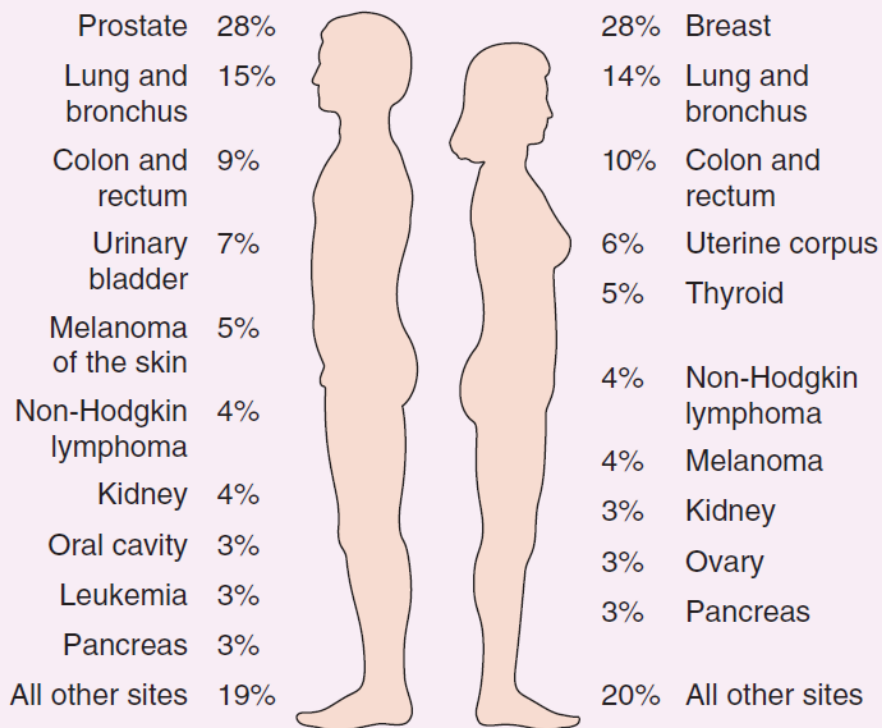




# Epidemiology

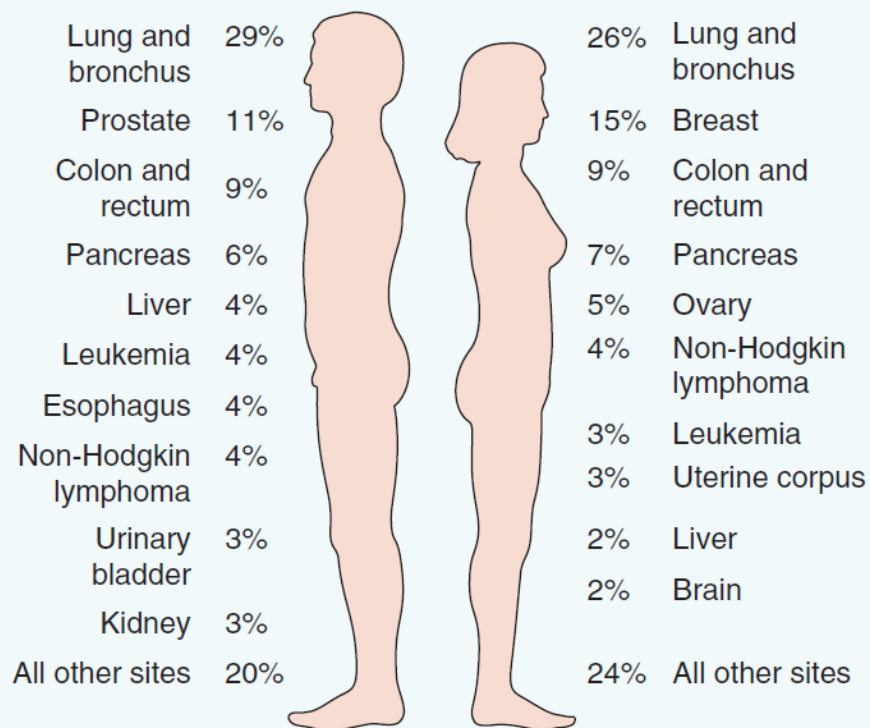
# US data

## A. 2010 ESTIMATED CANCER INCIDENCE BY SITE AND SEX\*

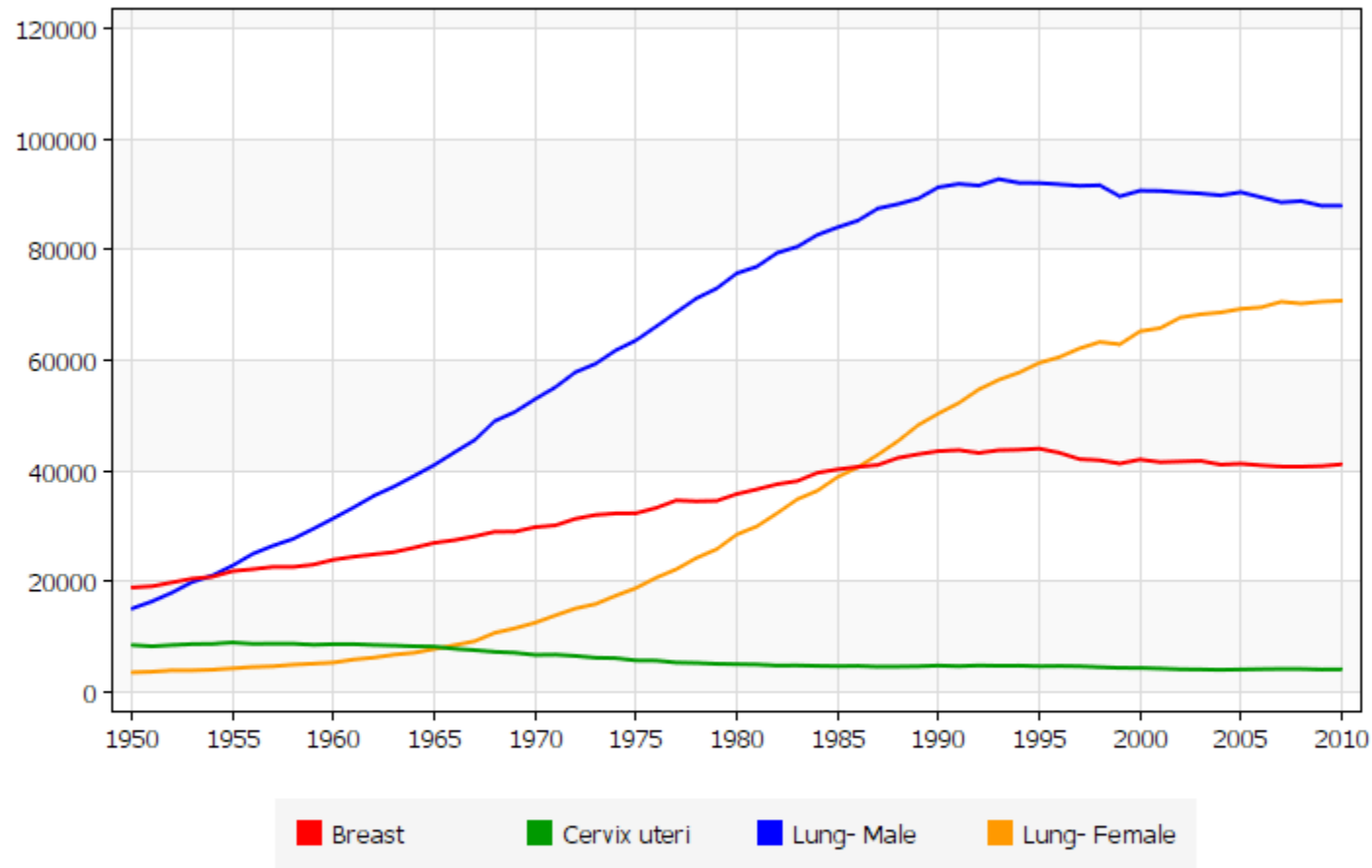


\* Excluding basal and squamous cell skin cancers and carcinoma in situ (except urinary bladder)

## B. 2010 ESTIMATED CANCER DEATHS BY SITE AND SEX

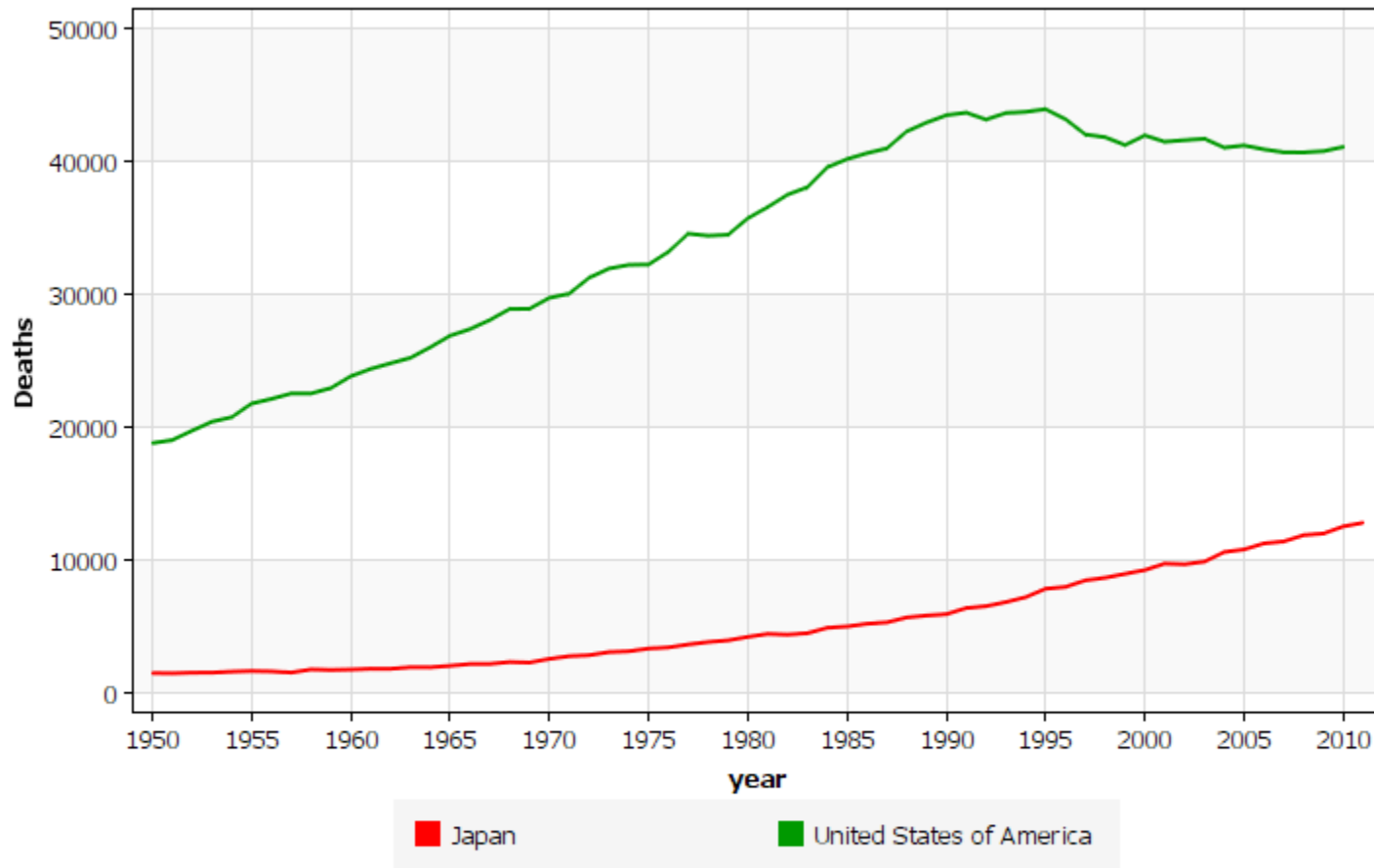


# Time trends (Total deaths US)



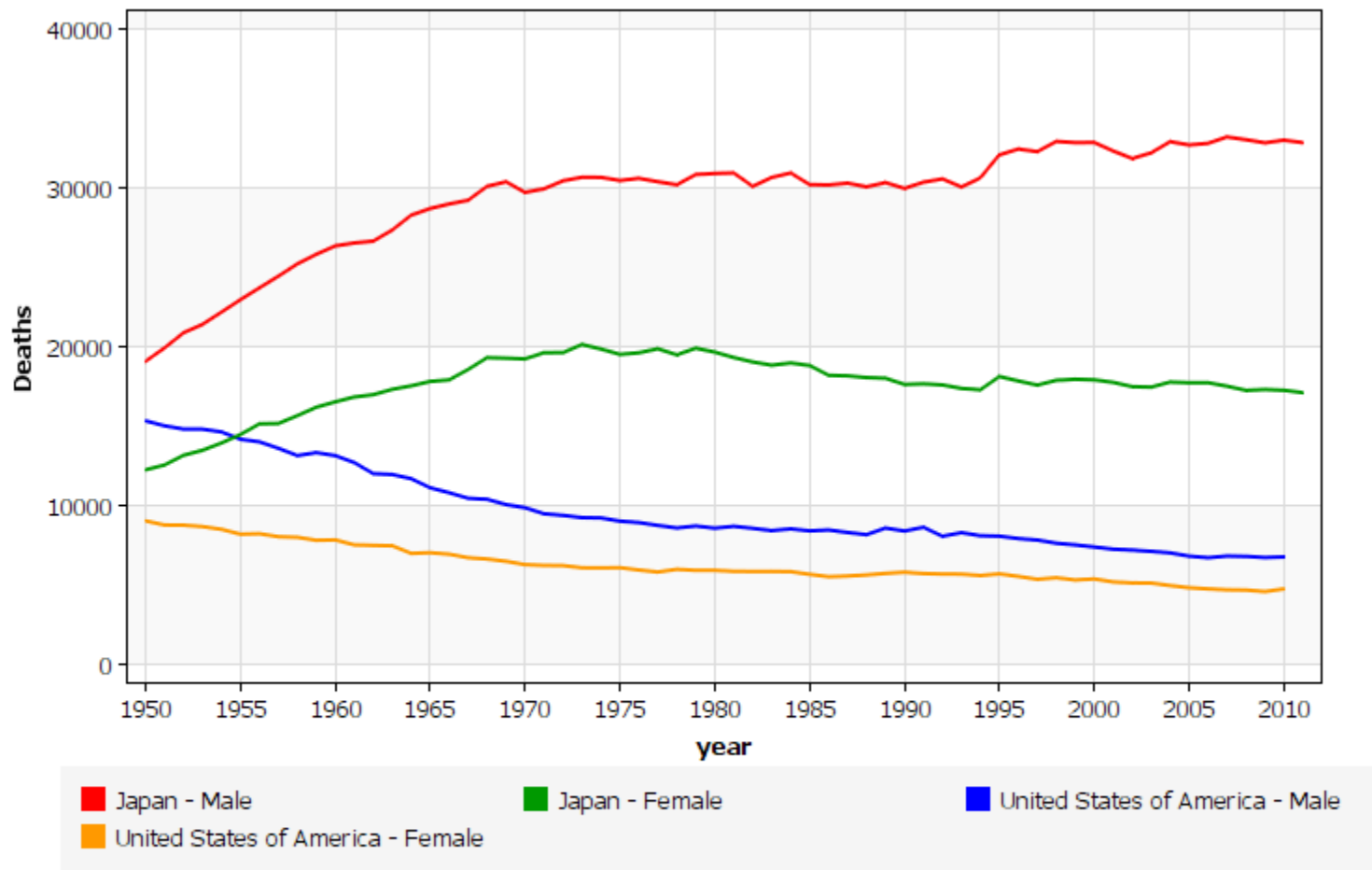
International Agency for Research on Cancer (IARC) - 3.11.2014

# Geographic variables (environmental)



International Agency for Research on Cancer (IARC) - 3.11.2014

# Geographic variables (environmental)



International Agency for Research on Cancer (IARC) - 3.11.2014

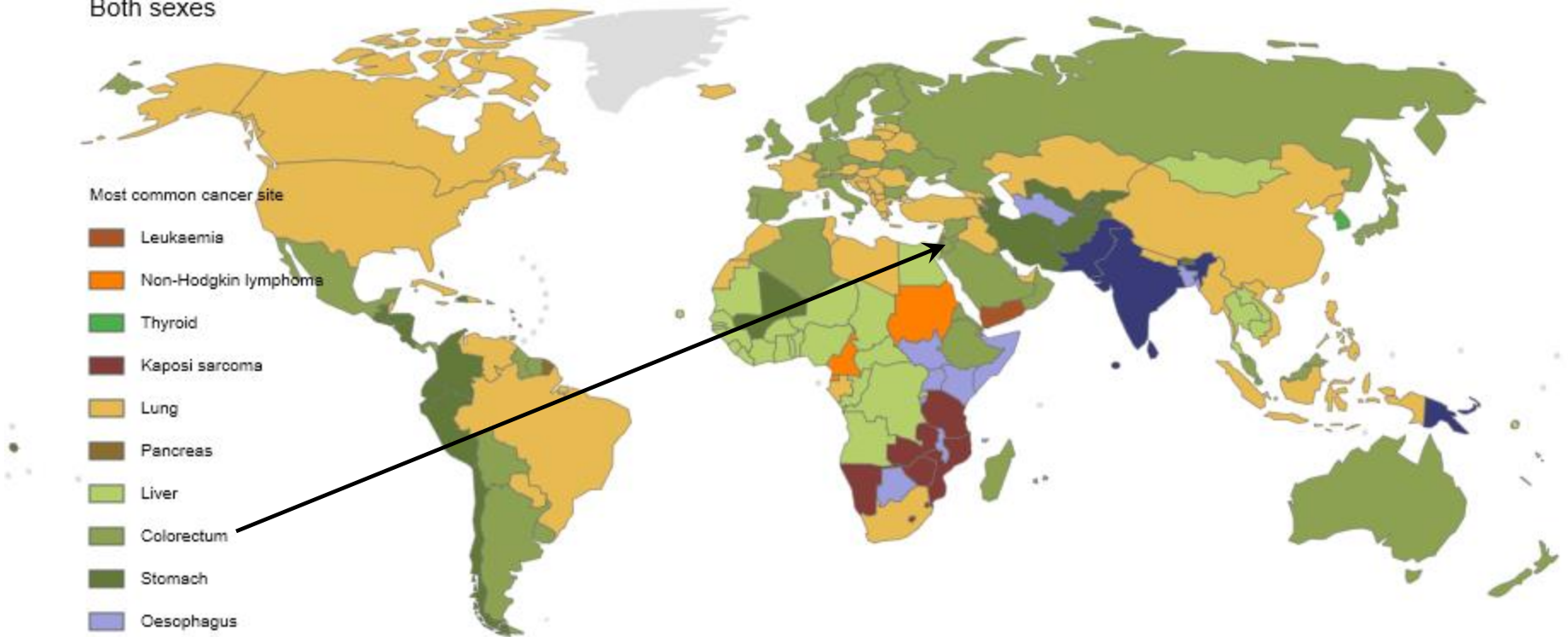
Agent/Group of Agents	Human Cancer Site and Type for Which Reasonable Evidence Is Available	Typical Use/Occurrence
Arsenic and arsenic compounds	Lung, skin, hemangiosarcoma	Byproduct of metal smelting Component of alloys, electrical and semiconductor devices, medications and herbicides, fungicides, and animal dips
Asbestos	Lung, mesothelioma; gastrointestinal tract (esophagus, stomach, large intestine)	Formerly used for many applications because of fire, heat, and friction resistance; still found in existing construction as well as fire-resistant textiles, friction materials (e.g., brake linings), underlayment and roofing papers, and floor tiles
Benzene	Leukemia	Principal component of light oil Many applications exist in printing and lithography, paint, rubber, dry cleaning, adhesives and coatings, and detergents Formerly widely used as solvent and fumigant
Beryllium and beryllium compounds	Lung	Missile fuel and space vehicles Hardener for lightweight compounds metal alloys, particularly in aerospace applications and nuclear reactors
Cadmium and cadmium compounds	Prostate	Uses include yellow pigments and phosphors Found in solders Used in batteries and as alloy and in metal platings and coatings
Chromium compounds	Lung	Component of metal alloys, paints, pigments, and preservatives
Ethylene oxide	Leukemia	Ripening agent for fruits and nuts Used in rocket propellant and chemical synthesis, in fumigants for foodstuffs and textiles, and in sterilants for hospital equipment
Nickel compounds	Nose, lung	Nickel plating Component of ferrous alloys, ceramics, and batteries Byproduct of stainless steel arc welding
Radon and its decay products	Lung	From decay of minerals containing uranium Can be serious hazard in quarries and mines
Vinyl chloride	Angiosarcoma, liver	Refrigerant Monomer for vinyl polymers Adhesive for plastics Formerly used as inert aerosol propellant in pressurized containers

# Global data (WHO)

Incidence ASR  
Both sexes

Most common cancer site

- Leukaemia
- Non-Hodgkin lymphoma
- Thyroid
- Kaposi sarcoma
- Lung
- Pancreas
- Liver
- Colorectum
- Stomach
- Oesophagus
- Lip, oral cavity
- No Data



International Agency for Research on Cancer



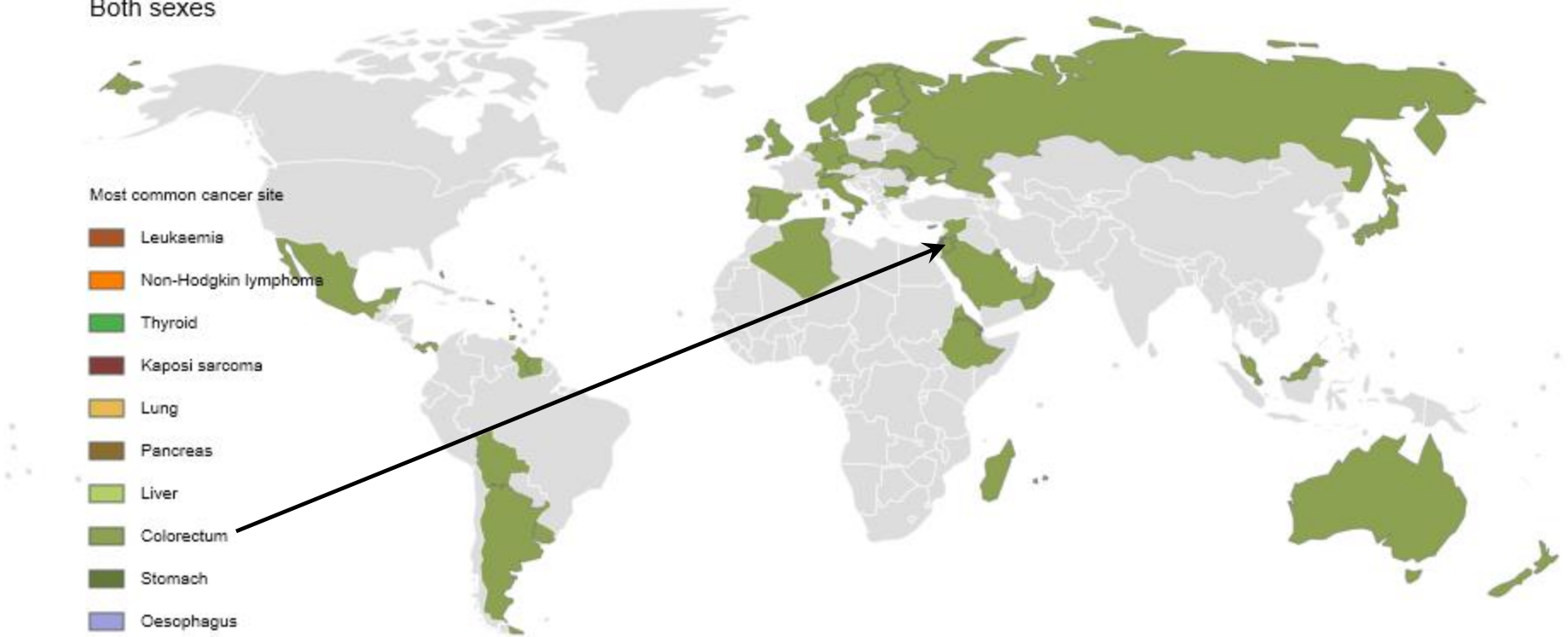
Source: GLOBOCAN 2012 (IARC)

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International Agency for Research on Cancer

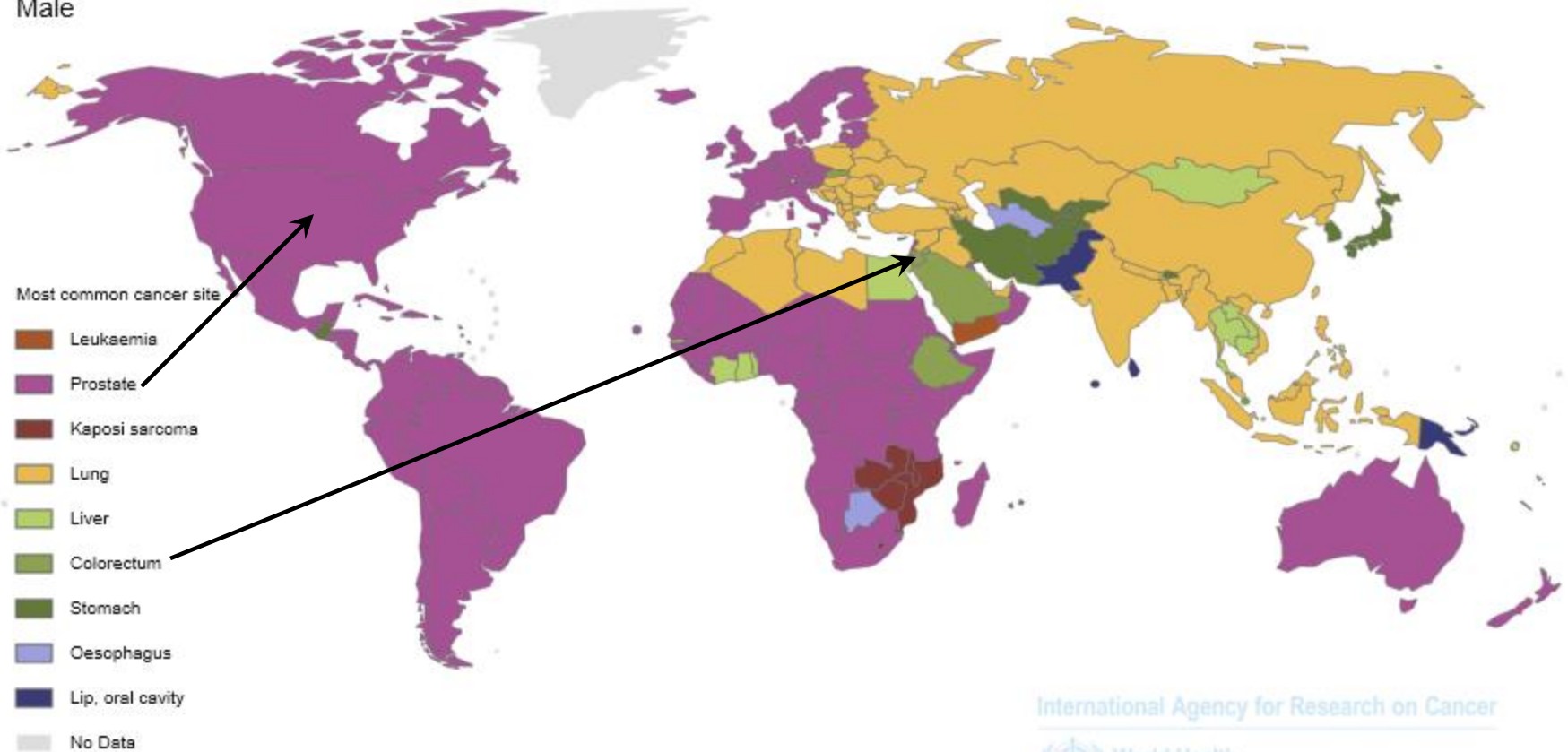


Source: GLOBOCAN 2012 (IARC)



# Global data (WHO)

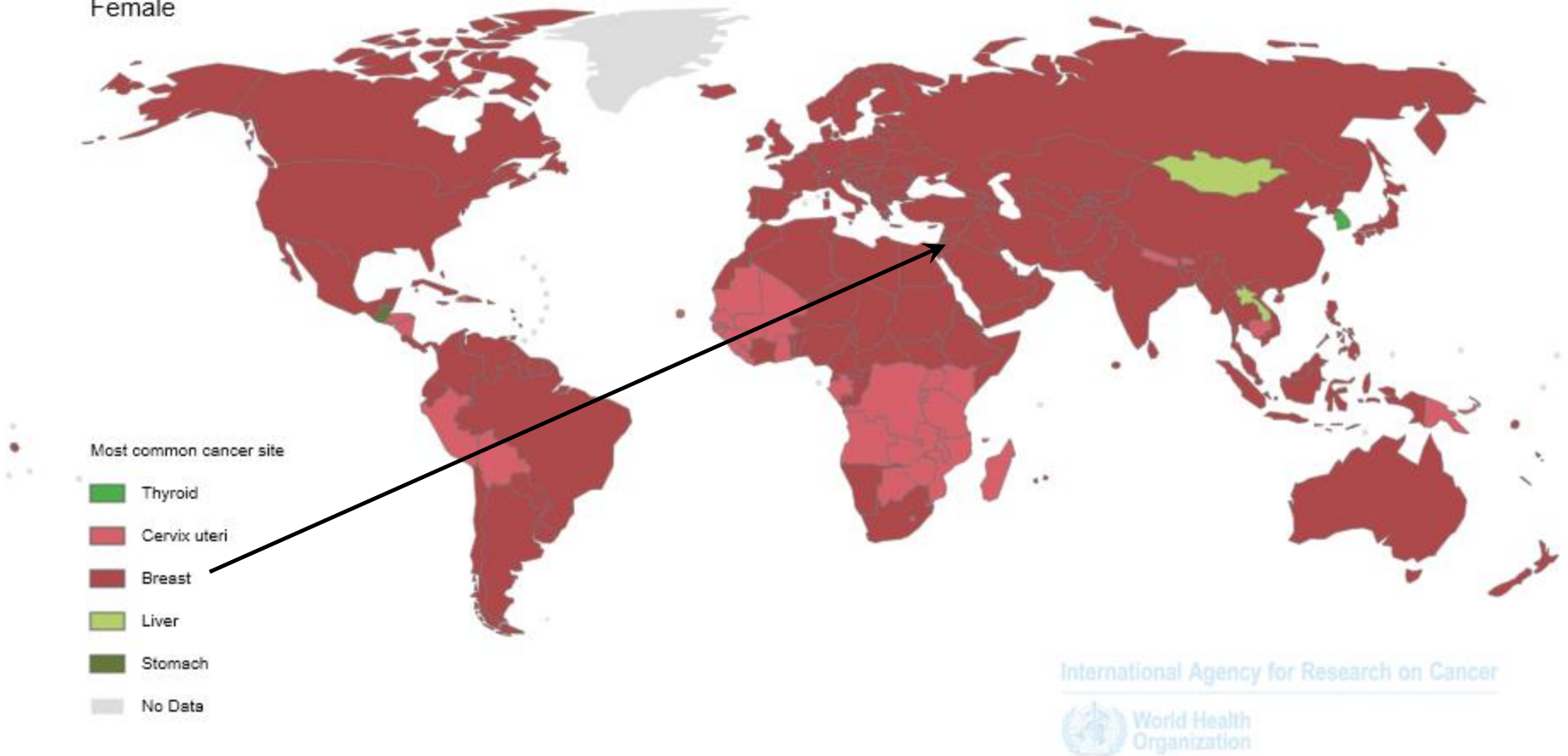
Incidence ASR  
Male



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

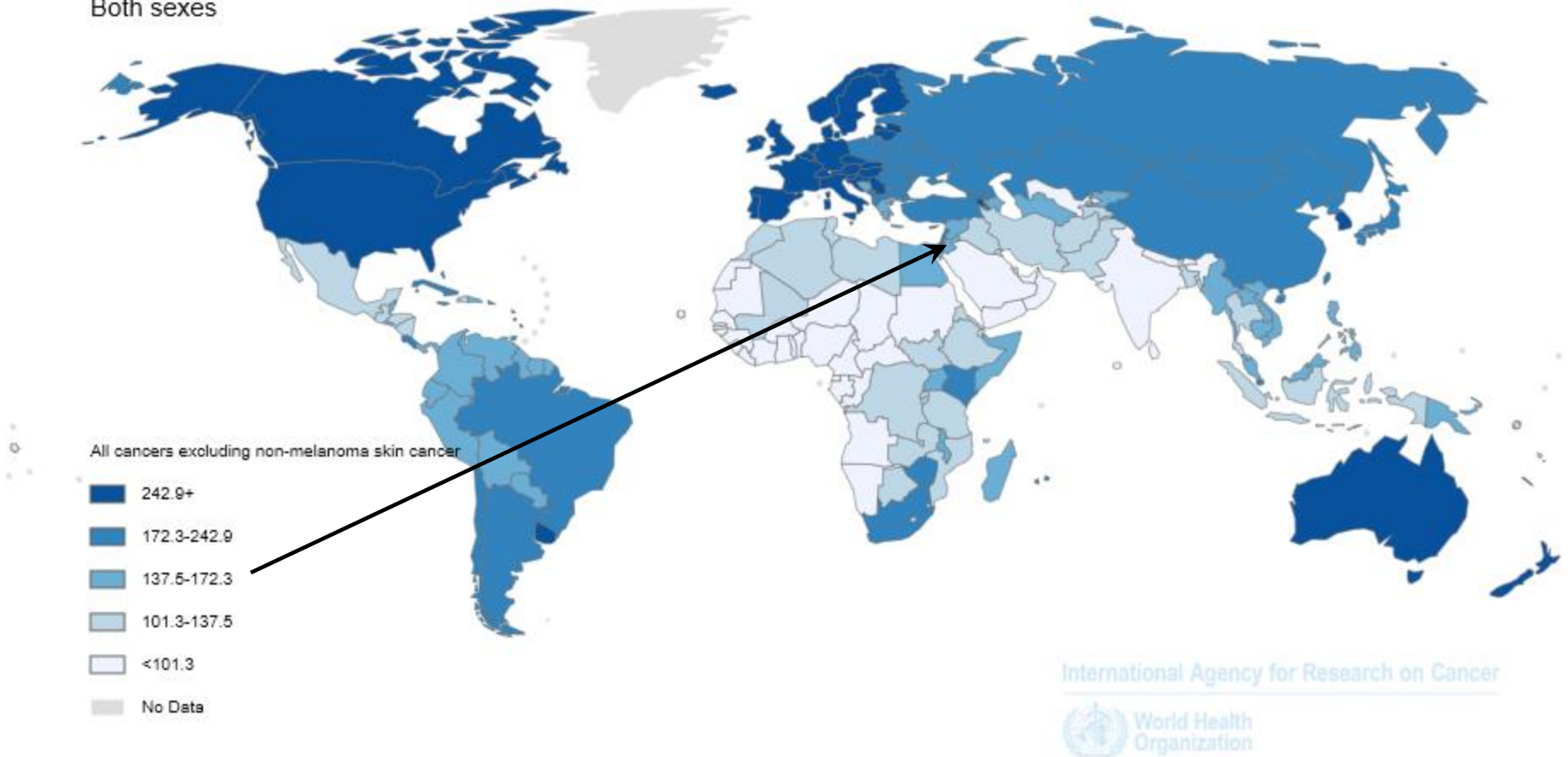
Incidence ASR  
Female



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

Incidence ASR  
Both sexes

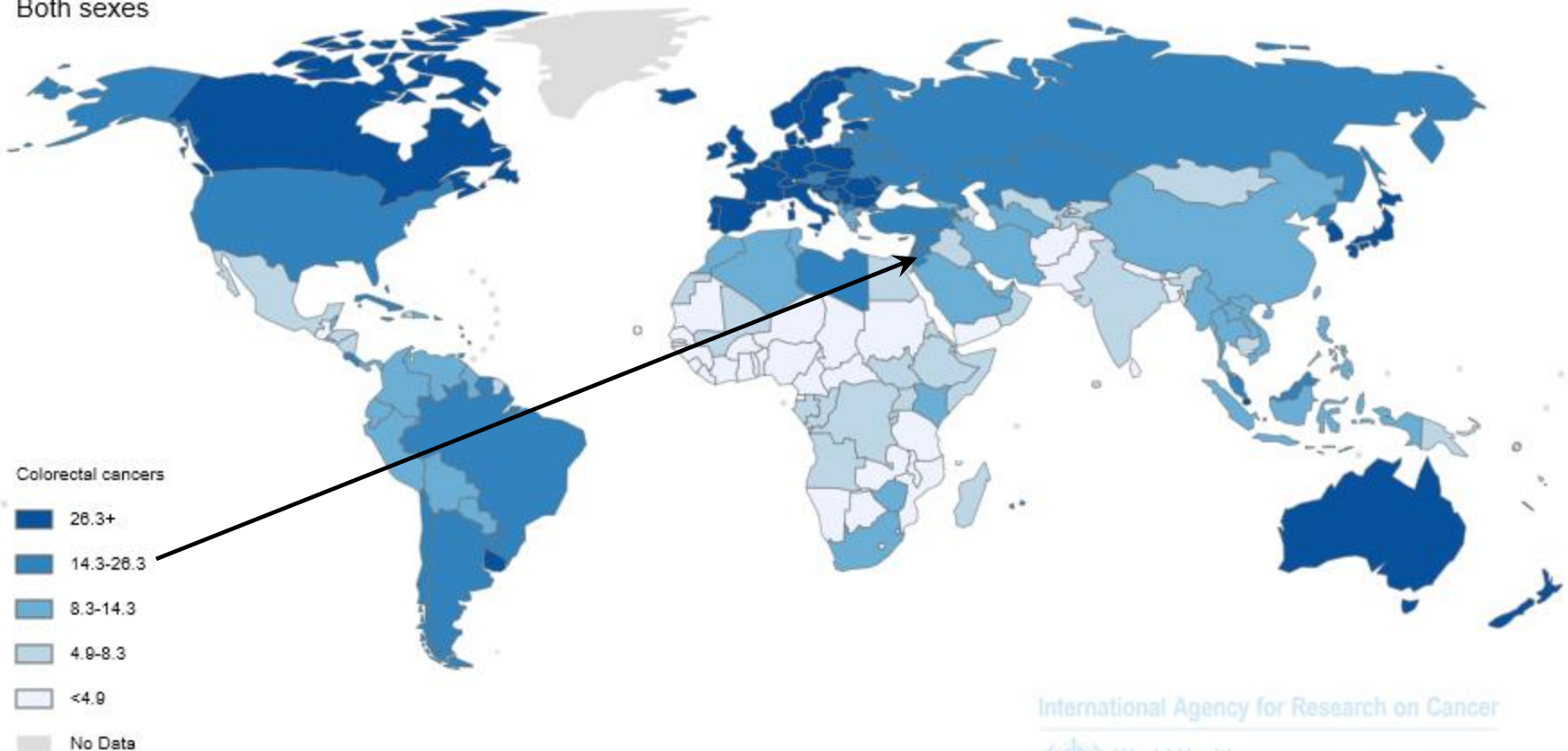


Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

Incidence ASR

Both sexes



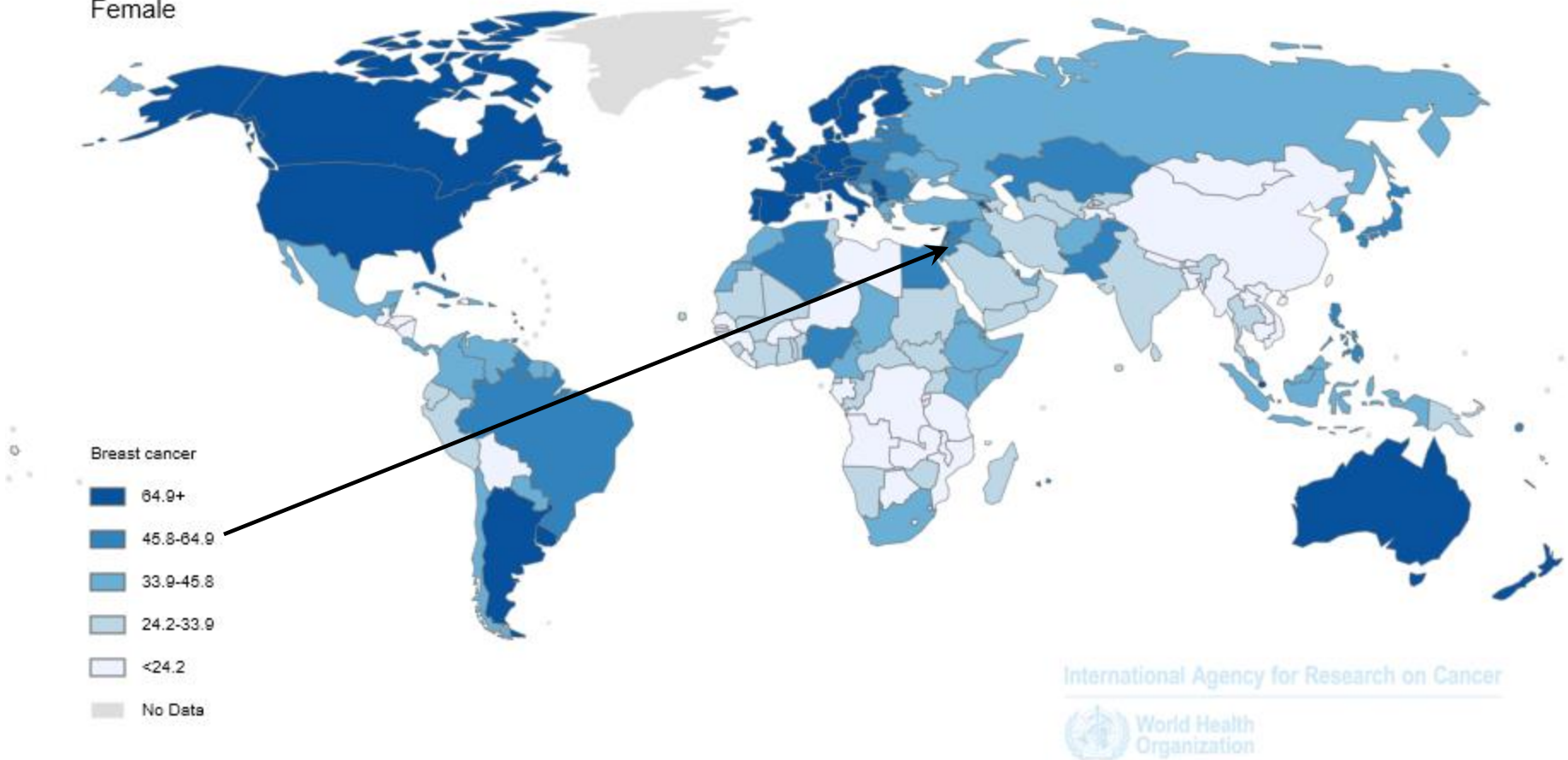
International Agency for Research on Cancer



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

Incidence ASR  
Female

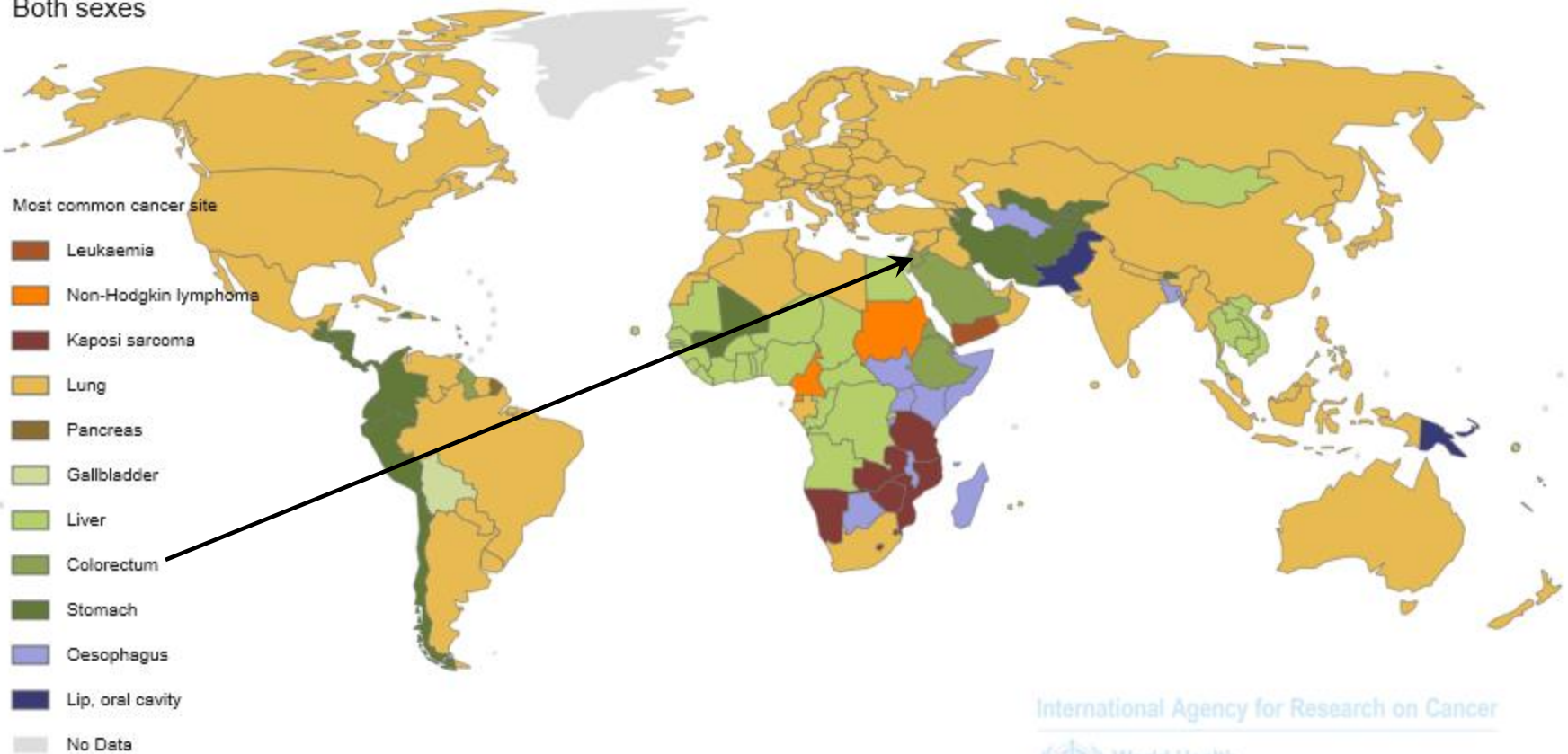


Source: GLOBOCAN 2012 (IARC)



# Global data (WHO)

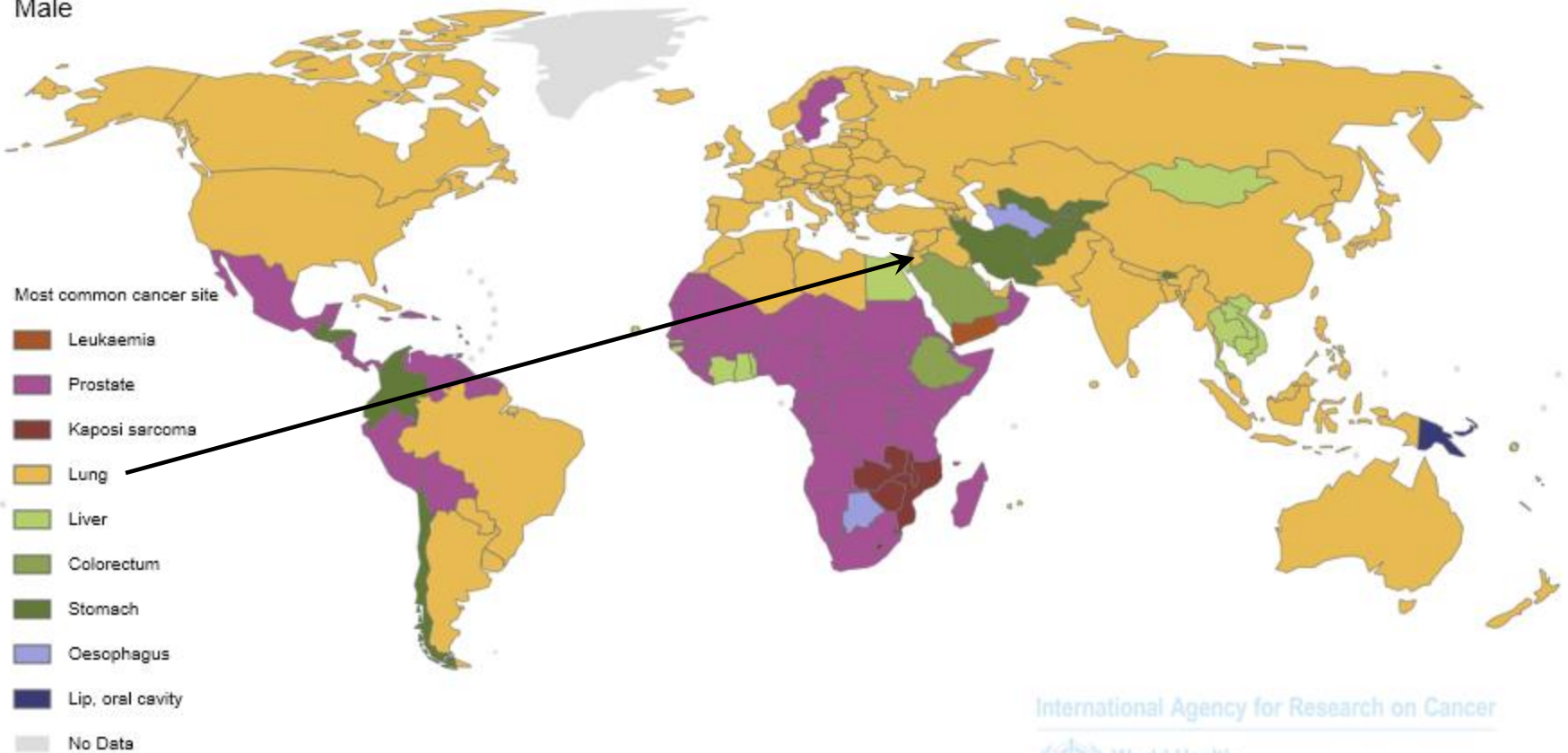
Mortality ASR  
Both sexes



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

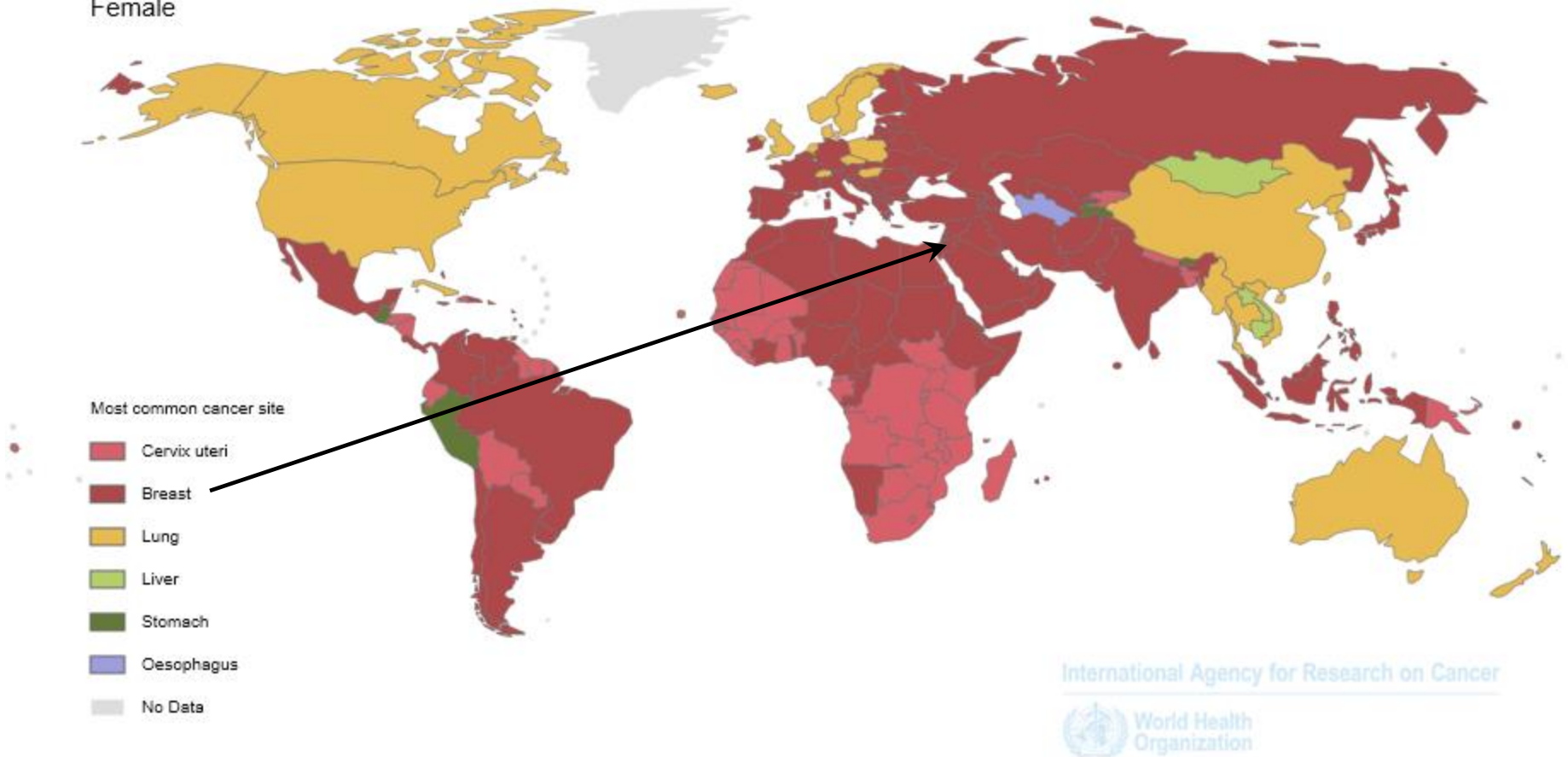
Mortality ASR  
Male



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

Mortality ASR  
Female

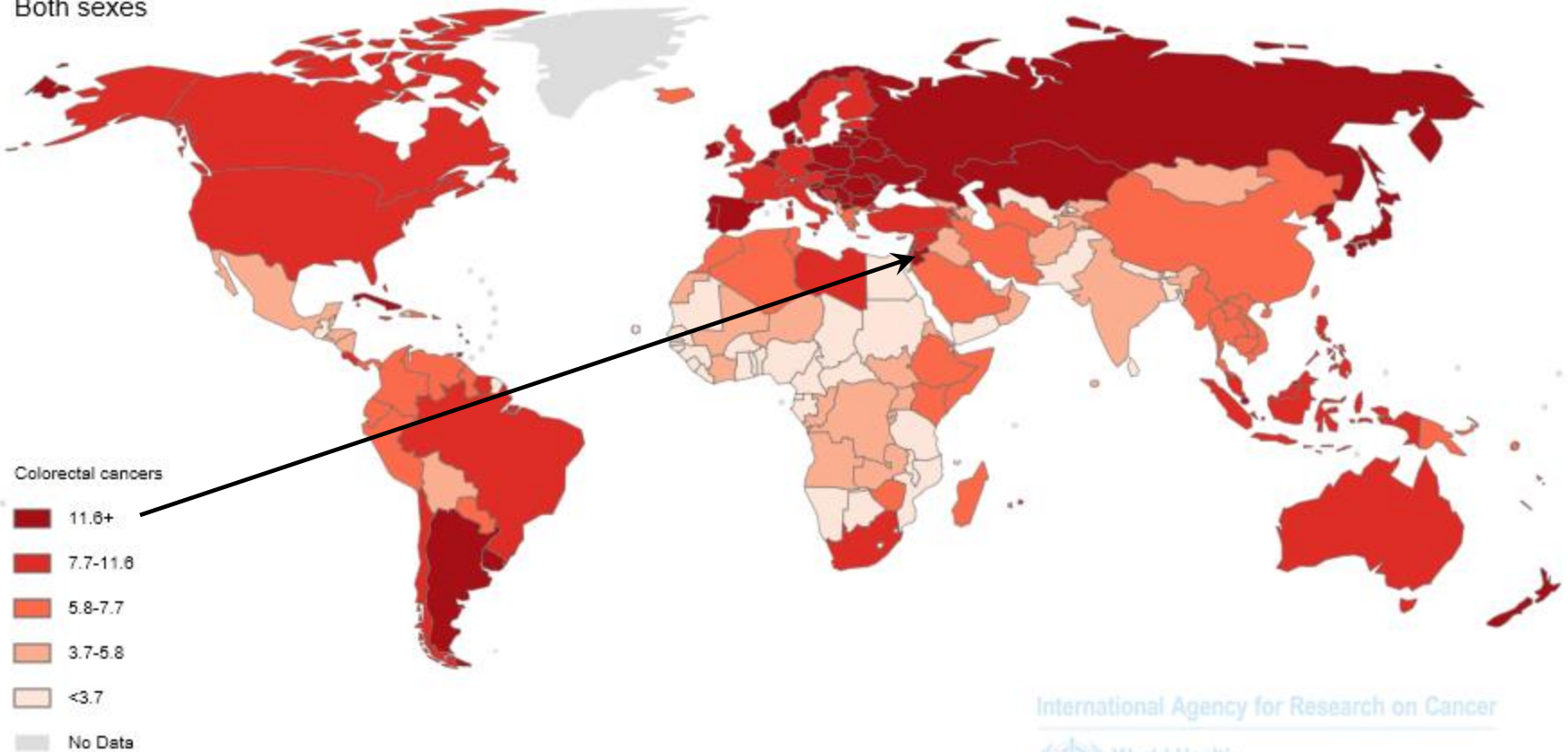


Source: GLOBOCAN 2012 (IARC)



# Global data (WHO)

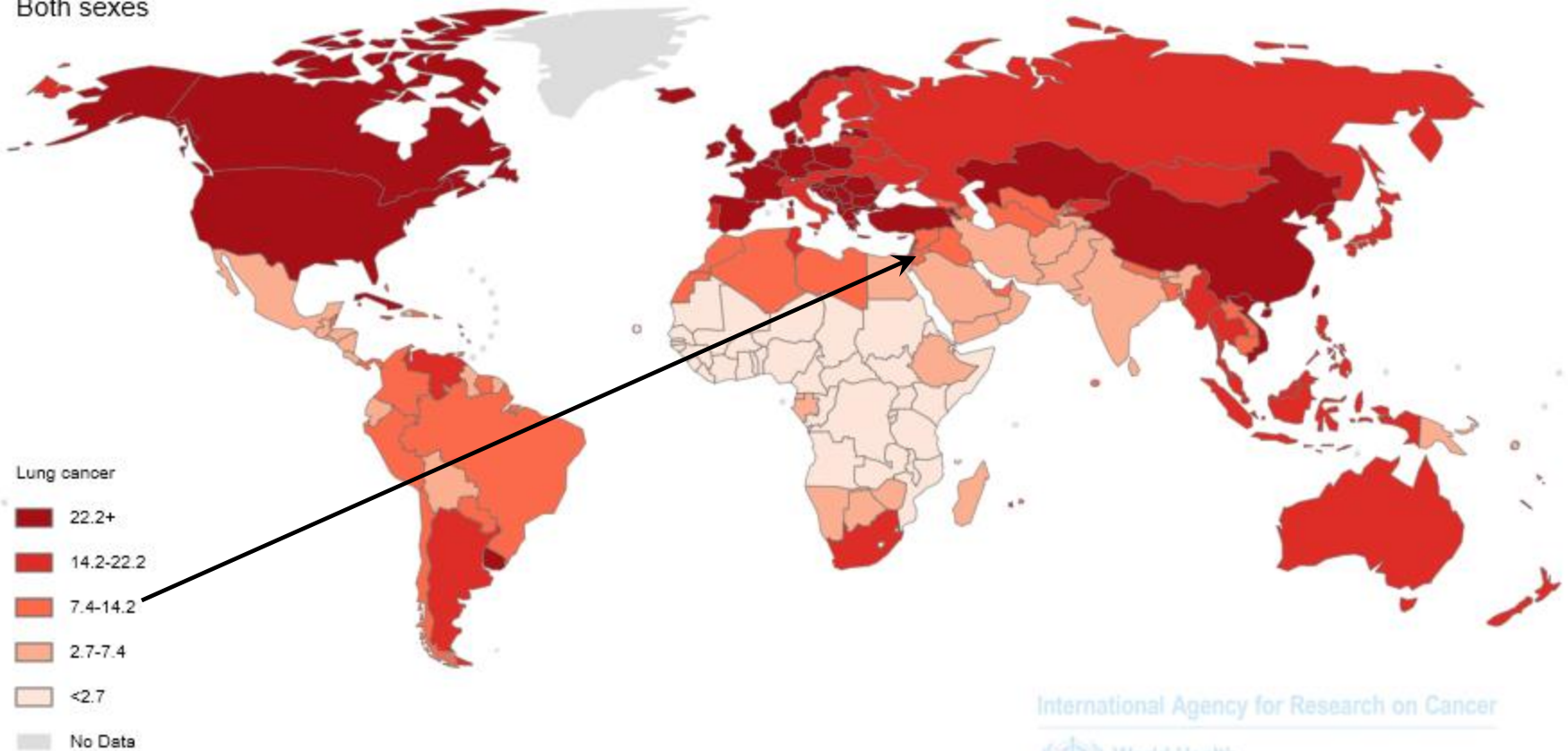
Mortality ASR  
Both sexes



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

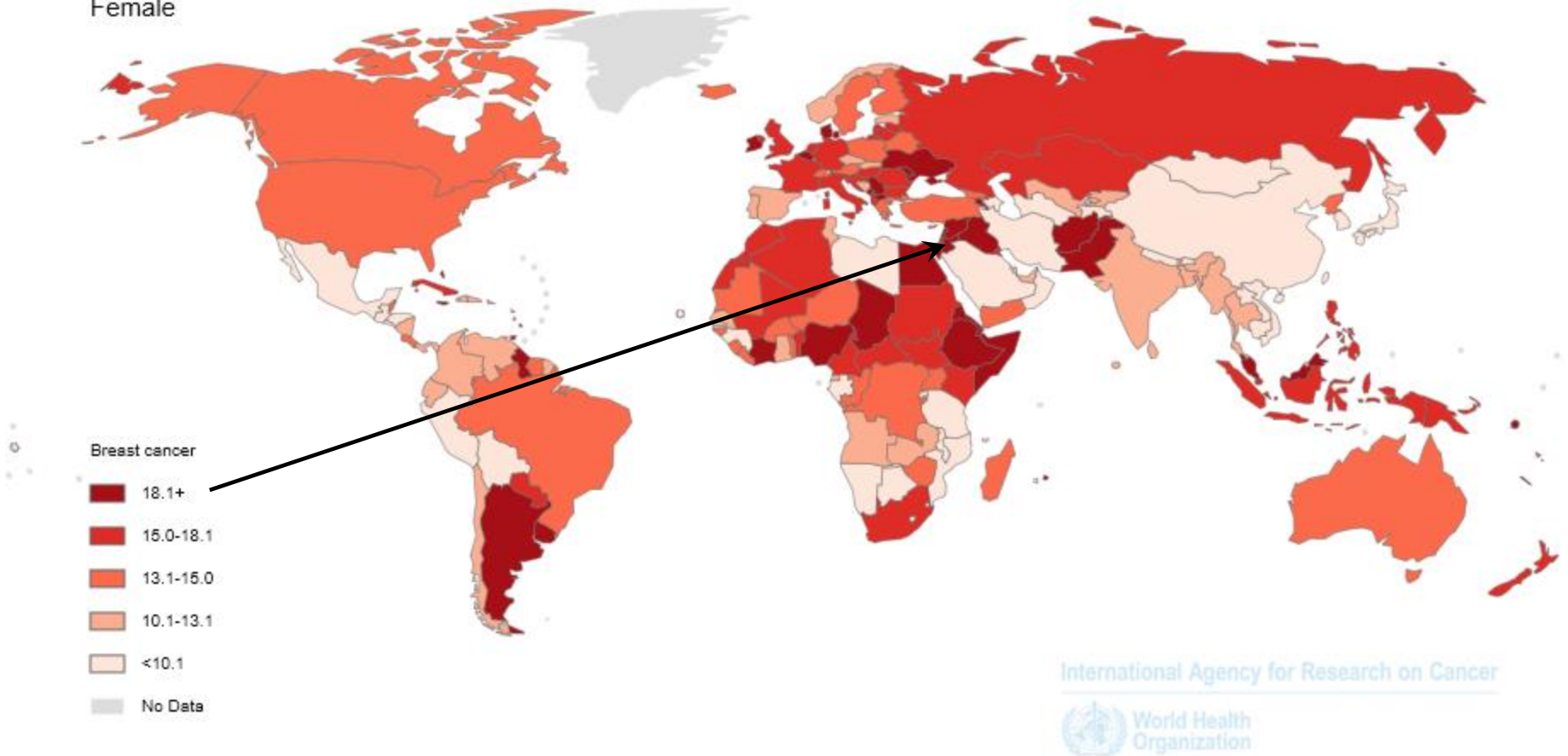
Mortality ASR  
Both sexes



Source: GLOBOCAN 2012 (IARC)

# Global data (WHO)

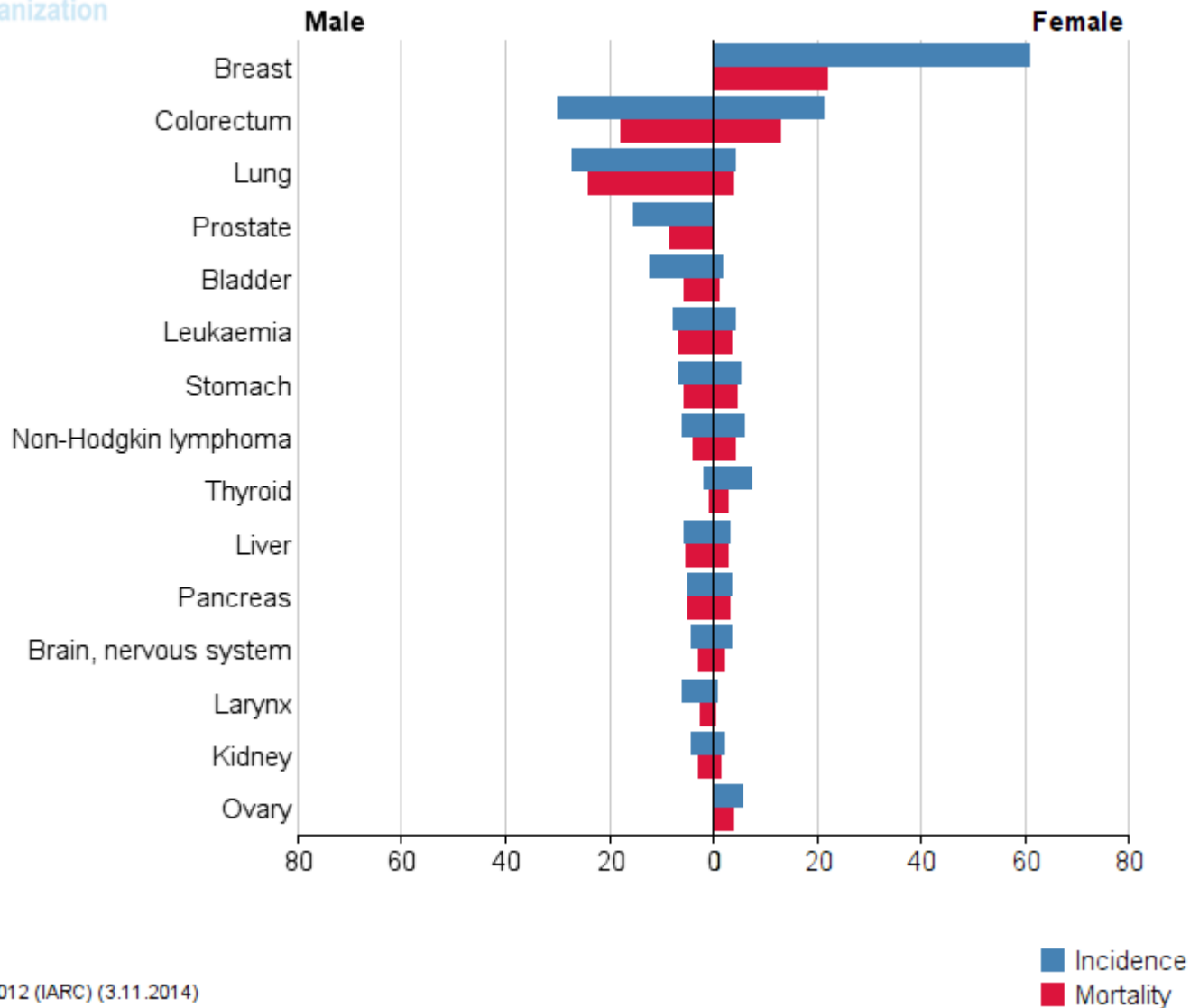
Mortality ASR  
Female



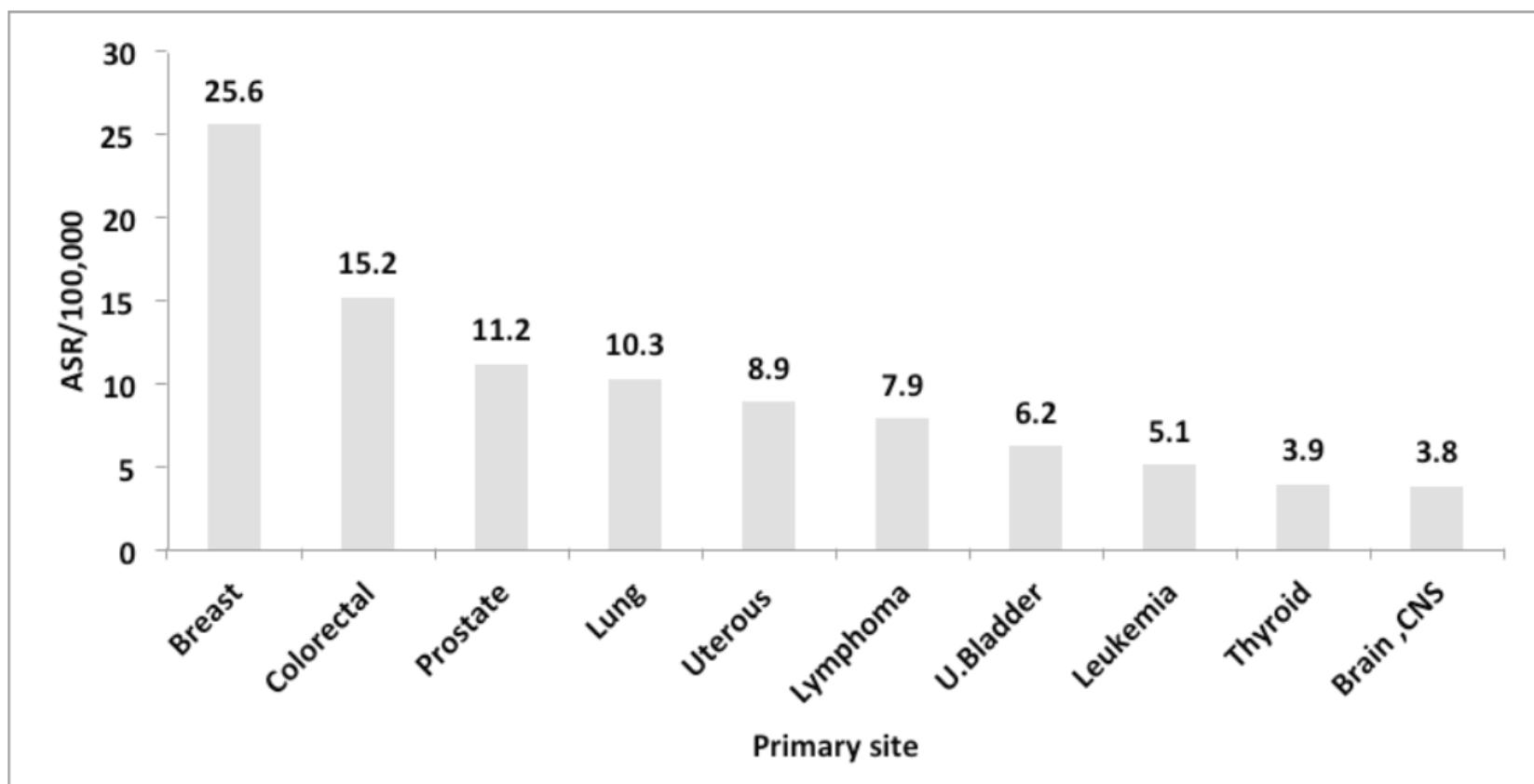
Source: GLOBOCAN 2012 (IARC)



# Estimated age-standardised incidence & mortality rates



**Figure (23) ASR of top ten cancers among Jordanians, both genders combined ,2011**



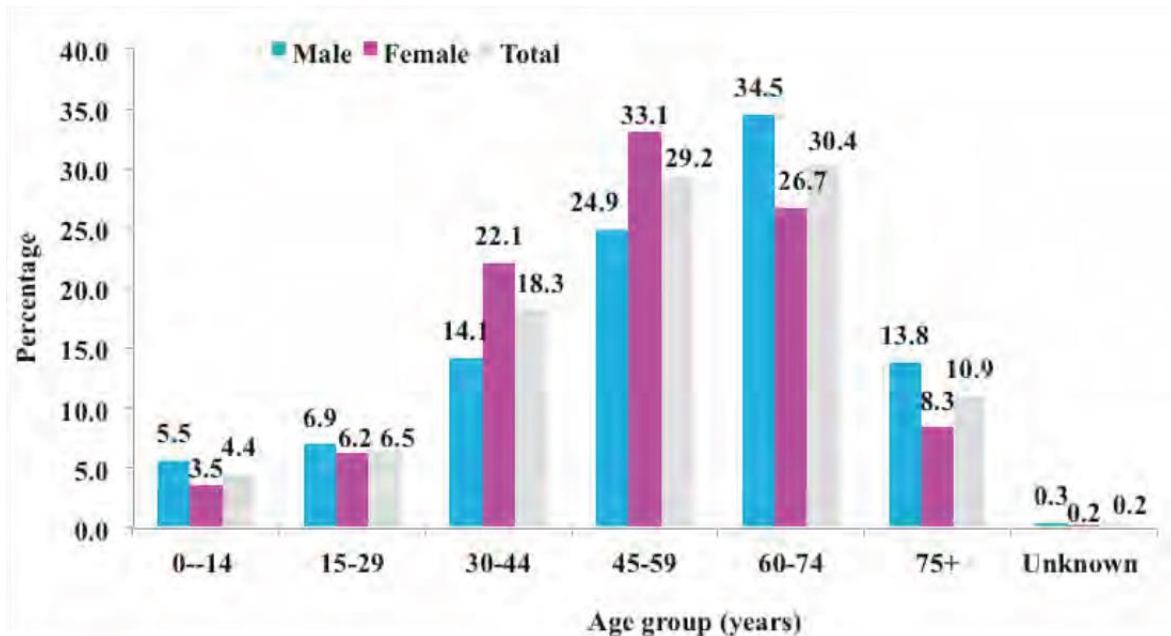


Rank	Cancer	Frequency	Percent
1	Breast	935	37.7
2	Colorectal	233	9.4
3	Thyroid	145	5.8
4	Corpus Uterous	138	5.6
5	Non-Hodgkin lymphoma	100	4.0
6	Leukemia	98	4.0
7	Ovary	70	2.8
8	Brain, Nervous system	67	2.7
9	Hodgkin disease	53	2.1
10	Cervix Uteri	51	2.1



	Site	Frequency	Percent
1	Lung	279	12.7
2	Colorectal	278	12.7
3	U. bladder	171	7.8
4	Prostate	169	7.7
5	Leukemia	128	5.8
6	NHL	120	5.5
7	Brain & CNS	108	4.9
8	Stomach	81	3.7
9	larynx	79	3.6
10	Hodgkin lymphoma	71	3.2

Percentage distribution of cancers for,  
Jordanians,2011, by age-group and sex

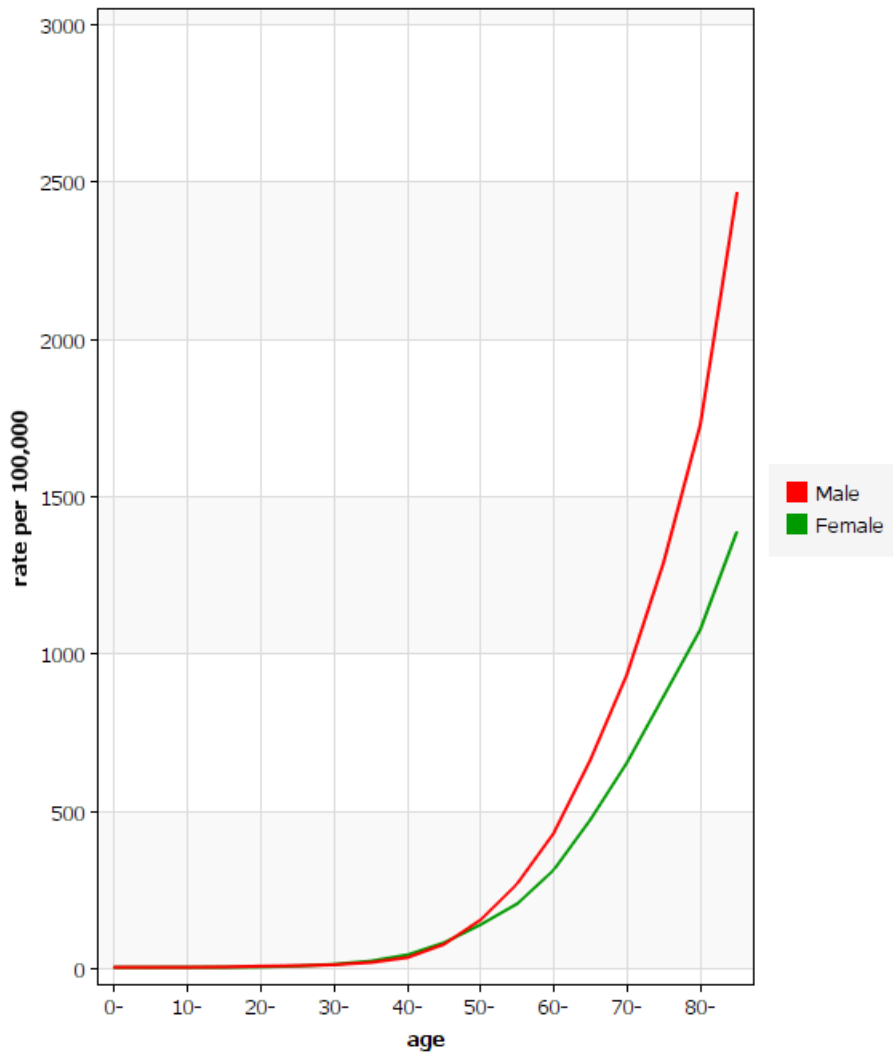


## Age

Frequency of cancer  
increases with age

Most cancer deaths occur  
between ages 55 and 75





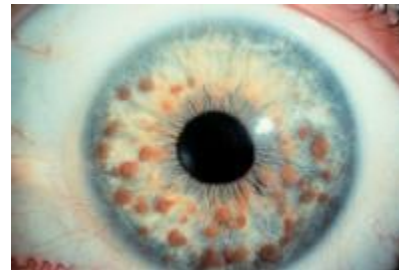
## Age

Frequency of cancer increases with age

Most cancer deaths occur between ages 55 and 75

## Autosomal Dominant Cancer Syndromes

Gene(s)	Inherited Predisposition
<i>RB</i>	Retinoblastoma
<i>TP53</i>	Li-Fraumeni syndrome (various tumors)
<i>p16INK4A</i>	Melanoma
<i>APC</i>	Familial adenomatous polyposis/colon cancer
<i>NF1, NF2</i>	Neurofibromatosis 1 and 2
<i>BRCA1, BRCA2</i>	Breast and ovarian tumors
<i>MEN1, RET</i>	Multiple endocrine neoplasia 1 and 2
<i>MSH2, MLH1, MSH6</i>	Hereditary nonpolyposis colon cancer
<i>PATCH</i>	Nevoid basal cell carcinoma syndrome



## Heredity (5-10%)

### Autosomal dominant

Single mutated copy enough

Inherited *RB* mutation patients typically present with bilateral tumors & higher risk of a second primary (osteosarcoma)

Marker phenotypes:

*APC*: multiple benign polyps

*NF1*: Lisch nodules & café-au-lait spots

Autosomal Dominant Cancer Syndromes	
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Autosomal Recessive Syndromes of Defective DNA Repair	
Xeroderma pigmentosum Ataxia-telangiectasia Bloom syndrome Fanconi anemia	
Familial Cancers of Uncertain Inheritance	
Breast cancer (not linked to <i>BRCA1</i> or <i>BRCA2</i> ) Ovarian cancer Pancreatic cancer	
Colon cancer Brain cancer	

## Heredity (5-10%)

### Autosomal recessive

Both copies mutated

Defective DNA repair  
resulting in genomic  
instability  
(chromosomal/DNA)



## Autosomal Dominant Cancer Syndromes

Gene(s)	Inherited Predisposition
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## Autosomal Recessive Syndromes of Defective DNA Repair

Xeroderma pigmentosum  
Ataxia-telangiectasia  
Bloom syndrome  
Fanconi anemia

## Familial Cancers of Uncertain Inheritance

Breast cancer (not linked to *BRCA1* or *BRCA2*)  
Ovarian cancer  
Pancreatic cancer

Colon cancer  
Brain cancer

## Heredity (5-10%)

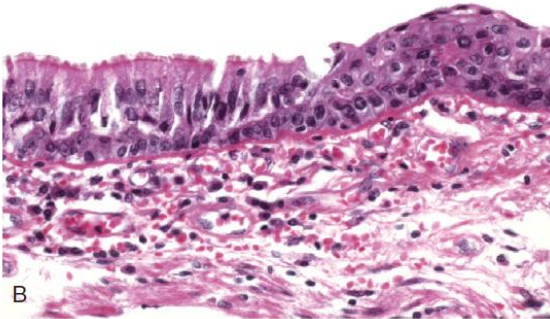
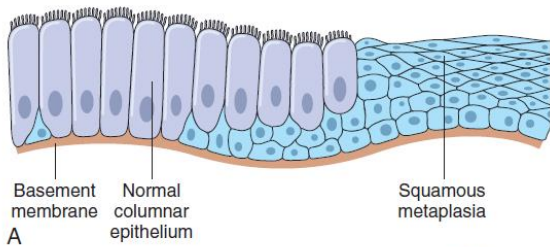
### Uncertain

Sporadic/familial

Familial:

- Early onset
- Multiple tumors
- Tumors in 2+ close relatives of index





+Dysplasia



## Acquired Preneoplastic Lesions

Does not mean inevitability, just increased likelihood

Common in chronic tissue injury or inflammation

Increased proliferation  
Exposure to inflammation byproducts



potential mutations