition (EPIC-Spain)

Adela Castelló [1,2,3], Miguel Rodríguez-Barranco [2,4,5,*], Nerea Fernández de Larrea [1,2], Paula Jakszyn [6,7], Ane Dorronsoro [8], Pilar Amiano [2,8,9], María-Dolores Chirlaque [2,10,11], Sandra Colorado-Yohar [2,10,12], Marcela Guevara [2,13,14], Conchi Moreno-Iribas [2,13,14], Marina Pollán [1,2,†] and María-José Sánchez [2,4,5,15,†]



Cairat et al. BMC Medicine (2022) 20:118
https://doi.org/10.1186/s12916-022-02319-y

BMC Medicine

RESEARCH ARTICLE Open Access

Circulating inflammatory biomarkers, adipokines and breast cancer risk—a case-control study nested within the EPIC cohort

Manon Cairat[1], Sabina Rinaldi[1], Anne-Sophie Navionis[1], Isabelle Romieu[2], Carine Biessy[1], Vivian Viallon[1], Anja Olsen[3,4], Anne Tjønneland[3,5], Agnès Fournier[6], Gianluca Severi[6,7], Marina Kvaskoff[6], Renée T. Fortner[8], Rudolf Kaaks[8], Krasimira Aleksandrova[9,10], Matthias B. Schulze[11,12], Giovanna Masala[13], Rosario Tumino[14], Sabina Sieri[15], Chiara Grasso[16], Amalia Mattiello[17], Inger T. Gram[18], Karina Standahl Olsen[18], Antonio Agudo[19,20], Pilar Amiano Etxezarreta[21,22,23], Maria-Jose Sánchez[23,24,25,26], Carmen Santiuste[23,27], Aurelio Barricarte[23,28,29], Evelyn Monninkhof[30], Anouk E. Hiensch[30], David Muller[31], Melissa A. Merritt[31,32], Ruth C. Travis[33], Elisabete Weiderpass[1], Marc J. Gunter[1] and Laure Dossus[1*]

Received: 19 November 2021 | Revised: 8 February 2022 | Accepted: 2 March 2022
DOI: 10.1002/ijc.34009

CANCER EPIDEMIOLOGY

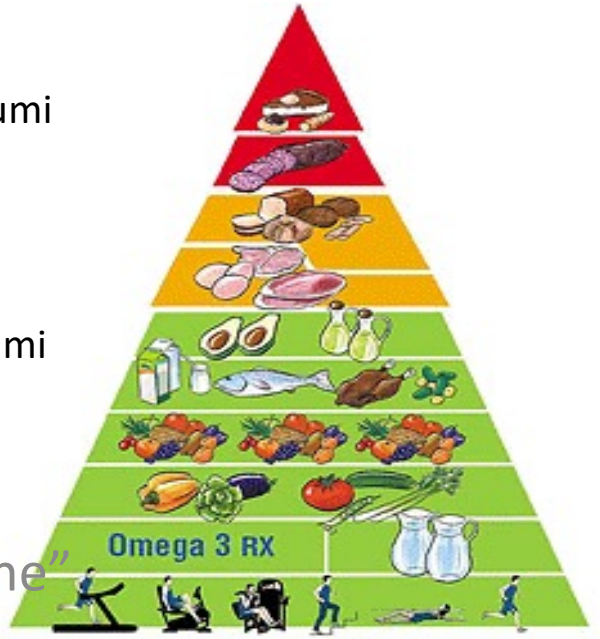
IJC INTERNATIONAL JOURNAL of CANCER

Biomarkers of the transsulfuration pathway and risk of renal cell carcinoma in the European Prospective Investigation into Cancer and Nutrition (EPIC) study

Joanna L. Clasen[1] | Alicia K. Heath[1] | Heleen Van Puyvelde[2,3] | Inge Huybrechts[2] | Jin Young Park[2] | Pietro Ferrari[2] | Ghislaine Scelo[4] | Arve Ulvik[5] | Øivind Midttun[5] | Per Magne Ueland[5] | Kim Overvad[6] | Anne Kirstine Eriksen[7] | Anne Tjønneland[7] | Rudolf Kaaks[8] | Verena Katzke[8] | Matthias B. Schulze[9,10] | Domenico Palli[11] | Claudia Agnoli[12] | Paolo Chiodini[13] | Rosario Tumino[14] | Carlotta Sacerdote[15] | Raul Zamora-Ros[16] | Miguel Rodriguez-Barranco[17,18,19] | Carmen Santiuste[19,20] | Eva Ardanaz[19,21,22] | Pilar Amiano[19,23,24] | Julie A. Schmidt[25] | Elisabete Weiderpass[2] | Marc Gunter[2] | Elio Riboli[1] | Amanda J. Cross[1] | Mattias Johansson[2] | David C. Muller[1,26]

Cosa mangiare? La piramide alimentare anti-cancro e le linee guida

- Consuma la giusta quantità di calorie.
- Bevi abbondante acqua (e non bibite carbonate)
- Mangia molti cibi di origine vegetale: verdure, legumi
- frutta, noci, fibre
- Usa olio di oliva, spezie, erbe per condire
- Limita il sale, le carni lavorate, gli insaccati, I dolciumi
- Limita alcool ed evita superalcolici



"30% dei tumori potrebbero essere prevenuti con una corretta alimentazione"

-American Institute for Cancer Research

Rise of Immunotherapy

- Long-term disease control against recalcitrant cancers
- Game-changing discoveries – more coming

2011

Ipilimumab introduced for melanoma

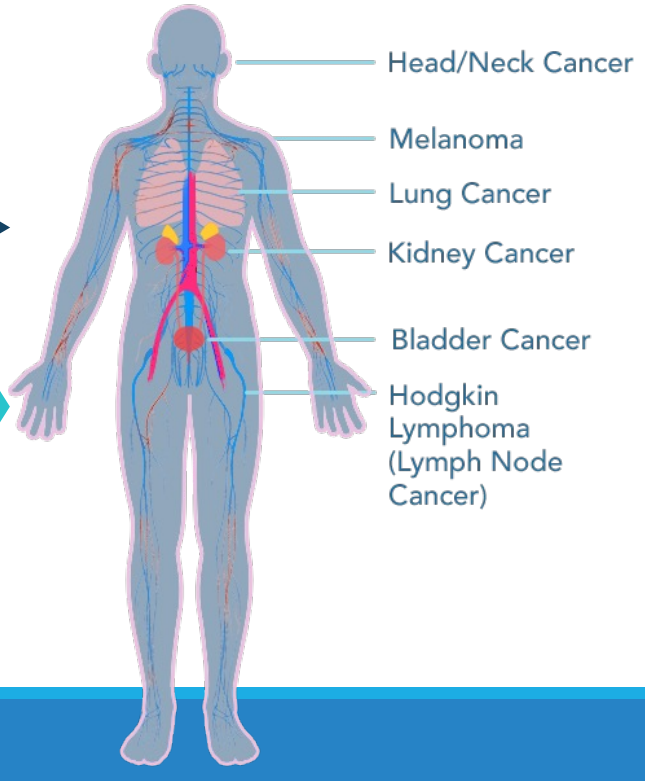
2014

Pembrolizumab, nivolumab approved for melanoma

2015-2018

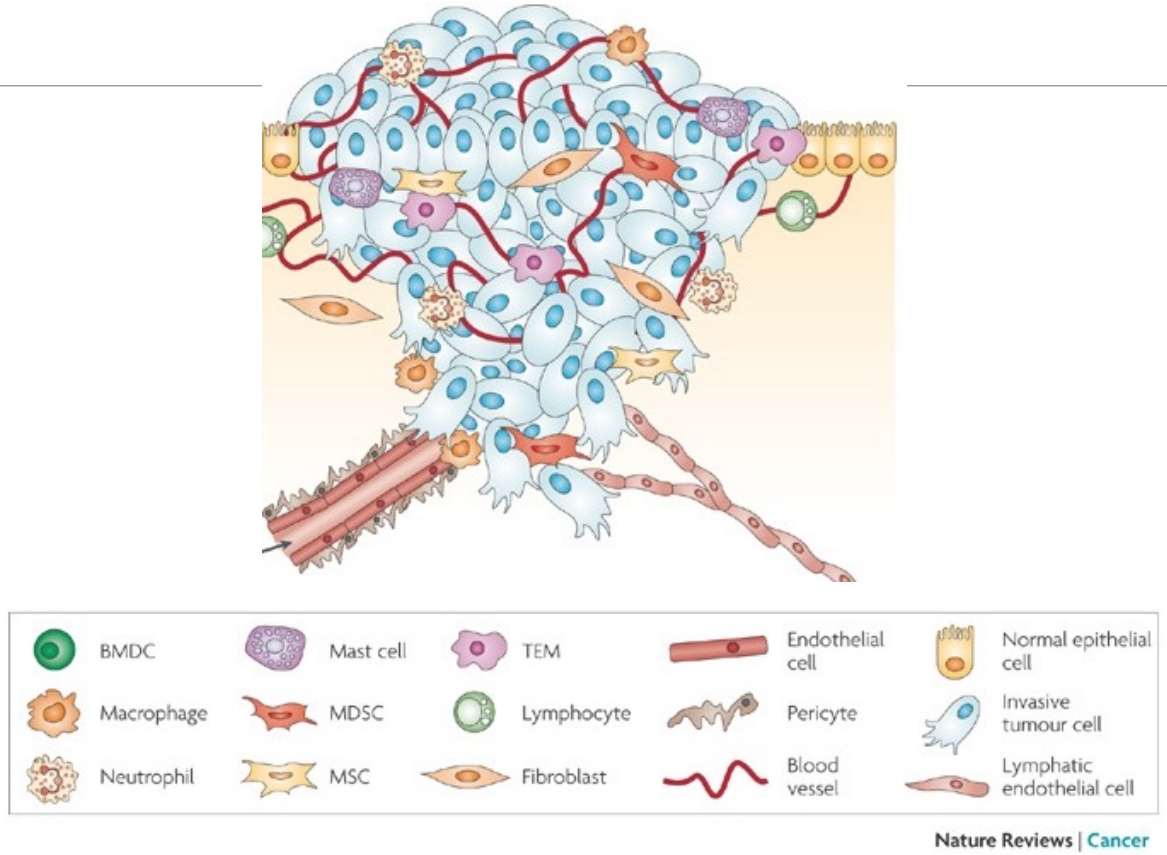
PD-1/L-1 drugs benefit even more of cancers

CAR-T and CAR-NK



CancerProgress.Net

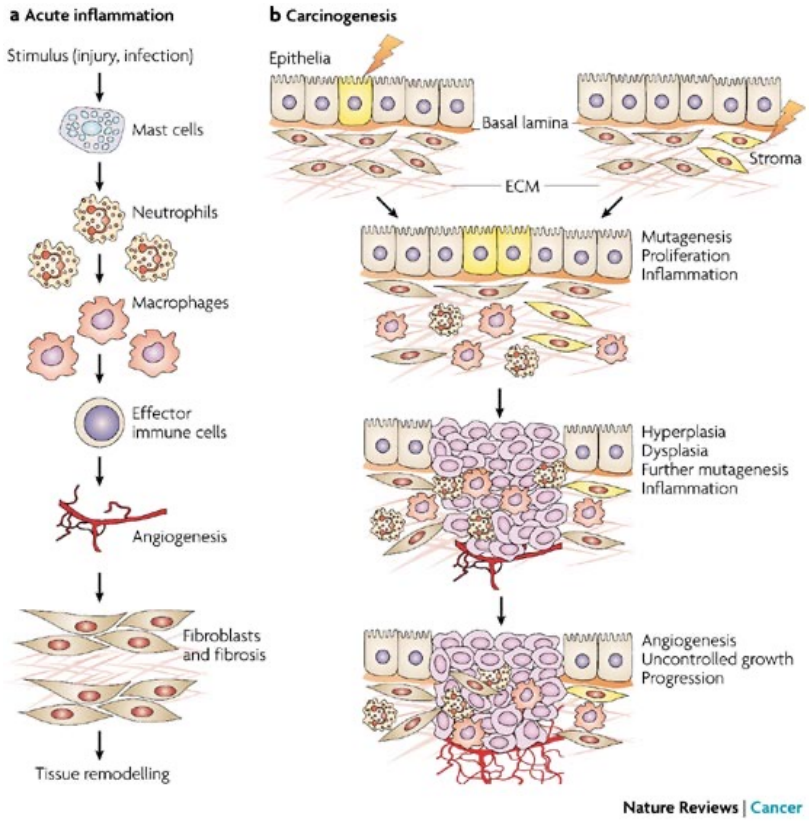
The tumor microenvironment



NK cells

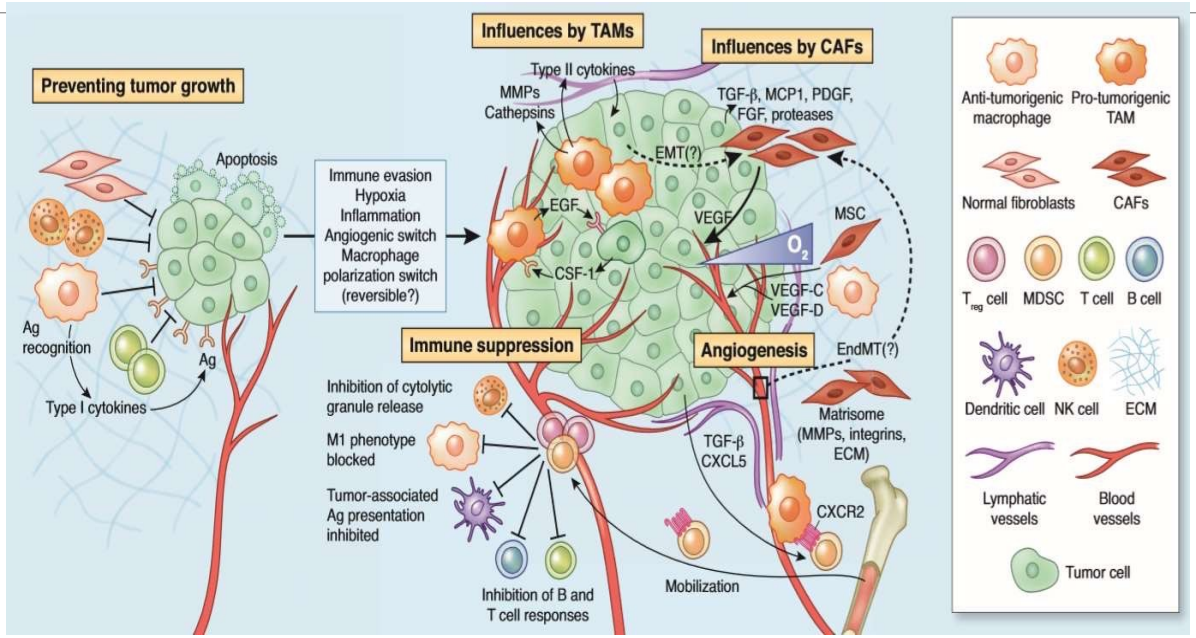
Johanna A. Joyce & Jeffrey W. Pollard
Nature Reviews Cancer 9, 239-252 (April 2009)
doi:10.1038/nrc2618

In inflammation and in tumor progression similar cellular activations occur in the microenvironment



Albini A, Sporn MB. The tumour microenvironment as a target for chemoprevention. Nat Rev Cancer. 7:139-47; 2007

MICROAMBIENTE: ruolo nei tumori

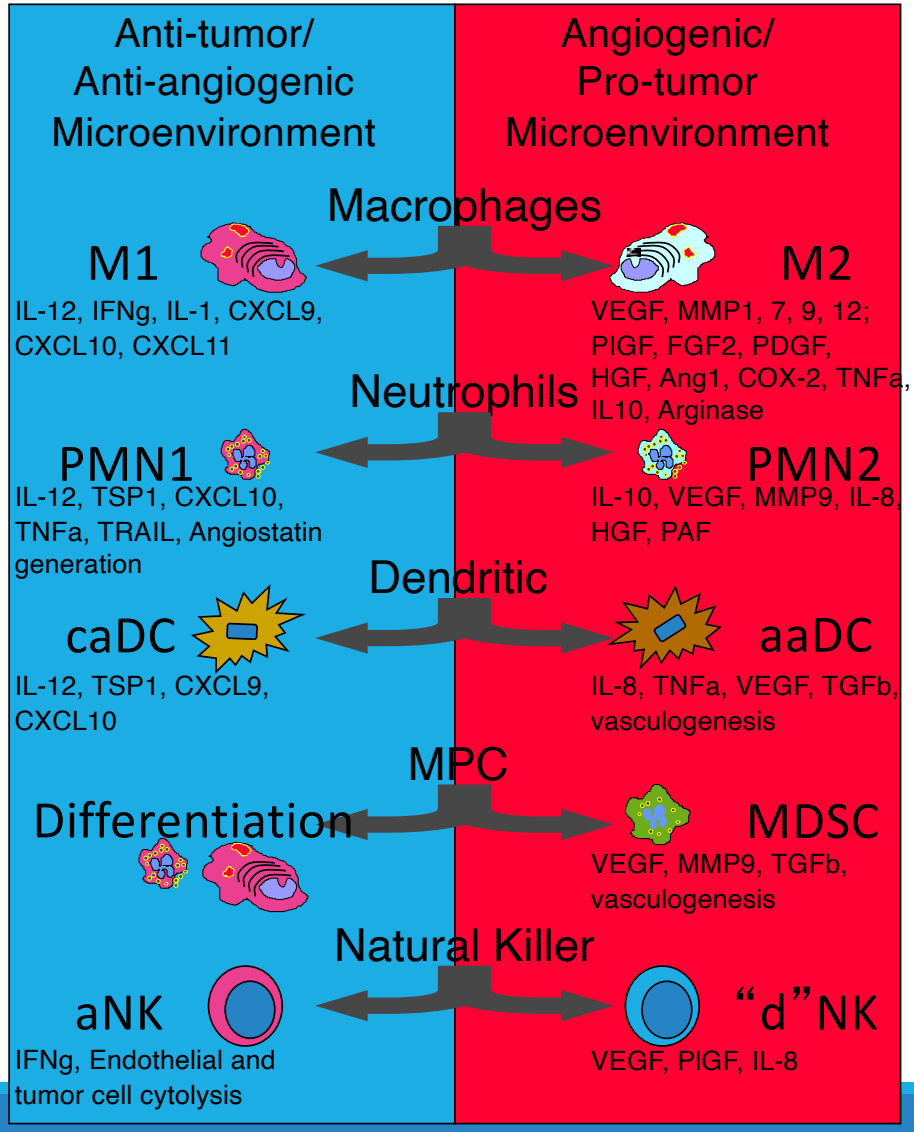


EQUILIBRIUM → PROMOTING/ESCAPE

Quail et al. Nature Medicine

Phenotype Switching in Leukocytes

Polarization of native immunity cells



Huang Y, Snuderl M, Jain RK. Polarization of tumor-associated macrophages: a novel strategy for vascular normalization and antitumor immunity. Cancer Cell. 2011 Jan 18;19(1):1-2.

Noonan, Albini et al, Cancer Metastasis Reviews

Immune cell plasticity

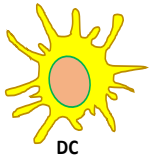
frontiers in Immunology

REVIEW
published: 05 April 2018
doi: 10.3389/fimmu.2018.00527

Contribution to Tumor Angiogenesis From Innate Immune Cells Within the Tumor Microenvironment: Implications for Immunotherapy

Adriana Albini[1,2†], Antonino Bruno[1†], Douglas M. Noonan[1,3‡] and Lorenzo Mortara[3‡]*

[1] Scientific and Technology Pole, IRCCS MultiMedica, Milano, Italy, [2] Department of Medicine and Surgery, University Milano-Bicocca, Monza, Italy, [3] Department of Biotechnology and Life Sciences, University of Insubria, Varese, Italy

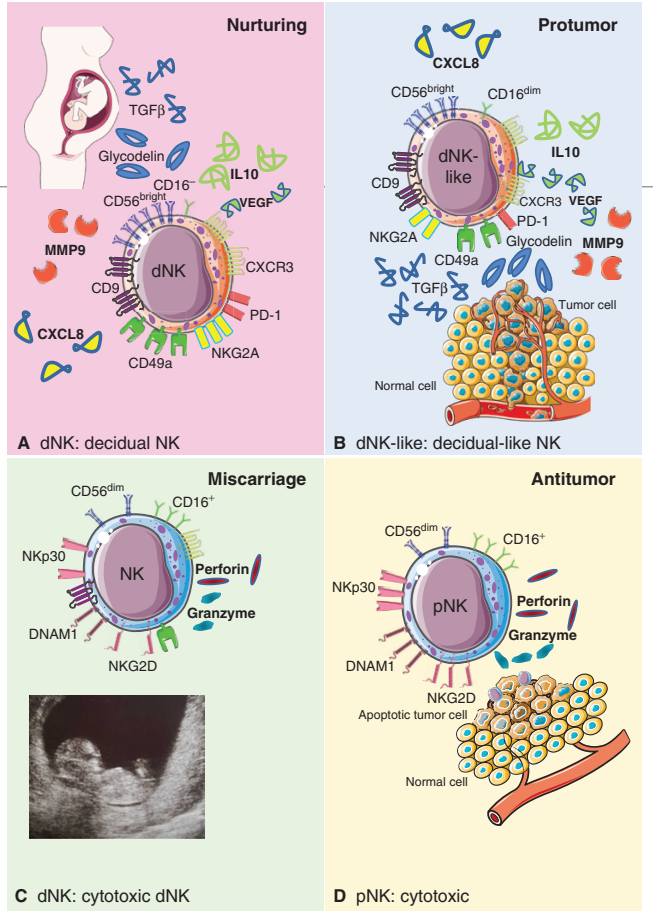
	Anti-tumor/ anti-angiogenic	Pro-tumor/ pro-angiogenic
 MACROPHAGE	**M1-like** IL-12, IFNγ, IL-1, CXCL9, CXCL10, CXCL11	**M2-like (TAM)** VEGF, MMP1, 7, 9, 12; PIGF, FGF2, PDGF, HGF, Ang1, COX-2, TNFα, IL10, ARG1
 NEUTROPHIL	**N1-like** IL-12, IFNγ, IL-1, CXCL9, CXCL10, CXCL11	**N2-like (TAN)** IL-10, VEGF, MMP-9, IL-8, HGF, PAF
 DC	**DC** IL-12, TSP1, CXCL9, CXCL10	**regDC** CXCL8, TNFα, VEGF, TGFβ
 MPC	**Maturation** Immunocompetent cells	**MDSC** VEGF, MMP9, TGFβ, EC-transdifferentiation
 MAST CELLS	**Mast cells** TNFα, ROS	**Mast cells** TGFβ, VEGF, FGF2, CXCL8, MMP9, Chymase, Tryptase

	Anti-tumor/ anti-angiogenic	Pro-tumor/ pro-angiogenic
 NK	**$CD56^{dim}CD16^{+}$ $Perf^{high}$ NK** Perforin, granzyme, ADCC	**$CD56^{bright}CD16^{-}VEGF^{high}$ $PlGF^{high}CXCL8^{+}$ NK** VEGF, PlGF, CXCL8
 ILCs	**ILC1** IFNγ **ILC3** CSF2, TNFα	**ILC1** IDO **ILC2** IL-5, IL-13 **ILC3** CXCL12, CCL19, CCL21, CXCR5, CCR7, IL-17
 γδT	**γδT** IFNγ	**γδTT17** IL-17, VEGF, Ang1, CXCL8, CCL2, CSF2,TNFα,MMP9, uPA, CXCL16, STAT3
 TH	**TH1** IL-2, IFNγ	**TH17** IL-6, IL-17,TNFα

Phenotype switch of innate immune cells in cancer

Nurturing NK cells and cytotoxic ones:

A double-edged sword in pregnancy and antitumor action



Albini A, Noonan DM, Cancer Discovery, jan 2021

Figure 1. Nurturing NK cells and cytotoxic ones: a double-edged sword in pregnancy and antitumor action. NK cells in various states: **A,** $CD56^{bright}CD16^{-}$, $CD9^{+}$, $CD49a^{+}$ dNK cells nurturing in the reproductive system, helping embryo implant and fetal development. dNK cells produce proangiogenic factors (including VEGF, CXCL8, angiogenin, and galectin-1), MMP9, and glycodelin. **B,** $CD56^{bright}CD16^{-}$, $CD9^{+}$, and $CD49a^{+}$ dNK-like cells, displaying protumor activities, nurturing in cancer. dNK-like cells produce proangiogenic factors (including VEGF, CXCL8, and angiogenin), MMP9, and TIMP1. **C,** $CD56^{dim}CD16^{+}$ cytotoxic dNK cell activation responsible for miscarriage and pregnancy loss. Cytotoxic dNK had increased perforin, granzyme B, and IFNγ expression. **D,** $CD56^{dim}CD16^{+}$ cytotoxic activities active in antitumor behavior. Cytotoxic NK cells release perforin and granzyme B and destroy the cancer cells. In bold are the factors produced by the NK cells. The figure

Published OnlineFirst December 4, 2020; DOI: 10.1158/2159-8290.CD-20-0796

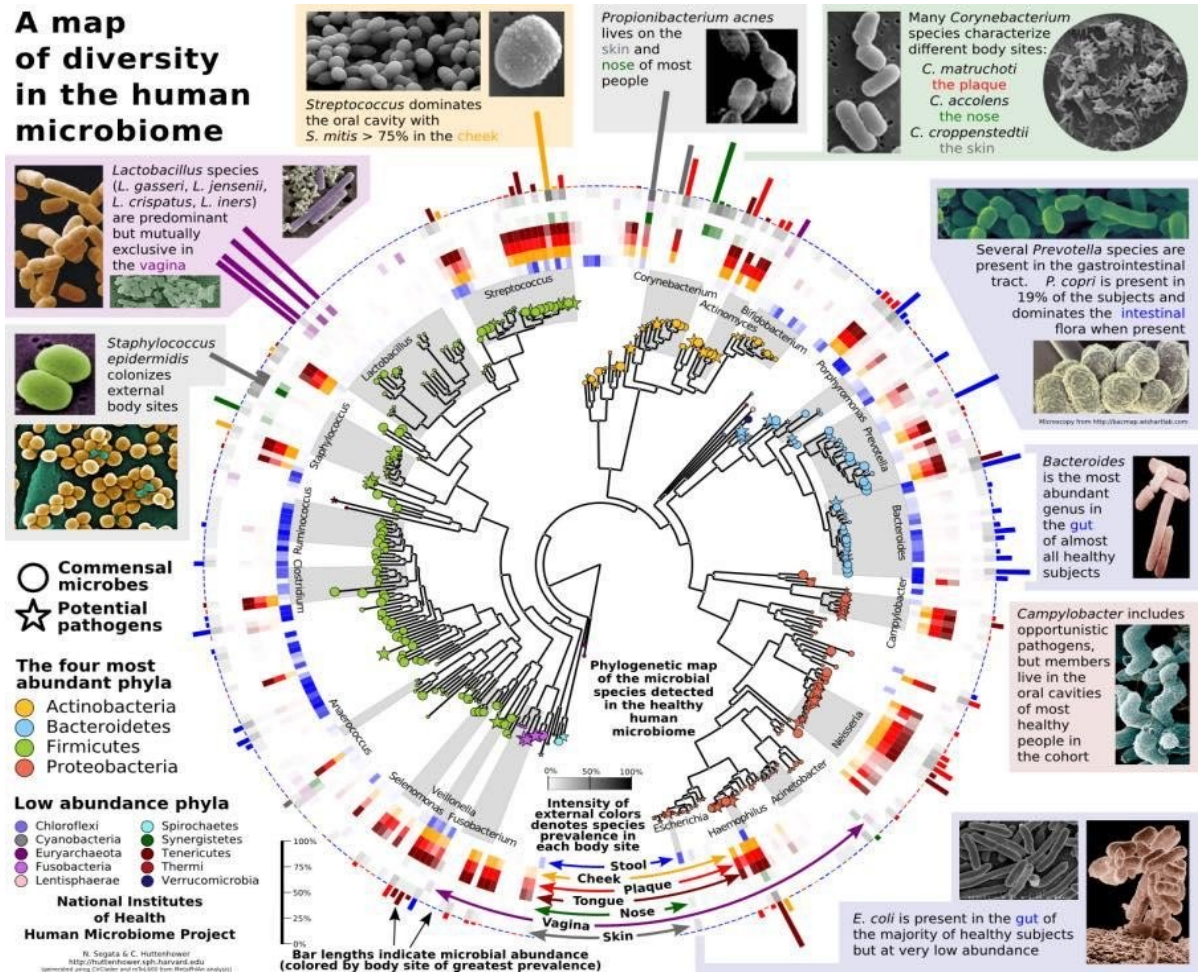
Il microbiota

Possiamo definire il microbiota intestinale umano come l'insieme dei microorganismi che si trovano nel tubo digerente dell'uomo. Qui vivono dalle 500 alle 1000 specie differenti di microorganismi, i più numerosi dei quali sono batteri seguiti da miceti e virus.

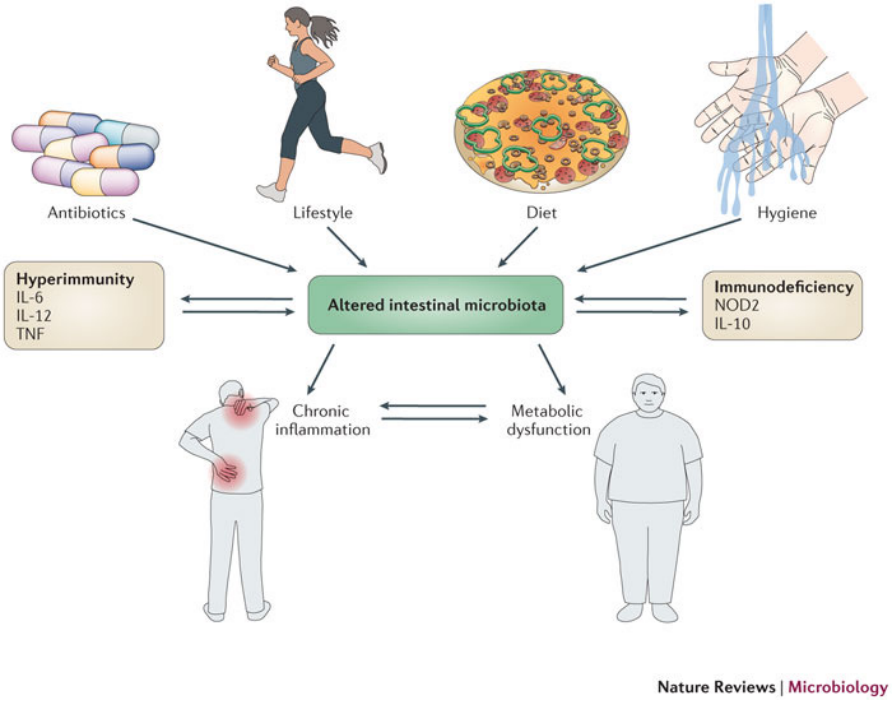
Il microbiota intestinale partecipa al metabolismo dei carboidrati, delle proteine e dei lipidi, regola la secrezione degli ormoni, del pH e degli ioni H, nonché la produzione di composti anti-batterici

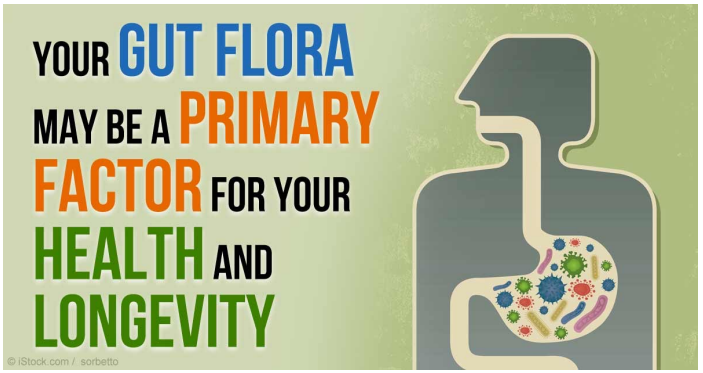
Di recente, i ricercatori hanno stabilito un legame tra il microbiota intestinale e il peso corporeo. Le persone obese tendono ad avere una composizione diversa dei batteri intestinali paragonati ad individui magri.

Gli studi mostrano che la composizione del microbiota intestinale si modifica con la perdita di peso e/o con l'aumento di peso; tuttavia, il significato di tali cambiamenti per la salute umana è ancora dibattuto

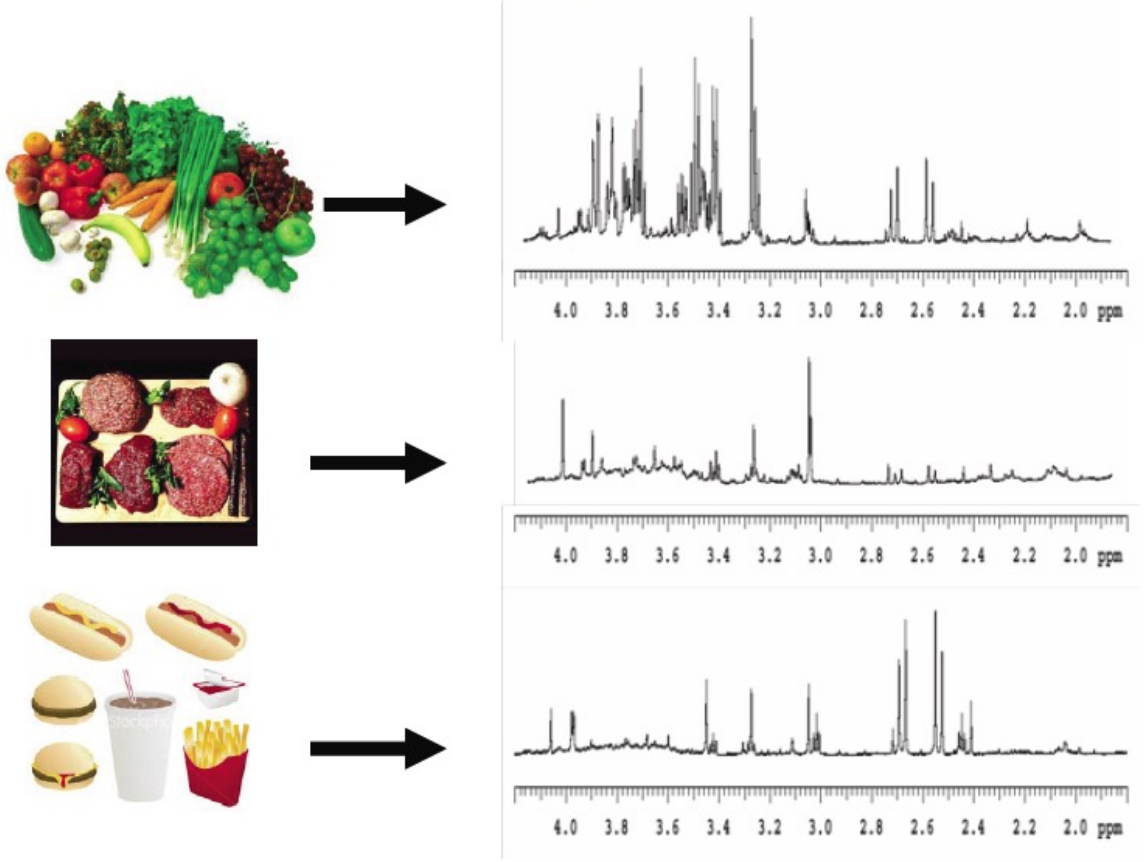

A map of diversity in the human microbiome
Streptococcus dominates the oral cavity with S. mitis > 75% in the cheek
Propionibacterium acnes lives on the skin and nose of most people
Many Corynebacterium species characterize different body sites:
C. matruchoti the plaque
C. accolens the nose
C. croppenstedtii the skin
Lactobacillus species (L. gasseri, L. jensenii, L. crispatus, L. iners) are predominant but mutually exclusive in the vagina
Several Prevotella species are present in the gastrointestinal tract. P. copri is present in 19% of the subjects and dominates the intestinal flora when present
Staphylococcus epidermidis colonizes external body sites
Bacteroides is the most abundant genus in the gut of almost all healthy subjects
Commensal microbes
Potential pathogens
Campylobacter includes opportunistic pathogens, but members live in the oral cavities of most healthy people in the cohort
The four most abundant phyla
Actinobacteria
Bacteroidetes
Firmicutes
Proteobacteria
Low abundance phyla
Chloroflexi
Cyanobacteria
Euryarchaeota
Fusobacteria
Lentisphaerae
Spirochaetes
Synergistetes
Tenericutes
Thermi
Verrucomicrobia
National Institutes of Health
Human Microbiome Project
N. Segata & C. Huttenhower
http://huttenhower.sph.harvard.edu
Phylogenetic map of the microbial species detected in the healthy human microbiome
Intensity of external colors denotes species prevalence in each body site
Stool
Cheek
Plaque
Tongue
Nose
Vagina
Skin
Bar lengths indicate microbial abundance (colored by body site of greatest prevalence)
E. coli is present in the gut of the majority of healthy subjects but at very low abundance
Streptococcus
Corynebacterium
Actinomyces
Bifidobacterium
Lactobacillus
Staphylococcus
Porphyromonas
Prevotella
Bacteroides
Ruminococcus
Clostridium
Campylobacter
Anaerococcus
Veillonella
Selenomonas
Fusobacterium
Neisseria
Escherichia
Haemophilus
Acinetobacter

Buoni germi per buona salute e longevità: il microbiota (alias: flora intestinale)





Profili metabolici in seguito al consumo di alimenti



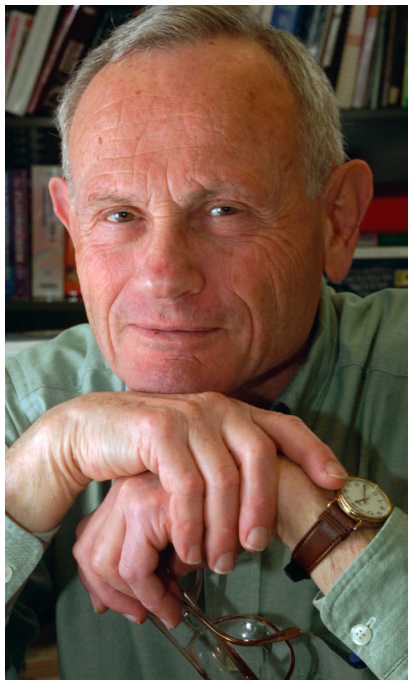
Chemoprevention

The concept of Chemoprevention:

In 1976, Michael Sporn defined chemoprevention:

"The use of specific agents to reverse, suppress or prevent the carcinogenic process to invasive cancer."

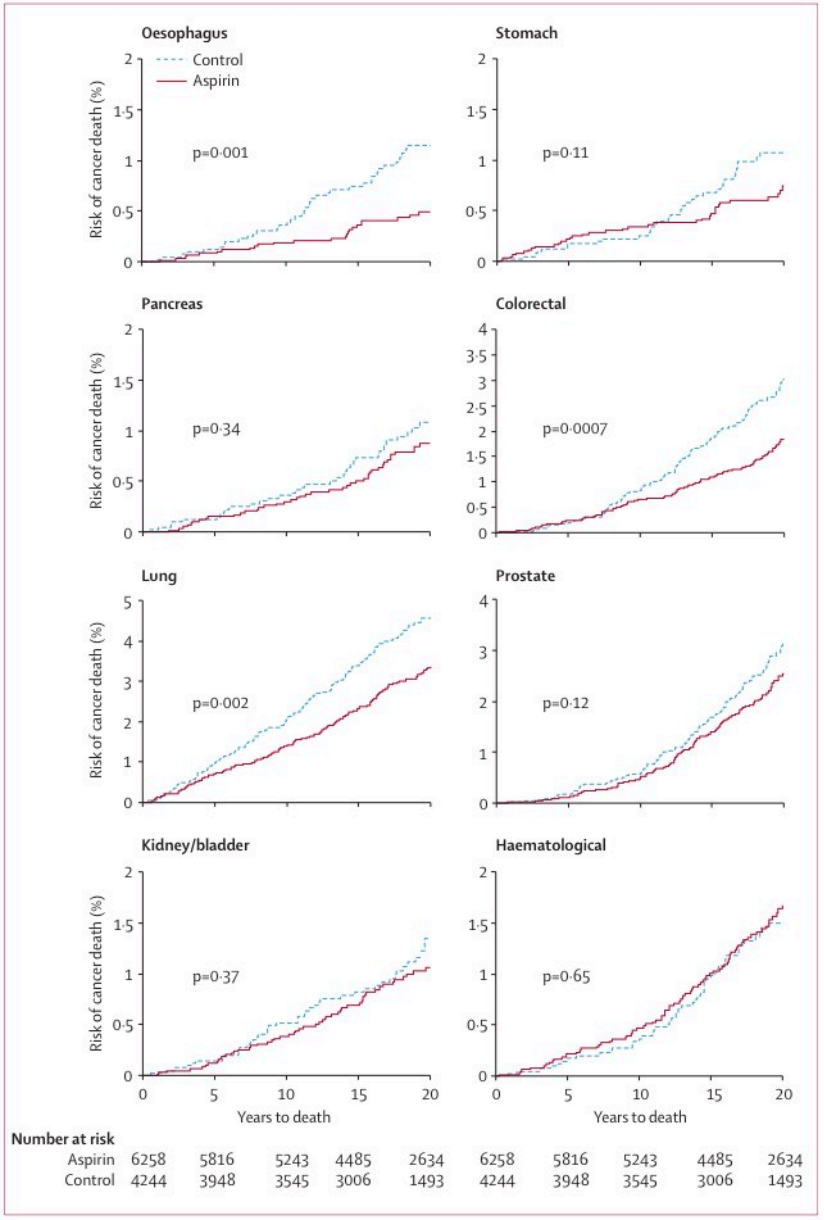
Michael Sporn



Aspirin in Chemoprevention

Targeting inflammation:
Several types of cancers are prevented

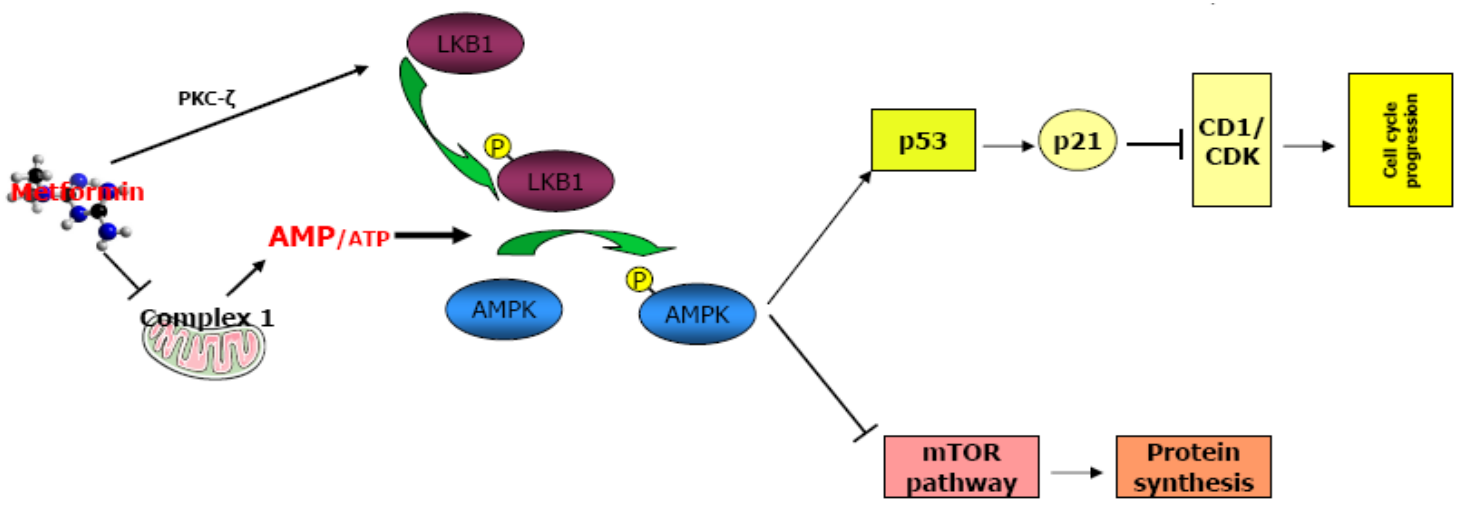
Warfarin had no effect over the same time period



Effect of daily aspirin on long-term risk of death due to cancer: analysis of individual patient data from randomised trials Rothwell PM et al Lancet. 2011;377(9759):31-41

From diabetes cure to cancer prevention … via angioprevention?

METFORMIN



A decreased risk of breast cancer was observed in female patients with type 2 diabetes using metformin on a long-term basis.

Bodmer M et al, Diabetes Care 2010

Epidemiological studies have confirmed that metformin, but not other anti-diabetic drugs, significantly reduces cancer incidence and improves cancer patients' survival in tipe 2 diabetics.

Evans JM et al. BMJ 2005

Combination Chemoprevention (to the micreonvironment): Metformin + Aspirin?

www.nature.com/scientificreports

SCIENTIFIC REPORTS

OPEN

Received: 01 June 2015
Accepted: 23 November 2015
Published: 05 January 2016

Aspirin and atenolol enhance metformin activity against breast cancer by targeting both neoplastic and microenvironment cells

Giovanna Talarico[1,*], Stefania Orecchioni[1,*], Katiuscia Dallaglio[2], Francesca Reggiani[1], Patrizia Mancuso[1], Angelica Calleri[1], Giuliana Gregato[1], Valentina Labanca[1], Teresa Rossi[2], Douglas M. Noonan[3,4], Adriana Albini[3,*] & Francesco Bertolini[1,*]

Metformin can induce breast cancer (BC) cell apoptosis and reduce BC local and metastatic growth in preclinical models. Since Metformin is frequently used along with Aspirin or beta-blockers, we investigated the effect of Metformin, Aspirin and the beta-blocker Atenolol in several BC models. *In vitro*, Aspirin synergized with Metformin in inducing apoptosis of triple negative and endocrine-sensitive BC cells, and in activating AMPK in BC and in white adipose tissue (WAT) progenitors known to cooperate to BC progression. Both Aspirin and Atenolol added to the inhibitory effect of Metformin against complex I of the respiratory chain. In both immune-deficient and immune-competent preclinical models, Atenolol increased Metformin activity against angiogenesis, local and metastatic growth of HER2+ and triple negative BC. Aspirin increased the activity of Metformin only in immune-competent HER2+ BC models. Both Aspirin and Atenolol, when added to Metformin, significantly reduced the endothelial cell component of tumor vessels, whereas pericytes were reduced by the addition of Atenolol but not by the addition of Aspirin. Our data indicate that the addition of Aspirin or of Atenolol to Metformin might be beneficial for BC control, and that this activity is likely due to effects on both BC and microenvironment cells.

MOLECULES CHEMOPREVENTIVE NUTRACEUTICHE-Nostro gruppo studio:

nutrients

MDPI

Review

Microalgal Derivatives as Potential Nutraceutical and Food Supplements for Human Health: A Focus on Cancer Prevention and Interception

Christian Galasso [1], Antonio Gentile [1], Ida Orefice [1], Adrianna Ianora [1], Antonino Bruno [2], Douglas M. Noonan [2,3], Clementina Sansone [1,*], Adriana Albini [2,4,*] and Christophe Brunet [1]

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marine drugs

MDPI

Article

MMP-9 and IL-1β as Targets for Diatoxanthin and Related Microalgal Pigments: Potential Chemopreventive and Photoprotective Agents

Luigi Pistelli [1], Clementina Sansone [1,*], Arianna Smerilli [1], Marco Festa [2], Douglas M. Noonan [3,4], Adriana Albini [2] and Christophe Brunet [1]

[1] Stazione Zoologica Anton Dohrn, Istituto Nazionale di Biologia, Ecologia e Biotecnologie Marine, Villa Comunale, 80121 Napoli, Italy; luigi.pistelli@szn.it (L.P.); arianna.smerilli@szn.it (A.S.); christophe.brunet@szn.it (C.B.)
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frontiers | Frontiers in Cardiovascular Medicine

ORIGINAL RESEARCH
published: 14 April 2022
doi: 10.3389/fcvm.2022.867867

An Olive Oil Mill Wastewater Extract Improves Chemotherapeutic Activity Against Breast Cancer Cells While Protecting From Cardiotoxicity

Nadia Benedetto [†], Luana Calabrone [†], Karolina Gutmariska [†], Nicoletta Macrì [†], Maria Grazia Cerrito [‡], Riccardo Ricotta [‡], Giuseppe Pelosi [†,], Antonino Bruno [†,§*], Douglas M. Noonan [†,‡‡] and Adriana Albini [¶*]*

[†] IRCCS MultiMedica, Milan, Italy, [‡] School of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy, [§] IRCCS MultiMedica, Sesto San Giovanni, Italy, [‖] Department of Oncology and Hemato-Oncology, University of Milan, Milan, Italy, [‡‡] Immunology and General Pathology Laboratory, Department of Biotechnology and Life Sciences, University of Insubria, Varese, Italy, [¶] European Institute of Oncology (IEO) IRCCS, Milan, Italy

OPEN ACCESS

Edited by:
Nazish Sayed,
Stanford University, United States

Cancer Letters 429 (2018) 100–116

Contents lists available at ScienceDirect

Cancer Letters

journal homepage: www.elsevier.com/locate/canlet

Original Articles

Acetyl-L-carnitine is an anti-angiogenic agent targeting the VEGFR2 and CXCR4 pathways

Denisa Baci [a], Antonino Bruno [a], Barbara Bassani [a], Matilde Tramacere [a], Lorenzo Mortara [b], Adriana Albini [c, a, *], Douglas M. Noonan [a, b]

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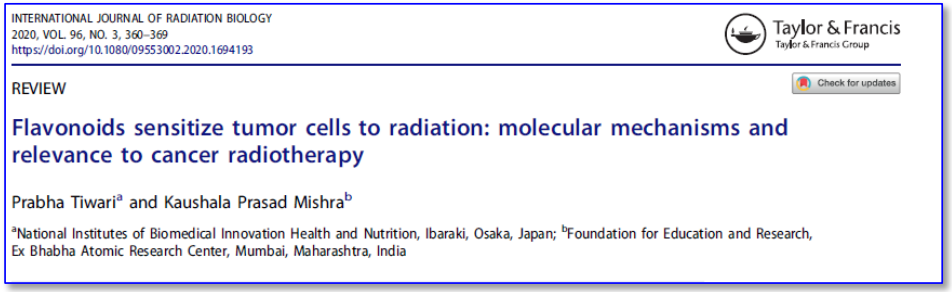
[b] Department of Biotechnology and Life Sciences, University of Insubria, Varese, Italy
[c] School of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy



INTERNATIONAL JOURNAL OF RADIATION BIOLOGY
2020, VOL. 96, NO. 3, 360–369
https://doi.org/10.1080/09553002.2020.1694193

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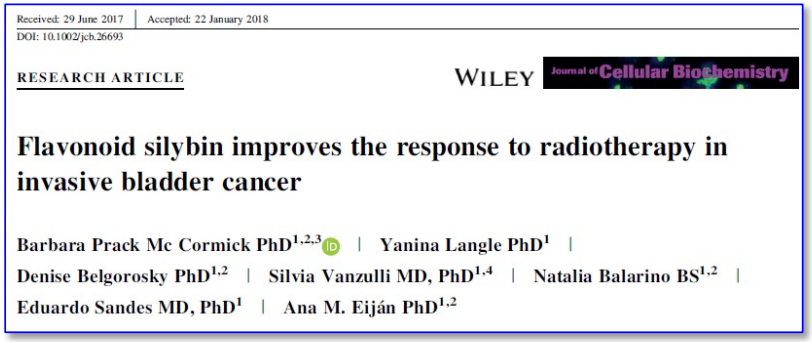
REVIEW

Flavonoids sensitize tumor cells to radiation: molecular mechanisms and relevance to cancer radiotherapy

Prabha Tiwari[a] and Kaushala Prasad Mishra[b]

[a]National Institutes of Biomedical Innovation Health and Nutrition, Ibaraki, Osaka, Japan; [b]Foundation for Education and Research, Ex Bhabha Atomic Research Center, Mumbai, Maharashtra, India



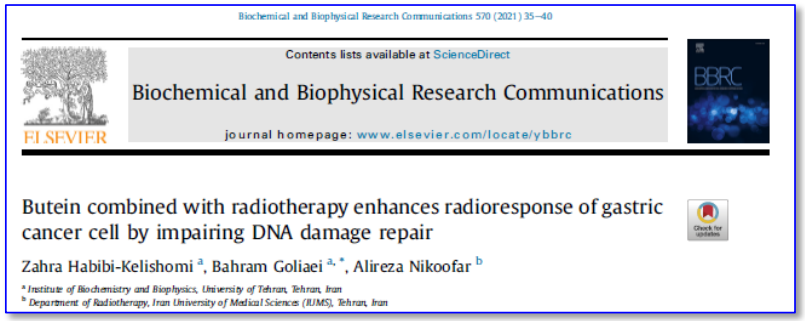
Received: 29 June 2017 | Accepted: 22 January 2018
DOI: 10.1002/jcb.26693

RESEARCH ARTICLE

WILEY Journal of Cellular Biochemistry

Flavonoid silybin improves the response to radiotherapy in invasive bladder cancer

Barbara Prack Mc Cormick PhD[1,2,3] | Yanina Langle PhD[1] | Denise Belgorosky PhD[1,2] | Silvia Vanzulli MD, PhD[1,4] | Natalia Balarino BS[1,2] | Eduardo Sandes MD, PhD[1] | Ana M. Eiján PhD[1,2]



Biochemical and Biophysical Research Communications 570 (2021) 35–40

Contents lists available at ScienceDirect

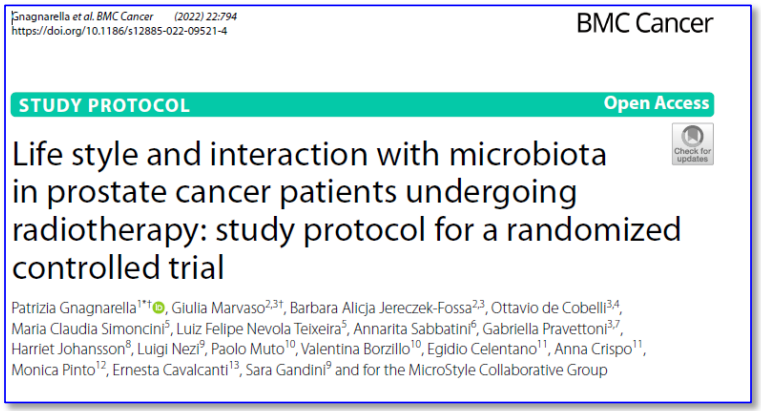
Biochemical and Biophysical Research Communications

journal homepage: www.elsevier.com/locate/ybbrc

Butein combined with radiotherapy enhances radioresponse of gastric cancer cell by impairing DNA damage repair

Zahra Habibi-Kelishomi [a], Bahram Goliaei [a, *], Alireza Nikoofar [b]

[a] Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran
[b] Department of Radiotherapy, Iran University of Medical Sciences (IUMS), Tehran, Iran



Gnagnarella et al. BMC Cancer (2022) 22:794
https://doi.org/10.1186/s12885-022-09521-4

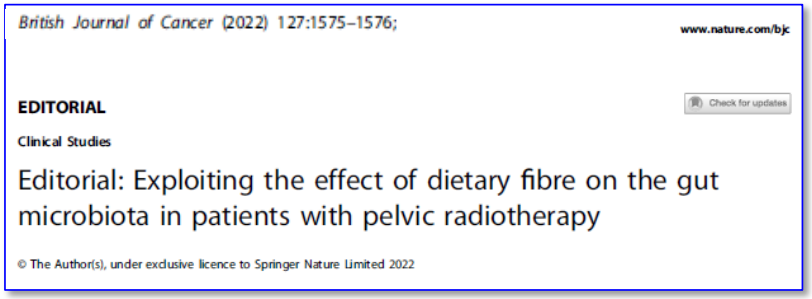
BMC Cancer

STUDY PROTOCOL Open Access

Check for updates

Life style and interaction with microbiota in prostate cancer patients undergoing radiotherapy: study protocol for a randomized controlled trial

Patrizia Gnagnarella[1*†], Giulia Marvaso[2,3†], Barbara Alicja Jereczek-Fossa[2,3], Ottavio de Cobelli[3,4], Maria Claudia Simoncini[5], Luiz Felipe Nevola Teixeira[5], Annarita Sabbatini[6], Gabriella Pravettoni[3,7], Harriet Johansson[8], Luigi Nezi[9], Paolo Muto[10], Valentina Borzillo[10], Egidio Celentano[11], Anna Crispo[11], Monica Pinto[12], Ernesta Cavalcanti[13], Sara Gandini[8] and for the MicroStyle Collaborative Group



British Journal of Cancer (2022) 127:1575–1576;

www.nature.com/bjc

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EDITORIAL

Clinical Studies

Editorial: Exploiting the effect of dietary fibre on the gut microbiota in patients with pelvic radiotherapy

Effetti benefici dell’attività fisica per la salute e la prevenzione

Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study

Chi Pang Wen, Jackson Pui Man Wai*, Min Kuang Tsai, Yi Chen Yang, Ting Yuan David Cheng, Meng-Chih Lee, Hui Ting Chan, Chwen Keng Tsao, Shan Pou Tsai, Xifeng Wu*

Lancet 2011; 378: 1244–53

Published Online
August 16, 2011
DOI:10.1016/S0140-6736(11)60749-6

See Comment page 1202

*These authors shared first authorship

Institute of Population Science, National Health Research Institutes, Zhunan, Taiwan (C P Wen M D, M K Tsai M S, Y C Yang M S, H T Chan M S); China Medical University Hospital, Taichung, Taiwan (C P Wen, M K Tsai, Y C Yang); Laboratory for Exercise Physiology Research, Institute of Sport Science, National Taiwan Sport University, Taoyuan, Taiwan (J P M Wai PhD); Department of Epidemiology, University of Washington, Seattle, WA, USA (T Y D Cheng M S); Institute of Medicine and Department of Family and Community Medicine, Chung Shan Medical University and Hospital,

Summary

Background The health benefits of leisure-time physical activity are well known, but whether less exercise than the recommended 150 min a week can have life expectancy benefits is unclear. We assessed the health benefits of a range of volumes of physical activity in a Taiwanese population.

Methods In this prospective cohort study, 416 175 individuals (199 265 men and 216 910 women) participated in a standard medical screening programme in Taiwan between 1996 and 2008, with an average follow-up of 8·05 years (SD 4·21). On the basis of the amount of weekly exercise indicated in a self-administered questionnaire, participants were placed into one of five categories of exercise volumes: inactive, or low, medium, high, or very high activity. We calculated hazard ratios (HR) for mortality risks for every group compared with the inactive group, and calculated life expectancy for every group.

Findings Compared with individuals in the inactive group, those in the low-volume activity group, who exercised for an average of 92 min per week (95% CI 71–112) or 15 min a day (SD 1·8), had a 14% reduced risk of all-cause mortality (0·86, 0·81–0·91), and had a 3 year longer life expectancy. Every additional 15 min of daily exercise beyond the minimum amount of 15 min a day further reduced all-cause mortality by 4% (95% CI 2·5–7·0) and all-cancer mortality by 1% (0·3–4·5). These benefits were applicable to all age groups and both sexes, and to those with cardiovascular disease risks. Individuals who were inactive had a 17% (HR 1·17, 95% CI 1·10–1·24) increased risk of mortality compared with individuals in the low-volume group.

Interpretation 15 min a day or 90 min a week of moderate-intensity exercise might be of benefit, even for individuals at risk of cardiovascular disease.

Funding Taiwan Department of Health Clinical Trial and Research Center of Excellence and National Health Research Institutes.

Quanto?

SPECIAL COMMUNICATIONS

Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise

AMERICAN COLLEGE of SPORTS MEDICINE

POSITION STAND

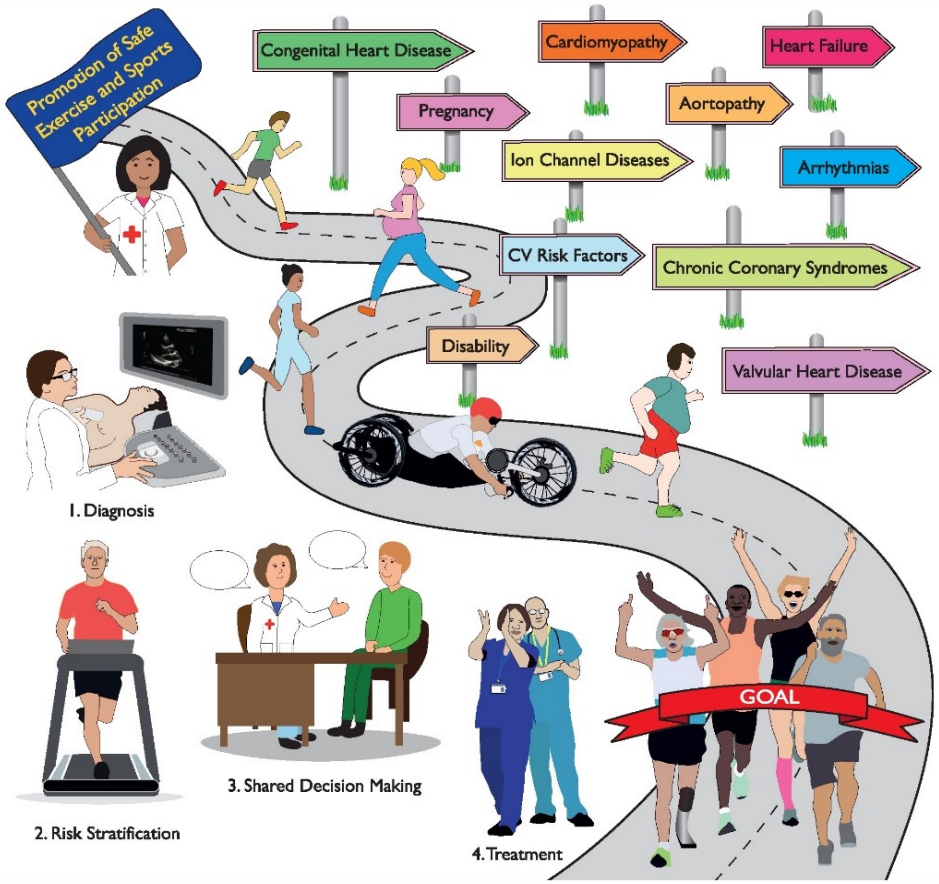
This pronouncement was written for the American College of Sports Medicine by Carol Ewing Garber, Ph.D., FACSM, (Chair); Bryan Blissmer, Ph.D.; Michael R. Deschenes, Ph.D., FACSM; Barry A. Franklin, Ph.D., FACSM; Michael J. Lamonte, Ph.D., FACSM; I-Min Lee, M.D., Sc.D., FACSM; David C. Nieman, Ph.D., FACSM; and David P. Swain, Ph.D., FACSM.

Recommendations for physical activity

Recommendations	Class [a]	Level [b]	Ref [c]
It is recommended for healthy adults of all ages to perform at least 150 minutes a week of moderate intensity or 75 minutes a week of vigorous intensity aerobic PA or an equivalent combination thereof.	I	A	258–261
For additional benefits in healthy adults, a gradual increase in aerobic PA to 300 minutes a week of moderate intensity, or 150 minutes a week of vigorous intensity aerobic PA, or an equivalent combination thereof is recommended.	I	A	259, 260
Regular assessment and counselling on PA is recommended to promote the engagement and, if necessary, to support an increase in PA volume over time.[d]	I	B	262–264
PA is recommended in low-risk individuals without further assessment.	I	C	265, 266
Multiple sessions of PA should be considered, each lasting ≥10 minutes and evenly spread throughout the week, i.e. on 4–5 days a week and preferably every day of the week.	IIa	B	267, 268
Clinical evaluation, including exercise testing, should be considered for sedentary people with CV risk factors who intend to engage in vigorous PAs or sports.	IIa	C	265

Piepoli MF et al. Eur J Prev Cardiol 2016; 23: NP1-96

2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease



Courtesy of Gaia Cattadori

Dose–Response Relationship Between Physical Activity and Risk of Heart Failure

A Meta-Analysis

Ambarish Pandey, MD; Sushil Garg, MD; Monica Khunger, MD; Douglas Darden, MD; Colby Ayers, MS; Dharam J. Kumbhani, MD, SM; Helen G. Mayo, MLS; James A. de Lemos, MD; Jarett D. Berry, MD, MS

***Background*—**Prior studies have reported an inverse association between physical activity (PA) and risk of heart failure (HF). However, a comprehensive assessment of the quantitative dose–response association between PA and HF risk has not been reported previously.

***Methods and Results*—**Prospective cohort studies with participants >18 years of age that reported association of baseline PA levels and incident HF were included. Categorical dose–response relationships between PA and HF risk were assessed with random-effects models. Generalized least-squares regression models were used to assess the quantitative relationship between PA (metabolic equivalent [MET]–min/wk) and HF risk across studies reporting quantitative PA estimates. Twelve prospective cohort studies with 20 203 HF events among 370 460 participants (53.5% women; median follow-up, 13 years) were included. The highest levels of PA were associated with significantly reduced risk of HF (pooled hazard ratio for highest versus lowest PA, 0.70; 95% confidence interval, 0.67–0.73). Compared with participants reporting no leisure-time PA, those who engaged in guideline-recommended minimum levels of PA (500 MET-min/wk; 2008 US federal guidelines) had modest reductions in HF risk (pooled hazard ratio, 0.90; 95% confidence interval, 0.87–0.92). In contrast, a substantial risk reduction was observed among individuals who engaged in PA at twice (hazard ratio for 1000 MET-min/wk, 0.81; 95% confidence interval, 0.77–0.86) and 4 times (hazard ratio for 2000 MET-min/wk, 0.65; 95% confidence interval, 0.58–0.73) the minimum guideline-recommended levels.

Conclusions*—**There is an inverse dose–response relationship between PA and HF risk. Doses of PA in excess of the guideline-recommended minimum PA levels may be required for more substantial reductions in HF risk. (Circulation*. 2015;132:1786-1794. DOI: 10.1161/CIRCULATIONAHA.115.015853.)

Prevenzione Primaria

Advances in Heart Failure

Exercise Training as Therapy for Heart Failure

Current Status and Future Directions

Prevenzione Secondaria

Jerome L. Fleg, MD; Lawton S. Cooper, MD, MPH; Barry A. Borlaug, MD; Mark J. Haykowsky, PhD; William E. Kraus, MD; Benjamin D. Levine, MD; Marc A. Pfeffer, MD, PhD; Ileana L. Piña, MD, MPH; David C. Poole, PhD, DSc; Gordon R. Reeves, MD, MPT; David J. Whellan, MD, MHS; Dalane W. Kitzman, MD; Results from a National Heart, Lung, and Blood Institute Working Group

Background

Despite a variety of pharmacological and device therapies for persons with chronic heart failure (HF), prognosis and quality of life (QOL) remain poor. The need for new effective strategies to improve outcomes for patients with HF is underscored by persistently high mortality, morbidity, healthcare use, and costs associated with HF, with >1 million US HF hospitalizations at an estimated direct and indirect cost in the US of $40 billion in 2012.[1]

Exercise intolerance is a primary symptom in patients with chronic HF, both those with preserved ejection fraction (HFpEF) and reduced ejection fraction (HFrEF), and is a strong determinant of prognosis and of reduced QOL.[2]

Exercise training improves exercise intolerance and QOL in patients with chronic stable HFrEF, and has become an accepted adjunct therapy for these patients (Class B level of evidence) based on a fairly extensive evidence base of randomized trials, mostly small.[3]

of aerobic exercise, including high-intensity interval training (HIIT), and resistance, training relative to aerobic training; combination of exercise training with other therapies; optimization of adherence; benefit for older patients with HF, those with HFpEF or multiple comorbidities, and those with acute decompensated HF.

The National Heart, Lung, and Blood Institute convened a working group of experts on June 11, 2012 in Bethesda, MD to identify knowledge gaps and to suggest general approaches to filling those gaps for exercise training as a treatment for HF. The National Heart, Lung, and Blood Institute invited experts in a variety of areas, including basic and clinical exercise physiologists, HF and cardiac rehabilitation (CR) specialists, and clinical trial specialists to address these issues. Workshop participants were asked to identify knowledge gaps and to suggest general approaches in basic and clinical investigation to evaluate, to optimize, and to translate the potential role of exercise training in the treatment of HF.

(*Circ Heart Fail.* 2015;8:209-220. DOI: 10.1161/CIRCHEARTFAILURE.113.001420.)

Courtesy of Gaia Cattadori

European Journal of Heart Failure (2011) 13, 347–357
doi:10.1093/eurjhf/hfr017

POSITION STATEMENT

Exercise training in heart failure: from theory to practice. A consensus document of the Heart Failure Association and the European Association for Cardiovascular Prevention and Rehabilitation

Massimo F. Piepoli[1]*, Viviane Conraads[2], Ugo Corrà[3], Kenneth Dickstein[4,5], Darrel P. Francis[6], Tiny Jaarsma[7], John McMurray[8], Burkert Pieske[9], Ewa Piotrowicz[10], Jean-Paul Schmid[11,12], Stefan D. Anker[13], Alain Cohen Solal[14], Gerasimos S. Filippatos[15], Arno W. Hoes[16], Stefan Gielen[17], Pantaleo Giannuzzi[3], and Piotr P. Ponikowski[18]

www.escardio.org/HFA

Massimo F Piepoli

Physical Activity Guidelines for Americans

2nd edition

Physical Activity Guidelines for Americans, 2nd edition | 2018 U.S. Department of Health and Human Services

Journal of
Clinical Medicine

MDPI

Review

Exercise Training in Post-COVID-19 Patients: The Need for a Multifactorial Protocol for a Multifactorial Pathophysiology

Gaia Cattadori [1,*], Silvia Di Marco [1], Massimo Baravelli [1], Anna Picozzi [1] and Giuseppe Ambrosio [2]

J. Clin. Med. **2022**, *11*, 2228. https://doi.org/10.3390/jcm11082228

3. Inflammation and Exercise Training

Exercise training is known to positively affect immune system and inflammation [3]. The acute inflammatory response may be reduced by a regular physical activity through at least five mechanisms: (1) reducing the inflammatory signalling pathway mediated by Toll-like receptors; (2) increasing anti-inflammatory cytokines such as Interleukin-10 and 37, which could inhibit the inflammatory cascade; (3) reducing lung inflammation promoting the conversion from Angiotensin II to Angiotensin 1–7; (4) activating the Angiotensin-converting enzyme 2 receptor vasodilator pathway to reduce lung inflammation; and (5) restoring nitric oxide levels in order to counteract endothelial dysfunction [8]. However, different physical activities in terms of intensity and type have different effects on the immune system and inflammation: intense exercise can actually lead to a higher level of inflammatory mediators and to increase the risk of injury and chronic inflammation, while moderate to vigorous effort with appropriate resting periods can achieve maximum benefit [9]. The "J curve" concept hypothesizes that excessive bouts of prolonged training can impair immune function, and high intensity exercise may thus be dangerous, helping to exacerbate virus infection, such as COVID-19. On the contrary, moderate intensity exercise improves the immune system and it should be recommended as a non-pharmacological, inexpensive and viable way to cope with COVID-19 virus. The "Forrest Gump" theory states, based on study on ACE axis unbalance, that "regular exercise would not reduce one's risk of getting infected with SARS-CoV-2 but it would reduce one's risk of getting severe disease [10,11]". Moreover, several studies have demonstrated that both acute and chronic exercise training at moderate intensity, improve endothelial dysfunction, muscular blood supply, peripheral O2 extraction, muscular strength, ventilator efficacy, resulting in clinically significant benefits in terms of improved exercise capacity, quality of life and cardio-pulmonary function. Exercise programs in adults hospitalized with an acute or an exacerbation of a chronic respiratory condition, even if disparate, were well tolerated, and adverse events were infrequent with movement out of bed within 24 h of hospitalization with progressive daily movement and progression titrated based on symptoms [12].

Courtesy of Gaia Cattadori

Inattività fisica associata a un rischio più elevato di COVID grave

Studio di Kaiser Permenente nel sud della California USA

- 48 440 adulti con diagnosi di COVID 19
- Livelli di attività fisica riportati due anni prima
- Confronto inattivo con attivo (= esercizio 150 min)
- Ricovero in terapia intensiva e morte

L'inattività fisica aumenta il rischio:

- 126% di ricovero
- 73% di cura in terapia intensiva
- 149% di morte

Fattori di rischio nell'infanzia-(ruolo della famiglia)

- Dislipidemia
- Obesità
- Alta pressione sanguigna
- Fumo passivo
- Inattività fisica
- Dieta malsana
- Stato socioeconomico basso
- Mancanza di istruzione
- Disuguaglianze sanitarie
- Scarsa alfabetizzazione sanitaria

Effetti benefici dell'attività fisica:

Miglioramento della salute delle ossa e del peso per i bambini dai 3 ai 5 anni.

Miglioramento della funzione cognitiva per i giovani dai 6 ai 13 anni.

Benefici per la salute del cervello, tra cui possibile miglioramento della funzione cognitiva, riduzione del rischio di ansia e depressione e miglioramento del sonno e della qualità della vita.

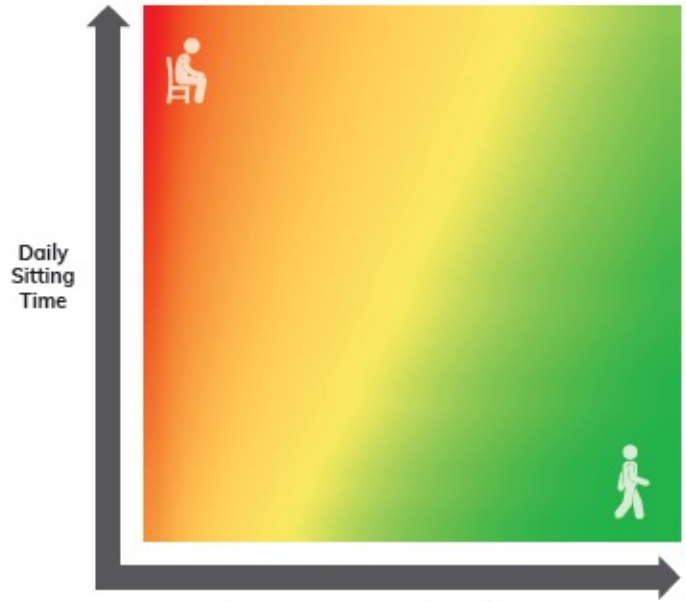
Per le donne in gravidanza, rischio ridotto di aumento di peso eccessivo, diabete gestazionale e depressione postpartum.

Per gli anziani, rischio ridotto di lesioni da caduta.

Per le persone con varie condizioni mediche croniche, ridotto rischio di mortalità per tutte le cause e specifiche per malattia, miglioramento della funzione fisica e migliore qualità della vita.

Ridotto rischio di cancro in gran numero di siti.

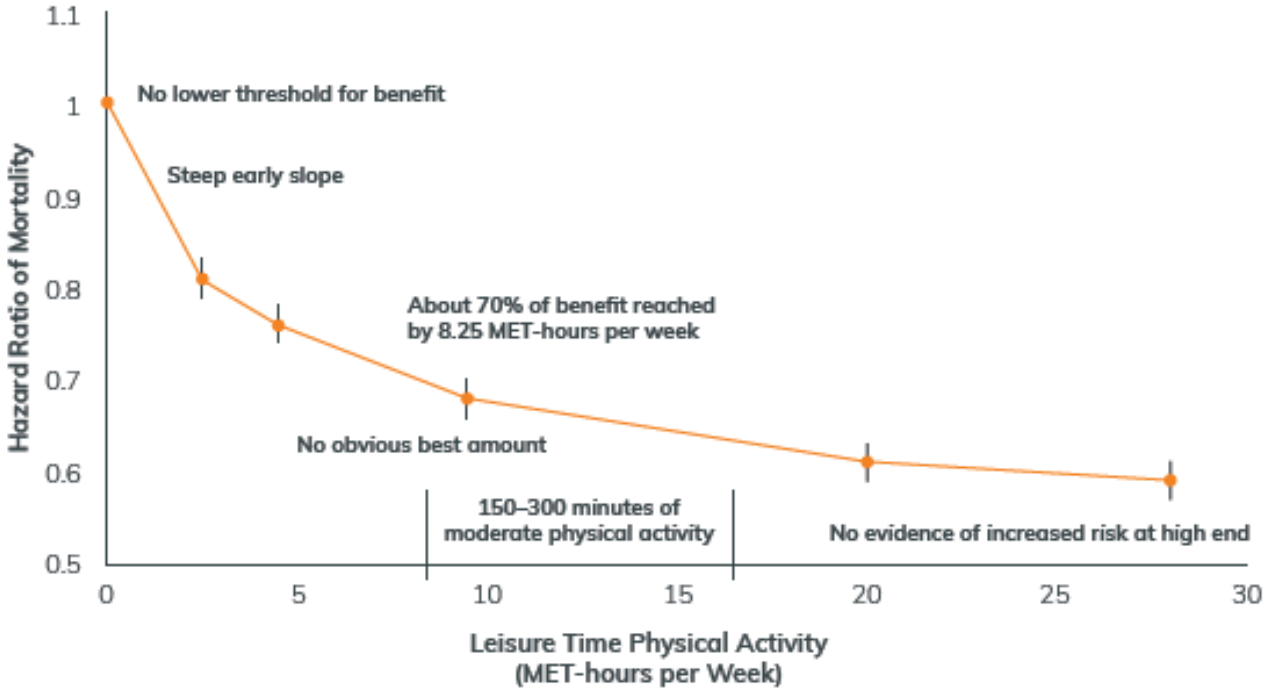
Rapporto tra esercizio fisico da moderato a vigoroso, tempo di sedentarieta e rischio di mortalità per tutte le cause negli adulti



Source: This heat map is adapted from data found in Ekelund U, Steene-Johannessen J, Brown WJ. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonized meta-analysis of data from more than 1 million men and women. Lancet. 2016;388:1302-1310. doi:10.1016/S0140-6736(16)30370-1.

Physical Activity Guidelines for Americans, 2nd edition | 2018 U.S. Department of Health and Human Services

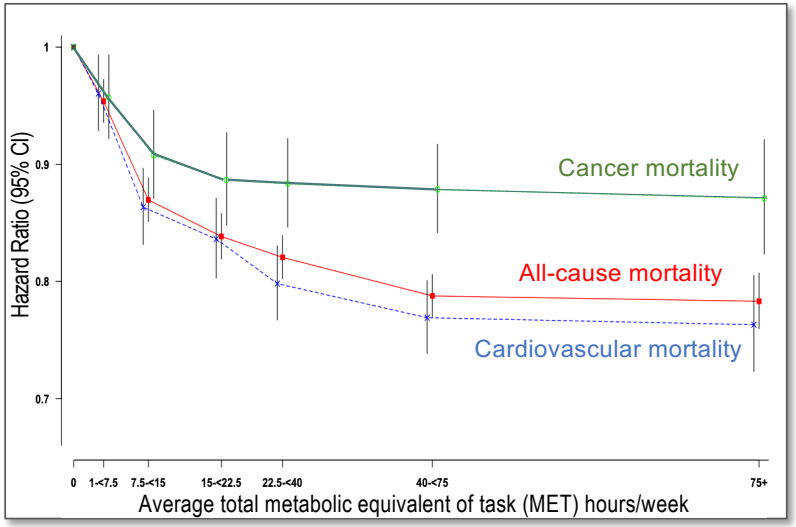
Relationship of Moderate-to-Vigorous Physical Activity to All-Cause Mortality



Source: Adapted from data found in Moore SC, Patel AV, Matthews CE. Leisure time physical activity of moderate to vigorous intensity and mortality: a large pooled cohort analysis. PLoS Med. 2012;9(11):e1001335. doi:10.1371/journal.pmed.1001335.

Many types of physical activity may lower risk of death for older adults (age 59-82)

In older adults getting regular physical activity*, **risk of death decreased – *regardless of type of activity*.**



*7.5 to 15 MET per week

Watts EL, et al. Association of Leisure Time Physical Activity Types and Risks of All-Cause, Cardiovascular, and Cancer Mortality Among Older Adults. JAMA Network Open. August 24, 2022.

CA CANCER J CLIN 2020;70:245–271

American Cancer Society Guideline for Diet and Physical Activity for Cancer Prevention

Cheryl L. Rock, PhD, RD[1]; Cynthia Thomson, PhD, RD[2]; Ted Gansler, MD, MPH, MBA [3]; Susan M. Gapstur, MPH, PhD[4]; Marjorie L. McCullough, ScD, RD[4]; Alpa V. Patel, PhD[4]; Kimberly S. Andrews, BA[5]; Elisa V. Bandera, MD, PhD[6]; Colleen K. Spees, PhD, MEd, RDN[7]; Kimberly Robien, PhD, RD[8]; Sheri Hartman, PhD[9]; Kristen Sullivan, MPH, MS[5]; Barbara L. Grant, MS, RD[10]; Kathryn K. Hamilton, MS, RD[11]; Lawrence H. Kushi, ScD[12]; Bette J. Caan, DrPH[12]; Debra Kibbe, MS, PHR[13]; Jessica Donze Black, RD, MPH[14]; Tracy L. Wiedt, MPH[5]; Catherine McMahon, MPH[15]; Kirsten Sloan, BA[15]; Colleen Doyle, MS, RD[5]

Abstract: The American Cancer Society (ACS) publishes the Diet and Physical Activity Guideline to serve as a foundation for its communication, policy, and community strategies and, ultimately, to affect dietary and physical activity patterns among Americans. This guideline is developed by a national panel of experts in cancer research, prevention, epidemiology, public health, and policy, and reflects the most current scientific evidence related to dietary and activity patterns and cancer risk. The ACS guideline focuses on recommendations for individual choices regarding diet and physical activity patterns, but those choices occur within a community context that either facilitates or creates barriers to healthy behaviors. Therefore, this committee presents recommendations for community action to accompany the 4 recommendations for individual choices to reduce cancer risk. These recommendations for community action recognize that a supportive social and physical environment is indispensable if individuals at all levels of society are to have genuine opportunities to choose healthy behaviors. This 2020 ACS guideline is consistent with guidelines from the American Heart Association and the American Diabetes Association for the prevention of coronary heart disease and diabetes as well as for general health promotion, as defined by the 2015 to 2020 Dietary Guidelines for Americans and the 2018 Physical Activity Guidelines for Americans. **CA Cancer J Clin 2020;70:245-271.**

Keywords: cancer prevention, dietary patterns, nutrition, physical activity

How do we incentivize a *healthy* lifestyle and/or disincentivize an *unhealthy* lifestyle?

Barriere sistemiche allo stile di vita sano

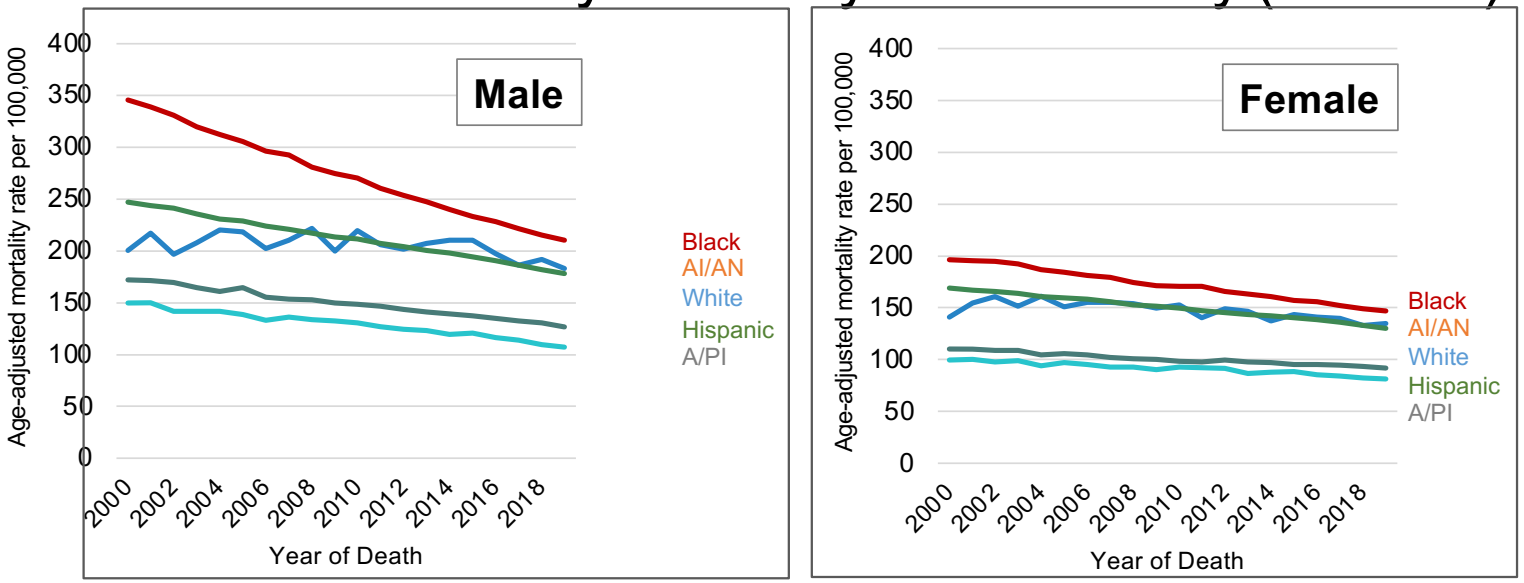
Sfide per aderire a modelli dietetici sani

- Fattori socioeconomici e insicurezza alimentare e nutrizionale
- Discriminazione strutturale e segregazione di quartiere
- Marketing mirato di cibi e bevande malsane

Barriere ambientali da esercitare

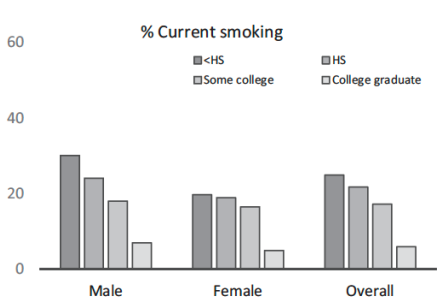
- Mancanza di accesso alla palestra e alle strutture per l'allenamento
- Pochi parchi o spazi verdi
- Mancanza di posti sicuri e convenienti per camminare o andare in bicicletta

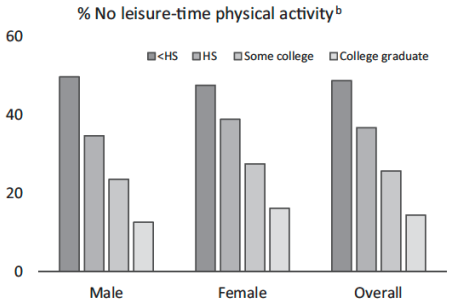
Cancer Mortality Trends by Race/Ethnicity (2000-19)

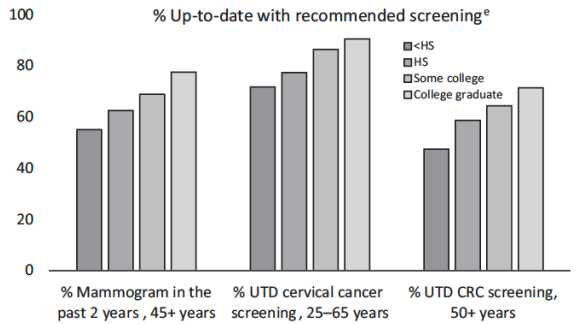


Source: NCI Surveillance, Epidemiology, and End Results Program (SEER), seer.cancer.gov

For more, see Lawrence, et al: Trends in Cancer Mortality Among Black Individuals in the U.S. From 1999 to 2019 – *JAMA Oncology*, May 19, 2022







More education

is associated with:

- ✓ **healthier lifestyle factors**
- ✓ **greater use of cancer screening tests**

Sauer et al, Cancer Epidemiol Biomarkers Prevent 28: 629-42, 2019

To do:

- Closer integration with prevention and screening for neoplastic disease
- Addressing health disparities in addition to other disparities
- Making it easier for people to adopt healthy lifestyles, prevention, and screening
- Implications for health disparities from the beginning when developing new technology
- Simplified screening approaches to detect a wider range of cancers hold great potential, provided they are evidence-based and can be equitably deployed

CANCER PREVENTION RESEARCH | COMMENTARY

Cancer Prevention Prioritized at AACR Annual Meeting and a New Working Group

Adriana Albini

ABSTRACT

Scientific advances in the late 19th century set the stage for progress in understanding and treating cancer, a disease that was previously considered almost hopeless. One hundred years later, cancer prevention is becoming an increasingly important focus for oncology research. New tools and ideas bring to the field some extremely promising molecular, organizational, social, and political approaches, which were a focus of the *American Association for Cancer Research* 2022 Annual Meeting and of the newly launched AACR Cancer Prevention Working Group (CPWG). We are moving toward precision prevention, better tools for early detection and for risk assessment, the use of a Precancer Atlas, unveiling of new biomarkers. Besides improving lifestyle, by avoiding risk factors such as tobacco use, excessive UV exposure, infectious agents, as well as poor dietary habits, lack of exercise, overweight, and obesity, many other factors can impact cancer risk, which is a warning to consider a multifaceted molecular but also social approach. Gender, ethnicity, geographic, and economic lines are associated with disparities in prevention, which we want to overcome. Here we summarize some challenges and priorities in cancer prevention emerging from the work of AACR and CPWG.

Cancer Prev Res 2022;15:475–80

doi: 10.1158/1940-6207.CAPR-22-0310

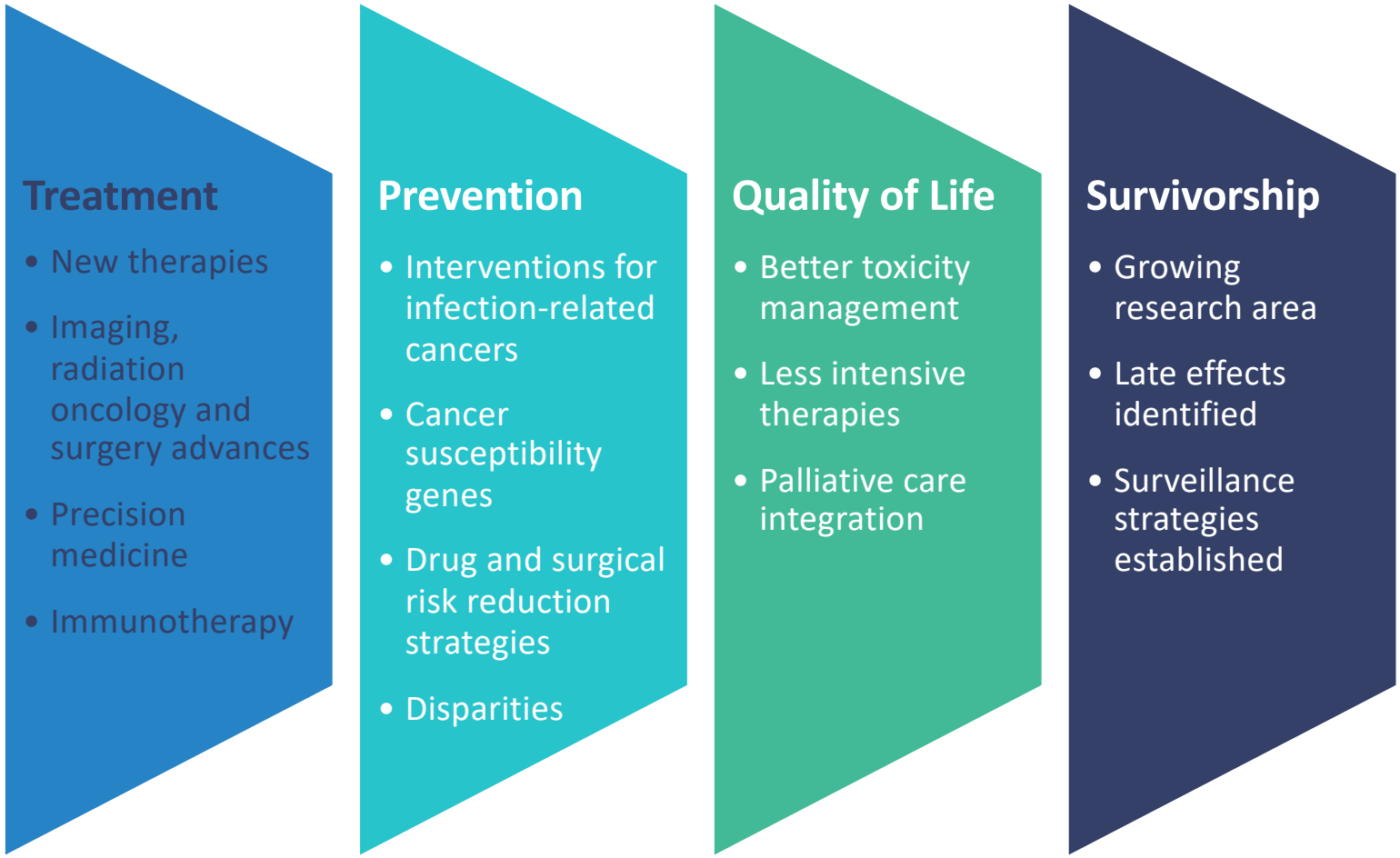
CPWG actions to accomplish its mission

The AACR Cancer Prevention Working Group will accomplish its mission by working to:
Foster transdisciplinary approaches to the study of cancer prevention
Promote the incorporation of molecular and biochemical concepts and techniques as well as novel data science tools into well-designed cancer prevention studies
Provide an ongoing forum(s) for the scholarly discussion and development of effective approaches to the conduct and interpretation of cancer prevention studies
Foster collaborations with individuals engaged in other scientific disciplines, as needed
Recommend scientific and educational programs that will serve to advance the field
Assist with the professional advancement of early- and mid-career investigators engaged in cancer prevention research
Establish a community of individuals expert in or interested in advancing progress in cancer prevention

Figure 1.
CPWG actions to accomplish its mission. Adapted from CPWG Charter (https://www.aacr.org/professionals/membership/scientific-working-groups/cancerprevention- working-group/cpwg-charter/).

Albini A. Cancer Prevention Prioritized at AACR Annual Meeting and a New Working Group. Cancer Prev Res 2022;15:475–80

Cancer:
Progress by Many Measures



Fare sport o attività fisica

LO SPORT ASSIEME ALLA DIETA MANTIENE IN SALUTE: UNA SCHERMITRICE ARMATA CONTRO IL CANCRO

Stile di vita NON salutare

RINGRAZIAMENTI

IRCCS IEO Milano

Adriana Albini
Roberto Orecchia

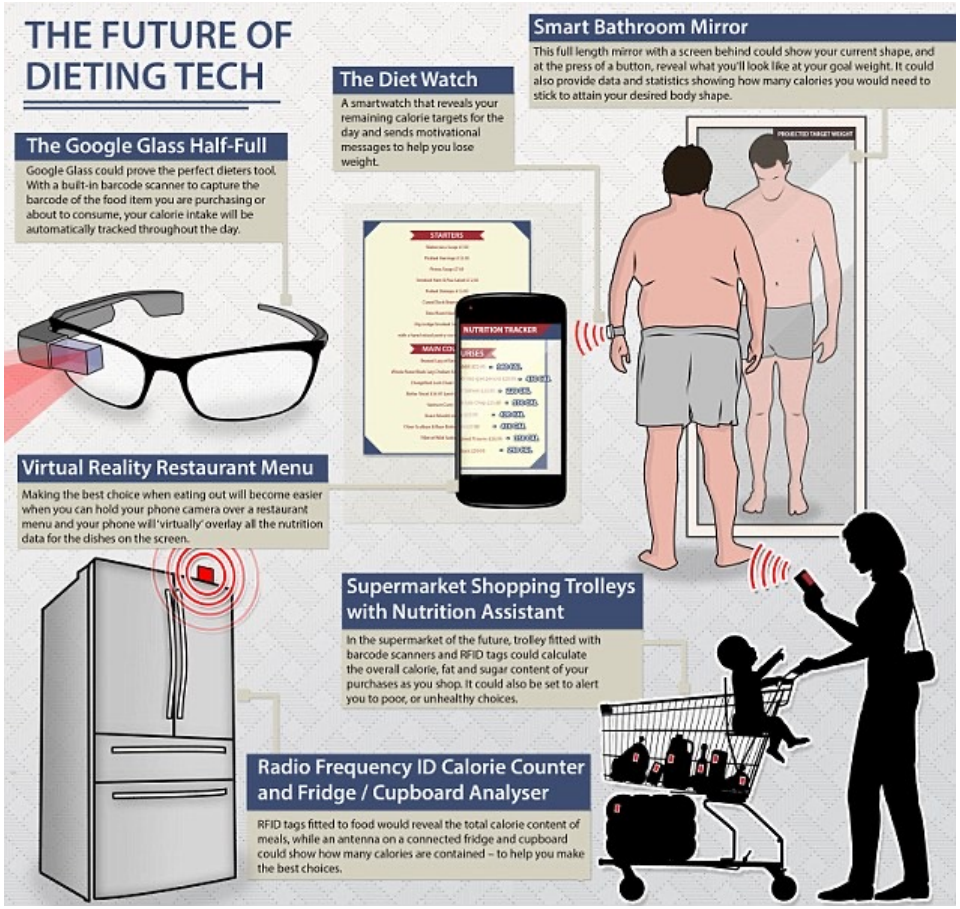
MultiMedica, Milano:

- Dott.ssa Luana Calabrone
- Dott.ssa Valentina Carlini
- Dott.ssa Corradino Paola
- Danilo Morelli

Università dell' Insubria:

- Prof. Douglas Noonan

La dieta Hi- tech



Il Carrello della spesa intelligente

Dotato di uno strumento per la nutrizione virtuale
che, tramite la lettura dei codici a barre, **riconoscerà l'ammontare totale di calorie, grassi e zuccheri** dei prodotti che si intende acquistare segnalando in caso di sgarri eccessivi e sconsigliando gli alimenti poco sani.