# PORTUGAL in focus

## Comparator Report on Cancer in Europe 2019 – Disease Burden, Costs and Access to Medicines

A Portugal-specific analysis and interpretation of the European report

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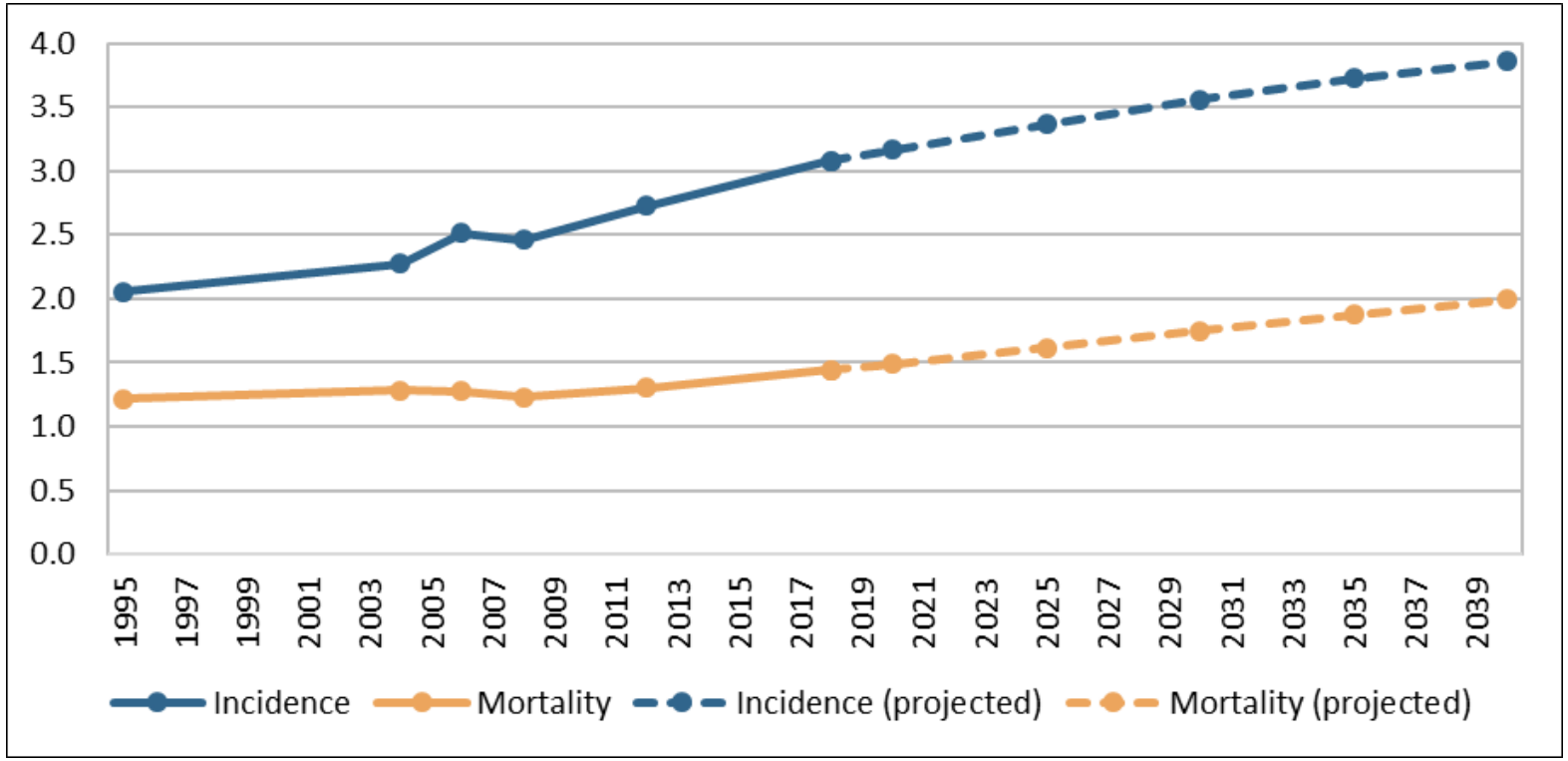
# Trends in cancer epidemiology in Europe are partly related to the demographic change




Cancer incidence and mortality (in million cases) in Europe, 1995–2018 and projection of status quo 2020–2040

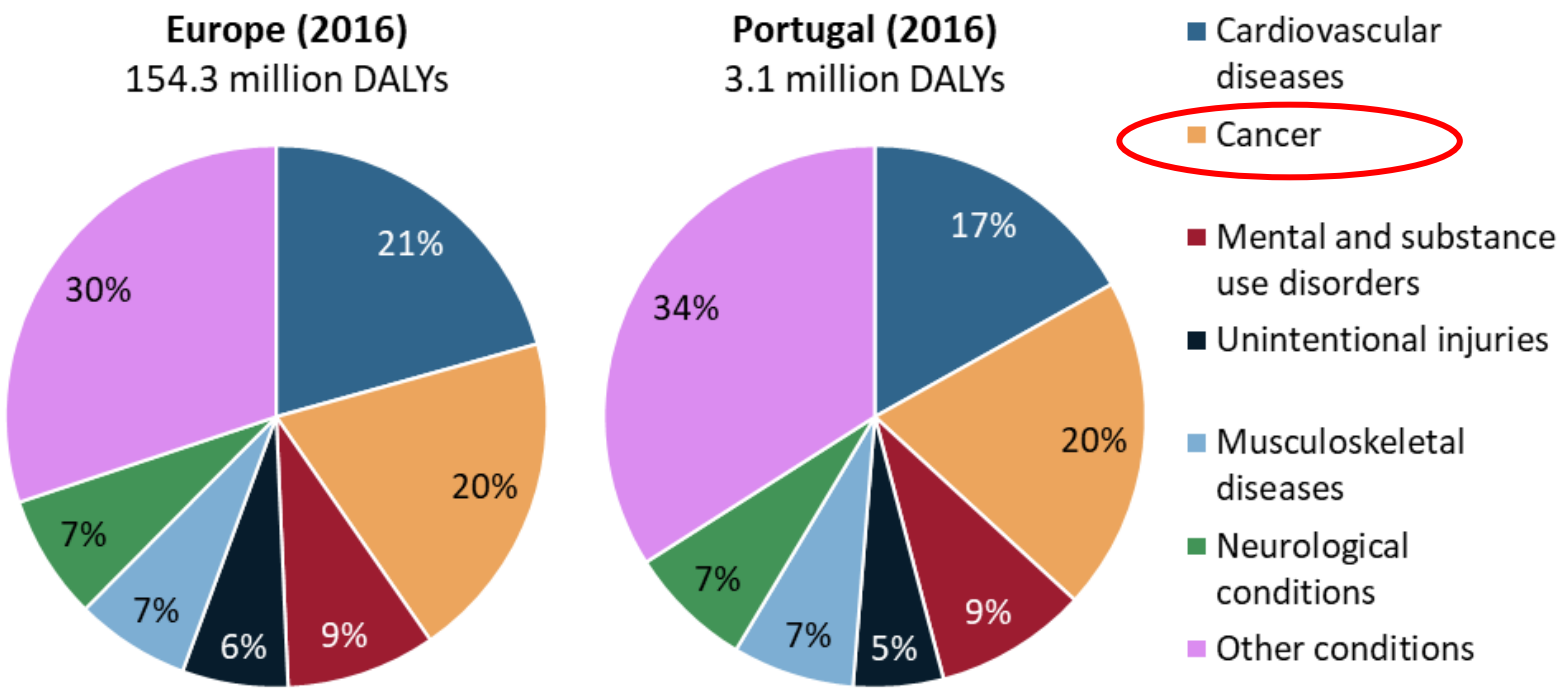
Notes: Europe includes the EU-28, IS, NO, and CH. Cancer is defined as ICD-10 C00-C97/C44.
Source: Boyle et al (2005), Bray et al (2002), Ferlay et al (2007+2010+2013+2018)

**50% increase in incidence** (from 2.1 to 3.1 million cases) 1995–2018
**20% increase in mortality** (from 1.2 to 1.4 million cases) 1995–2018

**Population aging** is a major determinant of trends in incidence and mortality

**Twofold strategy** is needed:
1) Reducing incidence → prevention, screening
2) Reducing mortality → screening, diagnosis, treatment

# Cancer is the no. 1 disease burden in Portugal




Disease burden of the largest disease groups in Europe & Portugal, 2016

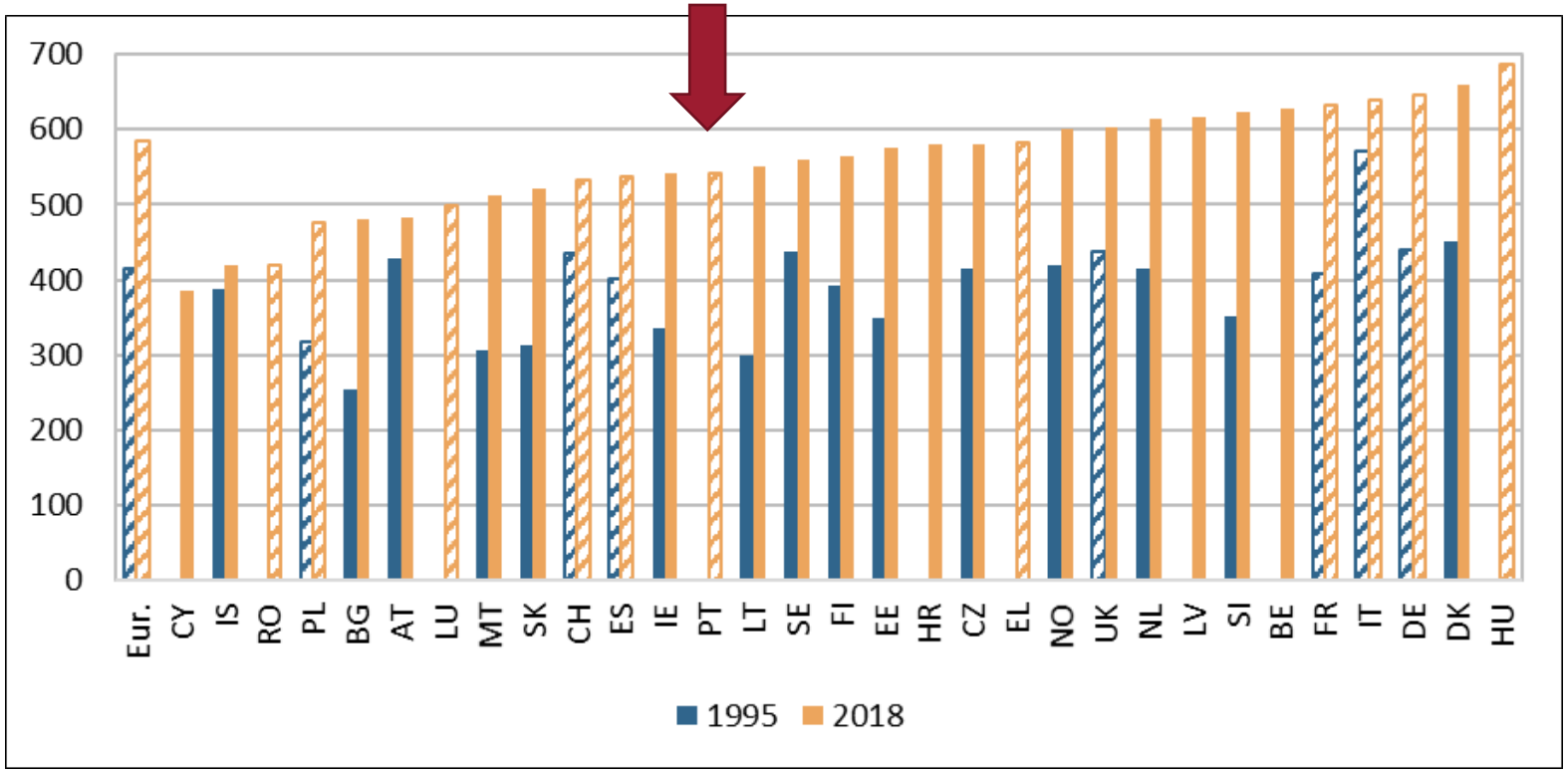
Source: WHO

In Portugal, cancer is the leading cause of DALYs

In Europe, cancer is the 2nd leading cause of DALYs behind cardiovascular diseases

DALYs (Disability Adjusted Life Years) comprise the effect of premature mortality and morbidity of a disease

# Cancer incidence has been increasing in all countries




Portuguese incidence slightly below European average in 2018

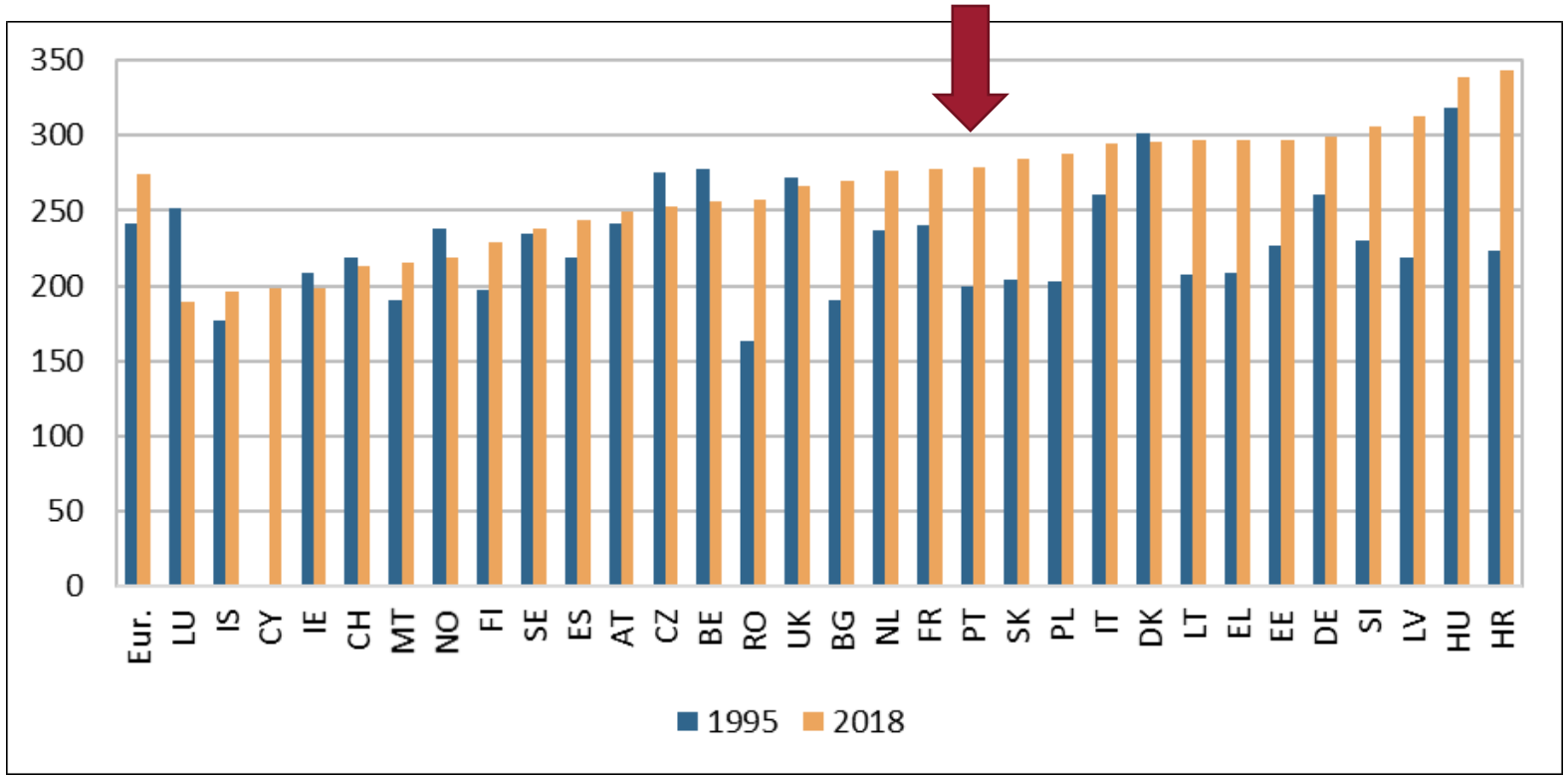
Factors driving the development over time:

- Population aging
- Risk factors (smoking, obesity, sunbathing, etc.)
- Screening
- Epidemiological development in other diseases (competing risks of death)

Estimated number of cancer incidence cases per 100,000 inhabitants (crude rates for both sexes), 1995–2018

Notes: Hatched bars indicate that national estimates are based on regional data or neighboring countries.
Source: ECIS, NORDCAN, Jönsson et al (2016)

# Cancer mortality has been increasing in most countries




Estimated number of cancer mortality cases per 100,000 inhabitants (crude rates for both sexes), 1995–2018

Source: IARC and ECIS

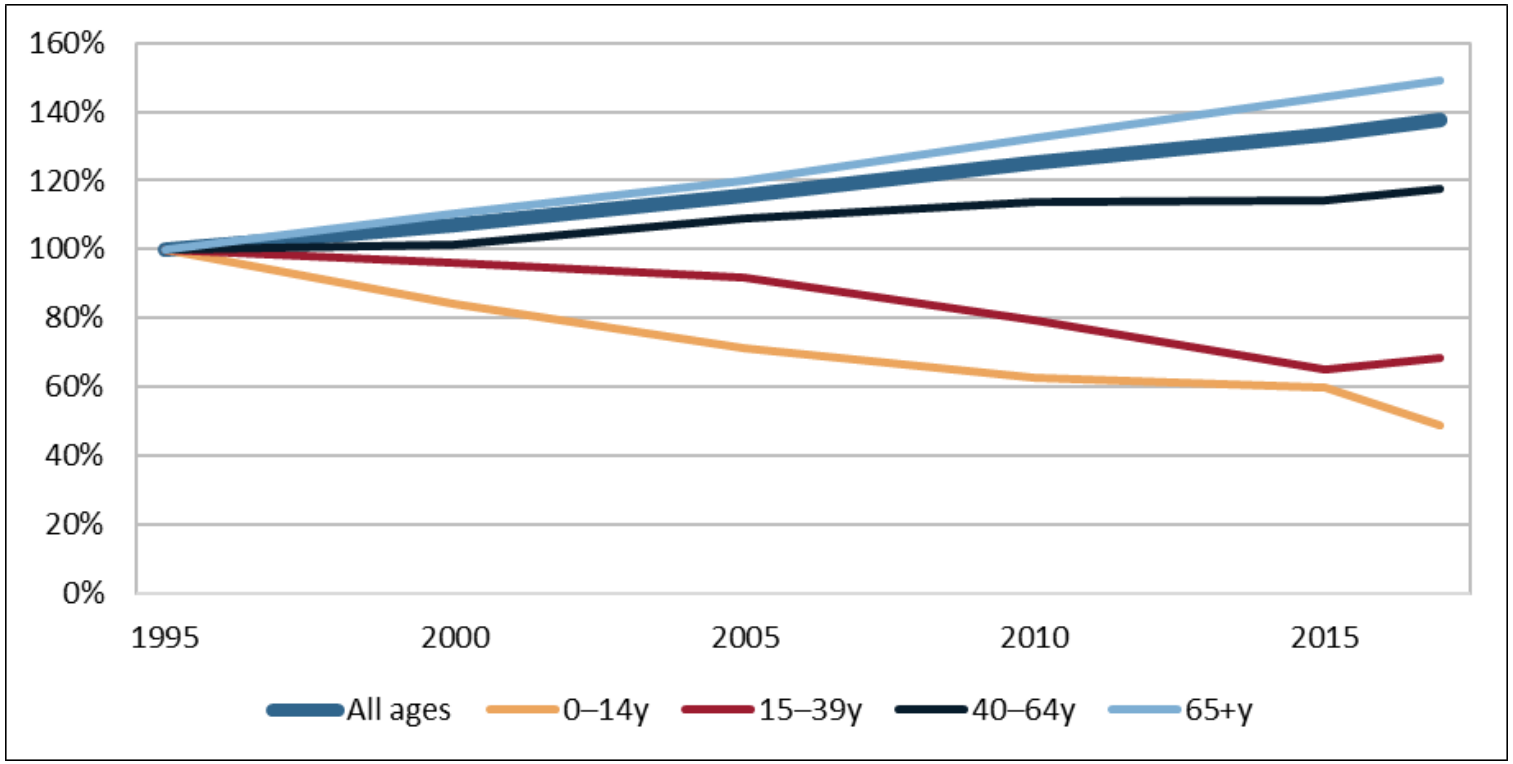
Large increase in Portugal

Portuguese mortality as high as European average

Factors driving the development over time:

- Incidence (and all its determinants listed above, incl. population aging)
- Screening (early stage detection)
- Treatment

# Cancer mortality by age group in Portugal reveals progress




Cancer mortality by age group (1995=base year) in Portugal, 1995–2017

Notes: Figures are based on total number of deaths (not per 100,000 inhabitants)
Source: IARC and Eurostat

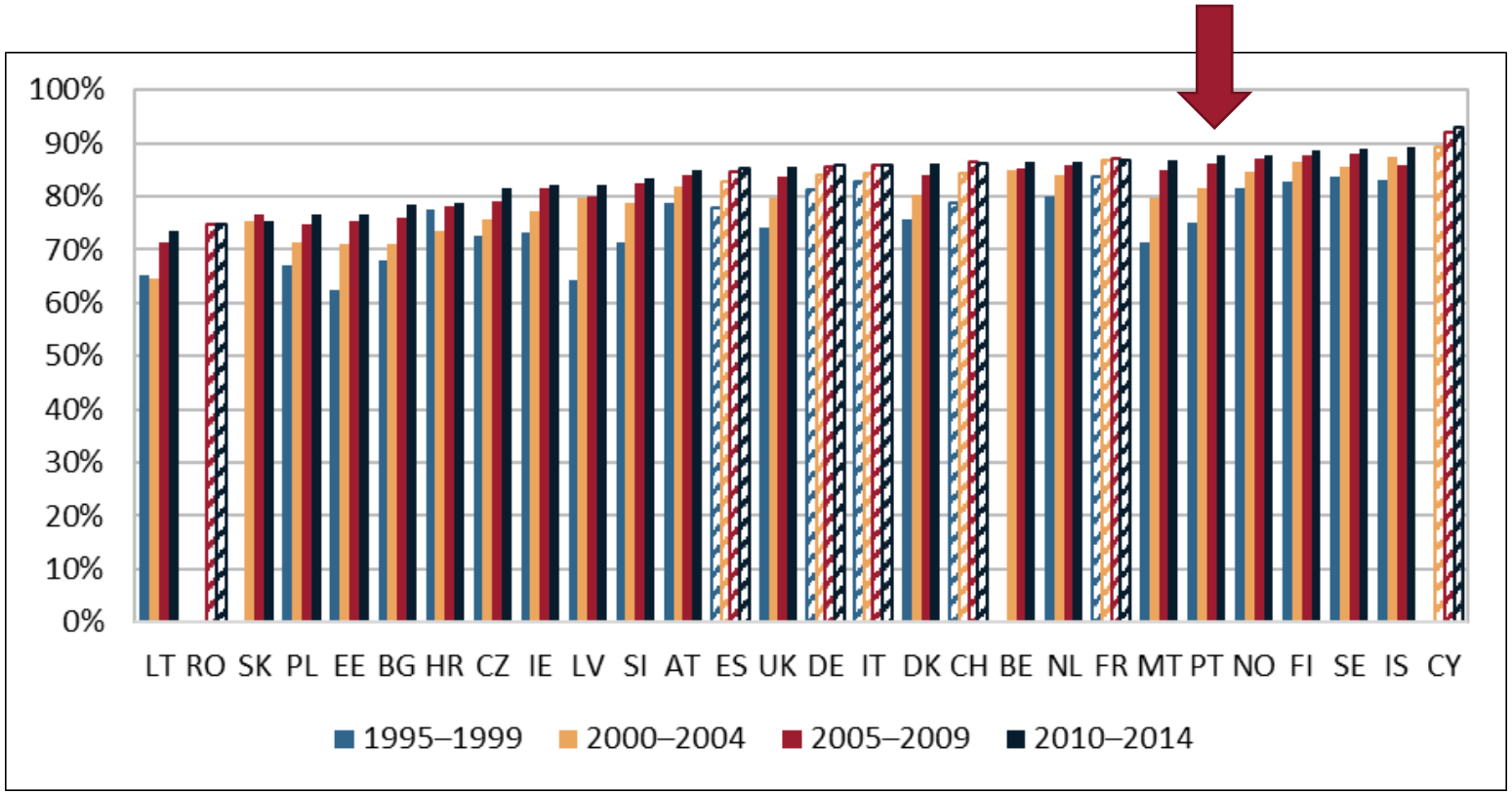
Deaths from cancer increased overall, but …

- Strong decrease in age groups below 40 years
- Modest increase in age group 40-64 years.

Concentration of deaths in the 65+ group might increase the need for social care.

This pattern is also observable in the rest of Europe.

# 5yr survival – breast cancer



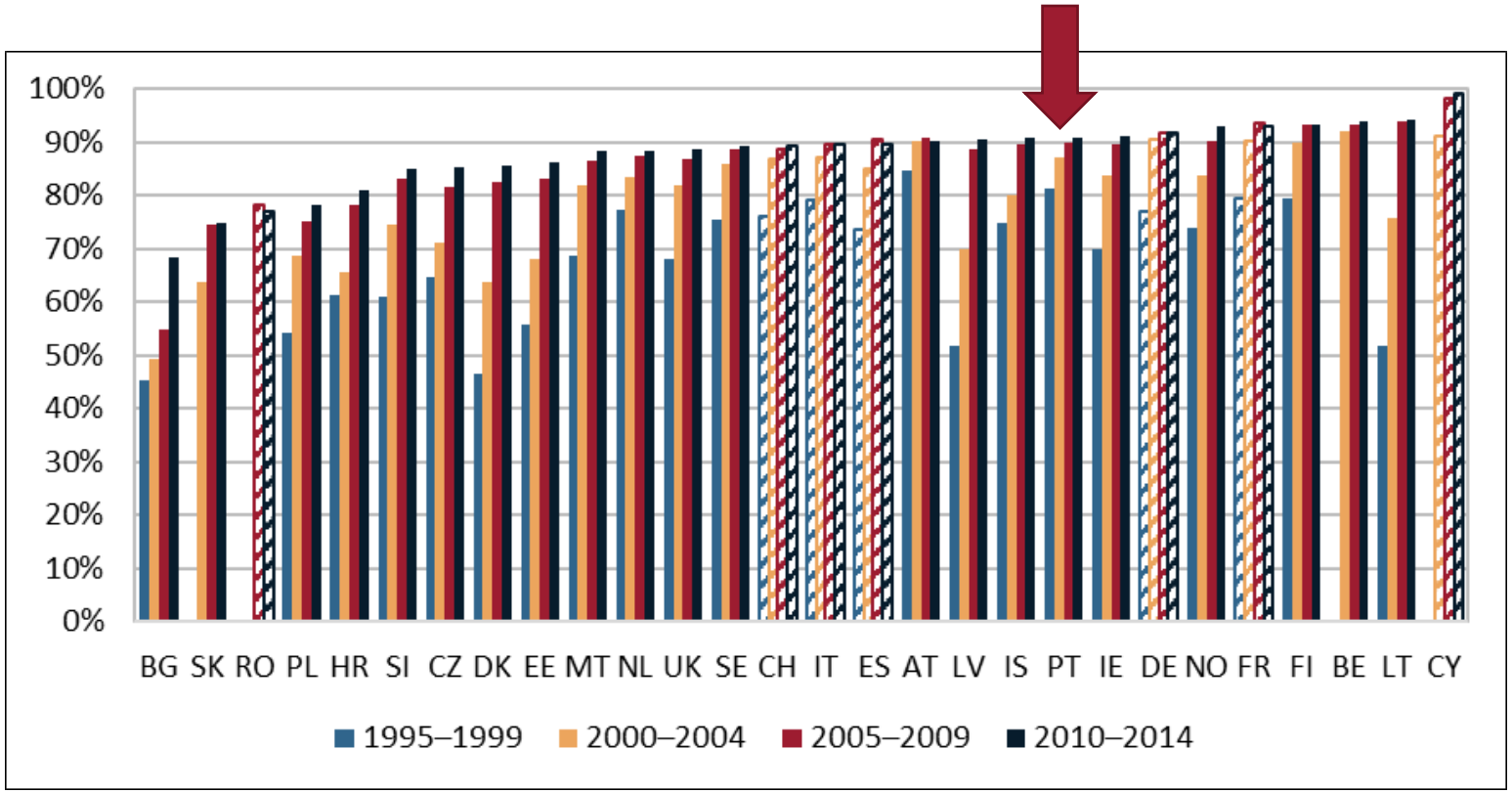

5-year age-standardized net survival rates for breast cancer in female adult patients (15–99 years), 1995–2014

Notes: Hatched bars in CH, DE, ES, FR, IT, and RO indicate that national estimates are based on regional data. Hatched bars in CY indicate less reliable estimates. Source: Allemani et al (2015+2018)

Portugal ranked 6th in 2010–2014

Many countries achieved comparatively similar survival (16 countries, incl. Portugal, in the range of 85% to 89%)

# 5yr survival – prostate cancer



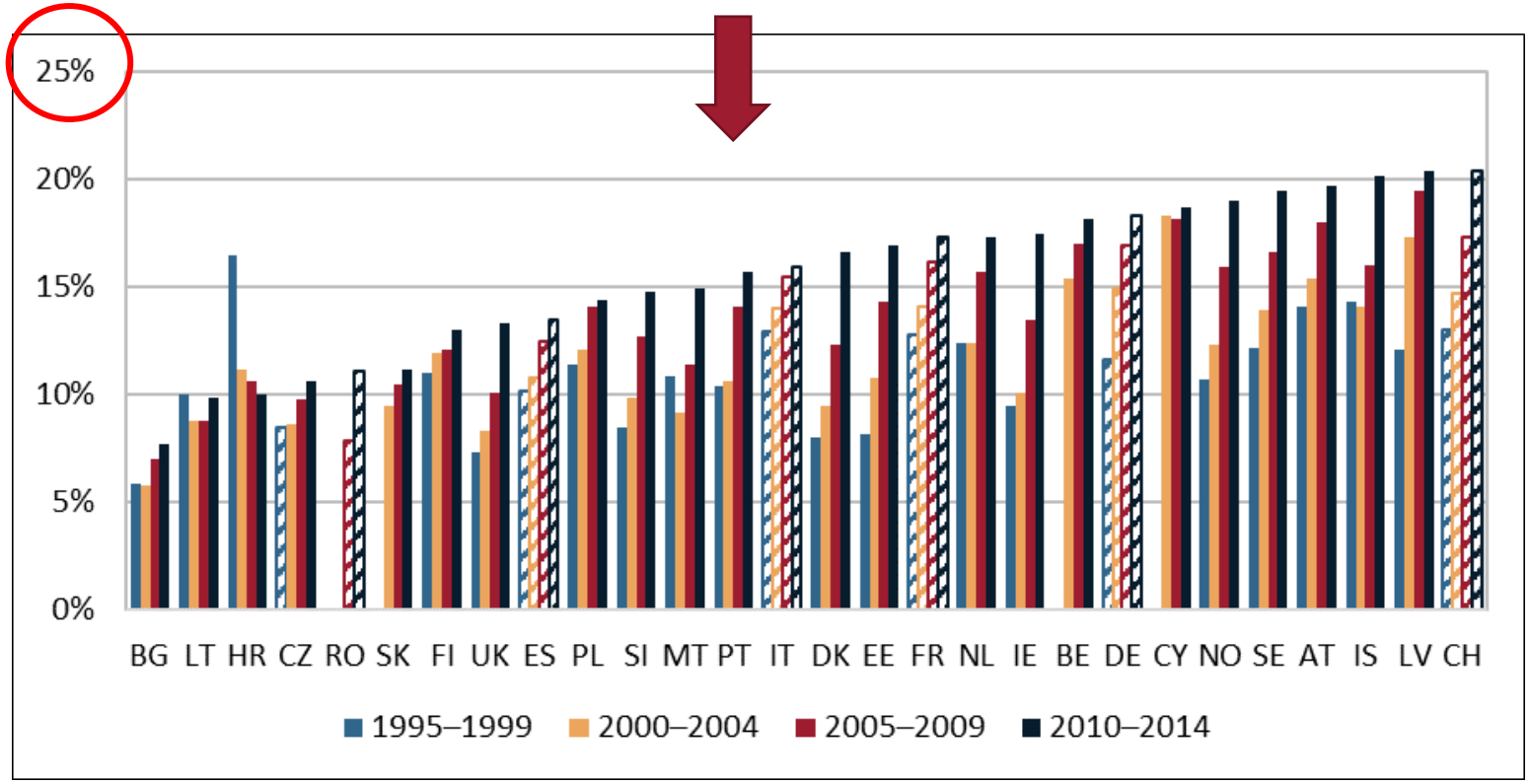

5-year age-standardized net survival rates for prostate cancer in male adult patients (15–99 years), 1995–2014

Notes: Hatched bars in CH, DE, ES, FR, IT, and RO indicate that national estimates are based on regional data. Hatched bars in CY indicate less reliable estimates. Source: Allemani et al (2015+2018)

Portugal ranked 9th in 2010–2014

Many countries achieved comparatively similar survival (18 countries, incl. Portugal, in the range of 88% to 94%)

# 5yr survival – lung cancer



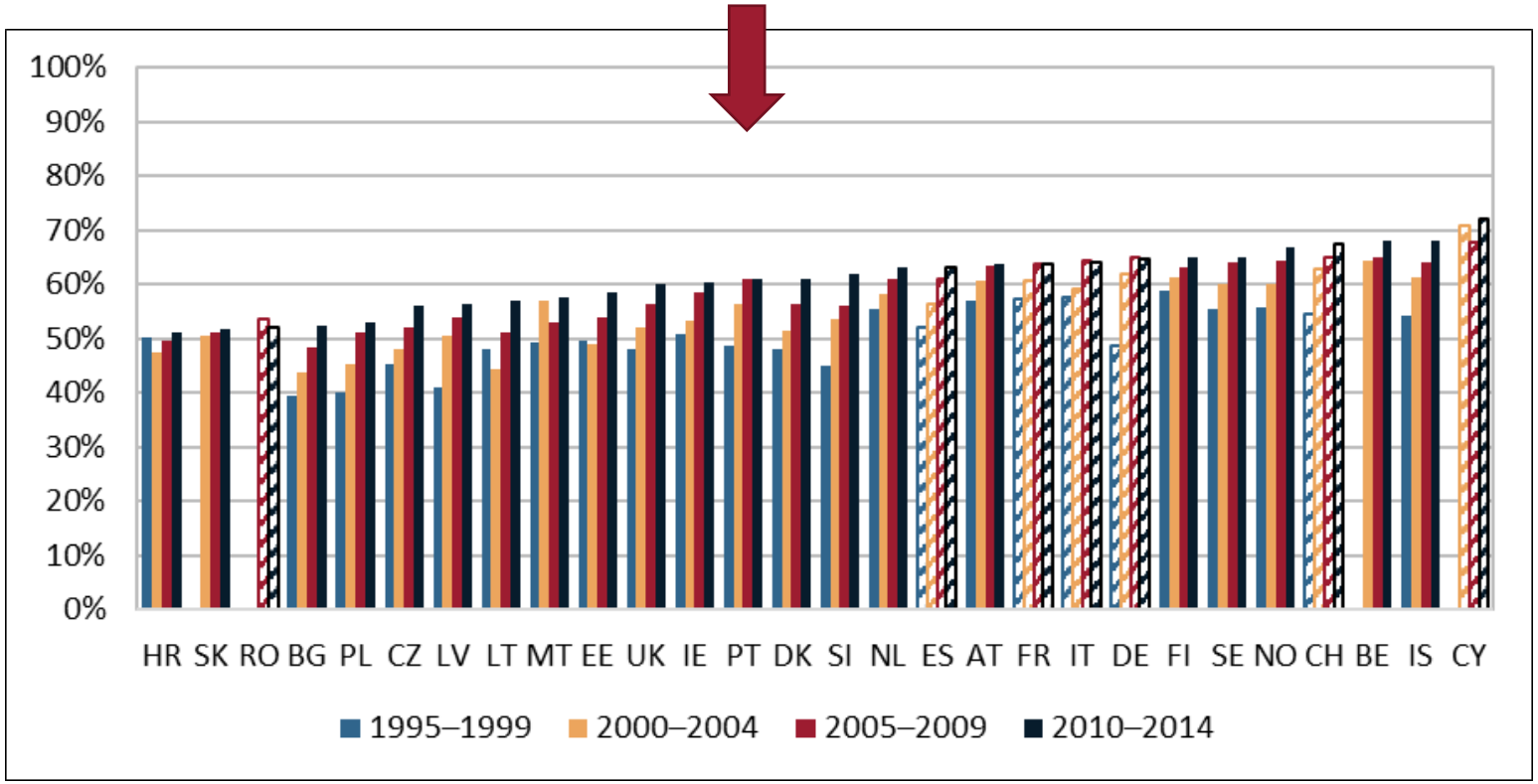

Portugal ranked 16th in 2010–2014

Very large country differences in survival

5-year age-standardized net survival rates for lung cancer in adult patients (15–99 years), 1995–2014

Notes: Hatched bars in CH, DE, ES, FR, IT, and RO indicate that national estimates are based on regional data.
Source: Allemani et al (2015+2018)

# 5yr survival – colon cancer




5-year age-standardized net survival rates for colon cancer in adult patients (15–99 years), 1995–2014

Notes: Hatched bars in CH, DE, ES, FR, IT, and RO indicate that national estimates are based on regional data. Hatched bars in CY indicate less reliable estimates. Source: Allemani et al (2015+2018)

Portugal ranked 16th in 2010–2014

Relatively large country differences in survival (compared to breast cancer)

# Explaining trends in incidence, mortality, survival

## INCIDENCE

- Population aging cannot be halted
- ≈40% of all cancer incidence cases might be preventable
- Focus on lifestyles:
  - Smoking
  - Obesity
  - Alcohol consumption
- Focus on vaccination/treatment:
  - HPV vaccination
  - Hep B vaccination
  - Hep C treatment
  - HIV treatment

## SURVIVAL

- Improvements in 5-year survival between 1995–1999 and 2010–2014 in all countries and cancer types
- Wealthier countries typically have the highest survival rates
- **Portugal** as good as European average for most cancer types
  - Example colon cancer: 400 more lives could be saved if Portugal was as good as Iceland
- Future increases in survival require:
  - Research and innovation
  - Patients access to innovations
  - Health care spending
- We lack data to assess whether quality of life also improves as survival increases

## MORTALITY

- Despite improvements in survival, cancer is the no. 1 cause of disease burden (DALYs) in **Portugal**
- Past advances in diagnostics and treatment are transforming cancer from an acute to a chronic disease
- Mortality trends seen in **Portugal** in young people are encouraging
- Screening (early-stage detection) is important
- Access to treatment is important

# Bringing benefits to patients

## Aims

- Timely and accurate diagnosis
- Timely access to treatment after diagnosis
- Access to novel treatment modalities (newest cancer medicines, etc.)

| Diagnostics | Treatment |
| --- | --- |

## Organization of care

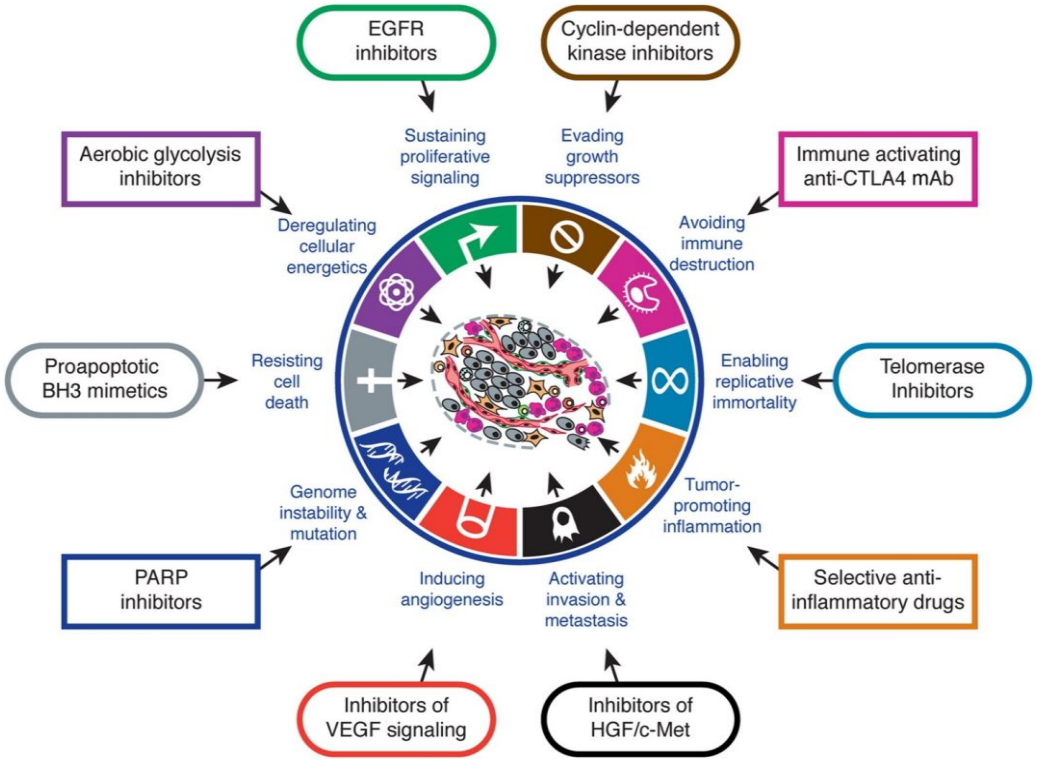
- Standardized care processes to ensure that all patients receive high-quality care
- Multi-disciplinary conference at critical decision points in the treatment process

# Advances in diagnostics

- More accurate diagnosis through (PET-)CT and (PET-)MRI scanners
  - High investment costs
  - Availability and access differs between and within countries
- Machine learning and artificial intelligence (AI) for imaging analysis in digital pathology
  - E.g. diagnosis of melanoma: similar or better performance than trained dermatologists
- Molecular prognostic/predictive testing (biomarkers)
  - Aim is to predict if a patient is likely to respond to a certain treatment → "**personalized therapies**"
  - E.g. examination of EGFR, ALK, BRAF, ROS1, PD-L1 status in lung cancer
  - Switch from single markers to broad panels (NGS panels)
  - Markers in blood, urine, saliva, and stool samples are being developed
  - Future complex landscape of different combinations of therapies will require extensive testing

# Cancer drug treatment in the last 30 years

- **Chemotherapy**
  - Cell toxic (affects all cells, not only cancer cells)
  - Often severe side effects
- **Targeted therapy (≈ end of 1990s)**
  - Agents that target cancer-specific mechanisms ("personalized medicine")
  - 2 types: Small molecules + (monoclonal) antibodies
  - Different toxicity profile and often decreased toxicity
  - Oral administration in some cases
  - Gene/protein expression analyses of tumors are likely to improve treatment accuracy in the near future
- **Immunotherapy (≈ beginning of 2010s)**
  - Activate the body's immune system to attack the tumor
  - Checkpoint inhibitor therapy
  - Cell-based therapy (CAR-T)




Different targets in modern cancer medicines

Source: Hanahan et al (2011)

# Medicines can go through a sequence of label extensions following initial approval

**Initial approval** (e.g. metastatic colorectal cancer)

→ **Cancer type** (e.g. breast cancer)

→ **Disease stage** (e.g. locally advanced)

→ **Treatment line/stage** (e.g. first line)

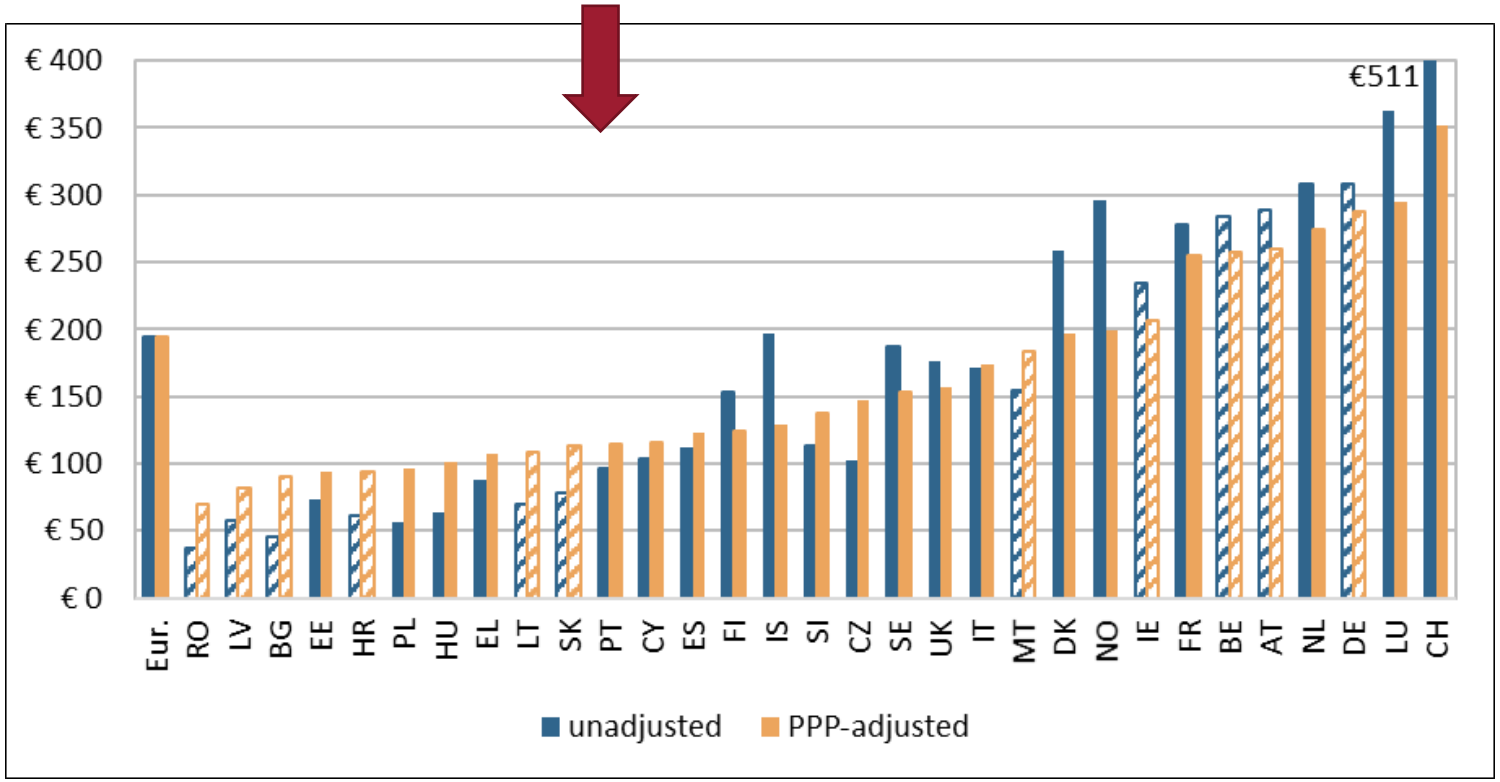
→ **Treatment regimen** (e.g. as monotherapy, initial approval being in combination with chemotherapy)

**Use in new route of administration**
(e.g. subcutaneous as additional option to intravenous)

**Patient sub-population**
(e.g. indicated for children or indicated only for patients with KRAS wild type tumours)

Source: The Expanding Value Footprint of Oncology Treatments (Office of Health Economics, 2014)

# Direct costs of cancer in 2018




Direct costs of cancer per capita (in €), 2018

Notes: Hatched bars indicate that the direct costs are estimated based on data from similar countries; see Appendix for methodology. The blue bar for CH is truncated - its true size is €511.

All countries spent between 4–7% of total health expenditure on cancer in 2018;
**Portugal spent ≈ 5%**

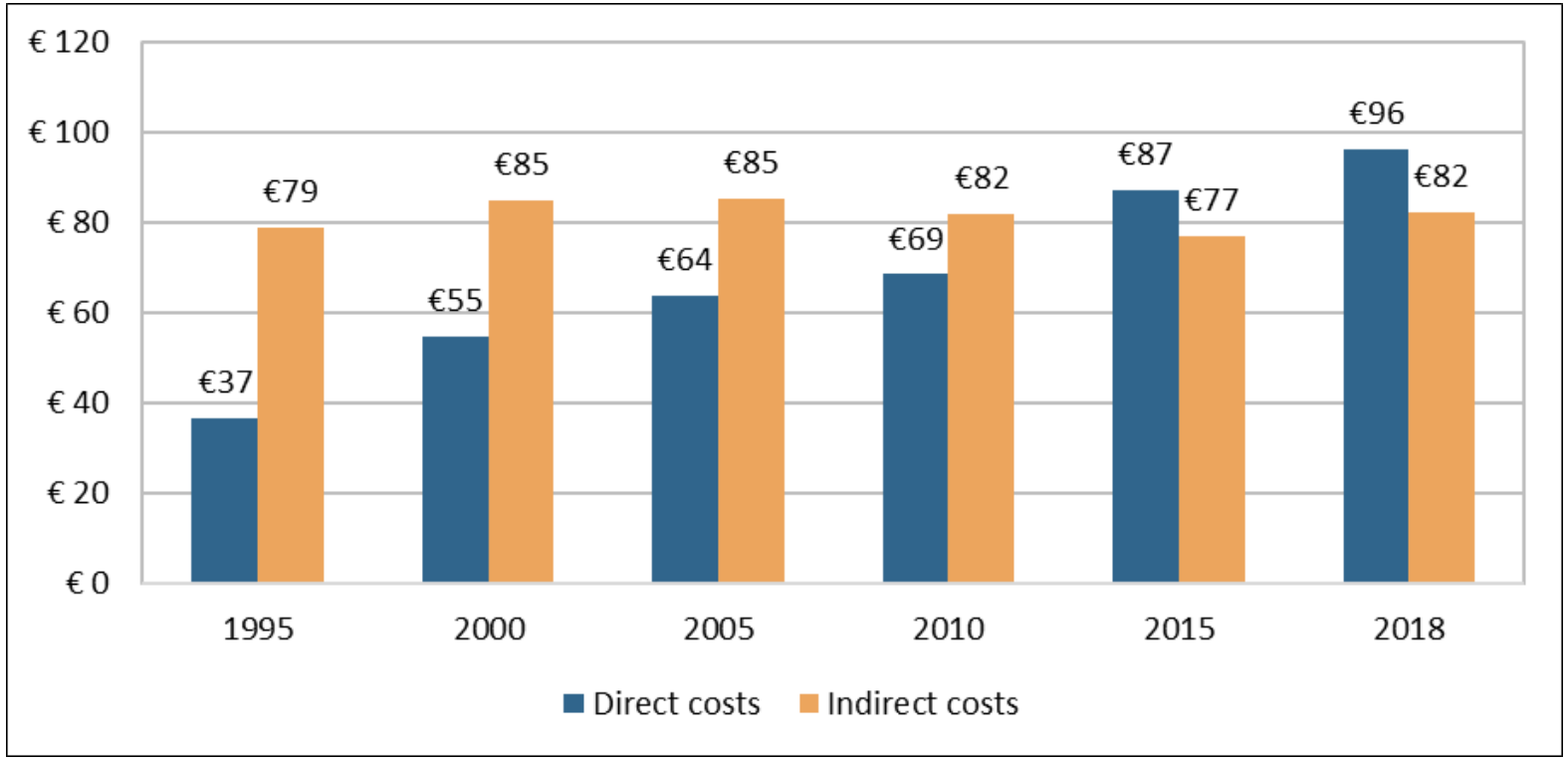
**Portugal spent ≈ €115 per capita** (PPP-adjusted), far below the European average (≈ €200)

General tendency:

- More spending → Higher survival
- **Portugal is comparatively efficient in spending, but low spending might hold back further improvements**

**Direct costs =** resources within the health care system (medical equipment, staff, medicines, etc.)

# Not investing in cancer is a big issue for the economy




Total costs of cancer per capita in Portugal (in €; 2018 prices & exchange rates, non-PPP-adjusted), 1995–2018

**Total costs per capita in Portugal increased** from €116 to €178 between 1995-2018

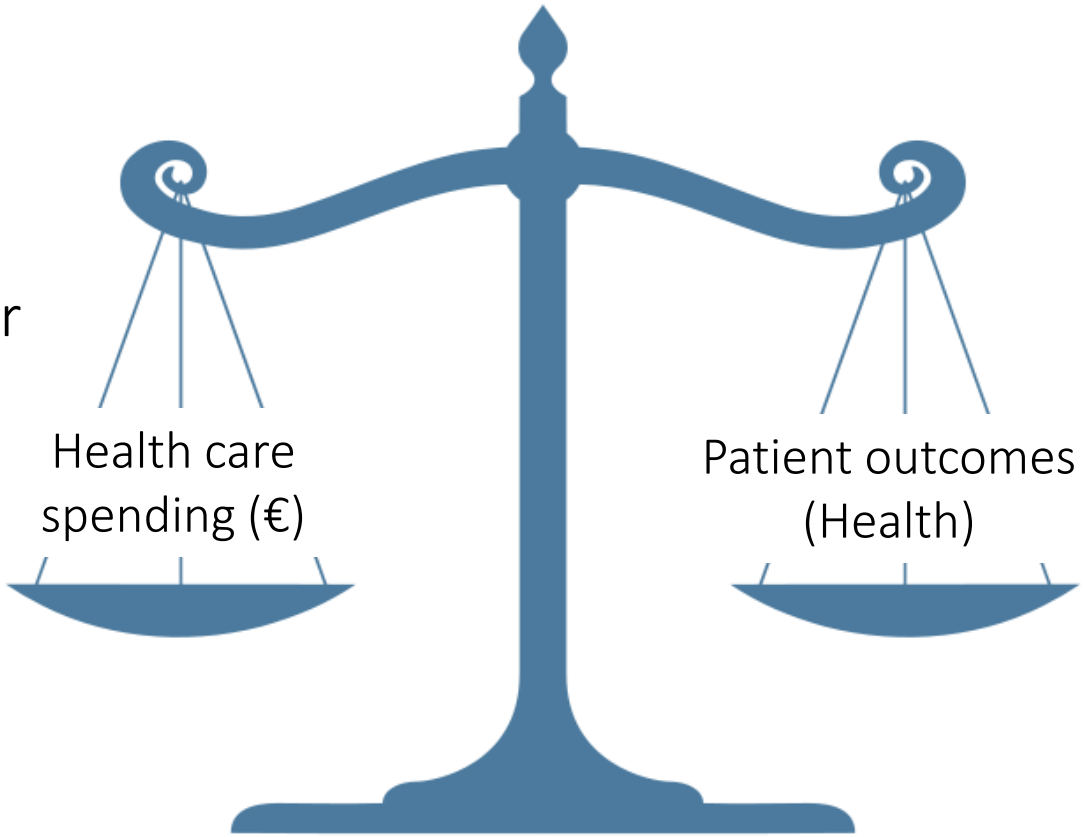
- Direct costs (+160%)
- Indirect costs (+4%)

In Europe, direct costs increased as well, but indirect costs decreased due to a reduction in mortality of working-age people (40-64 years) compared to Portugal

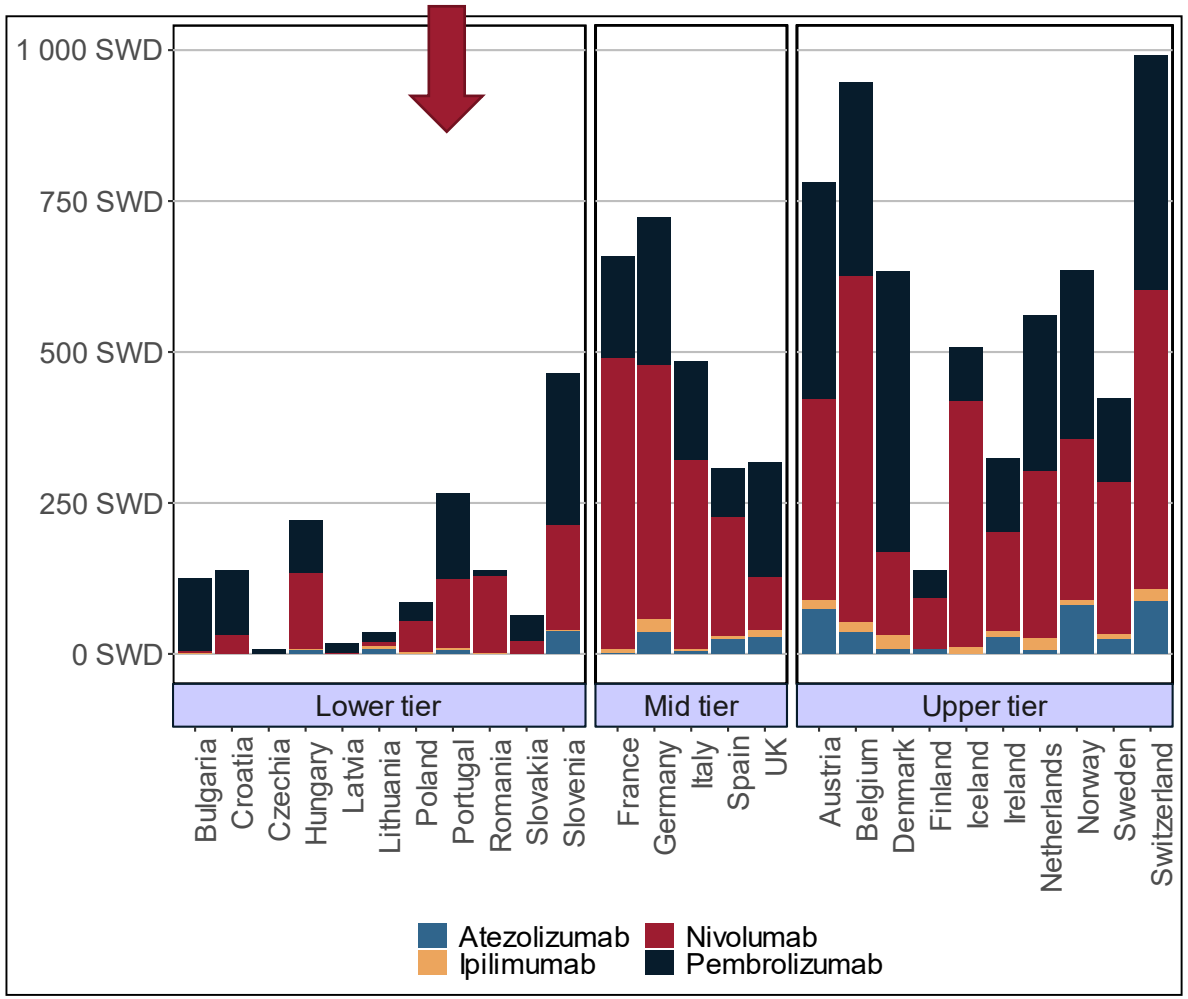
**Indirect costs =** productivity loss from (1) premature mortality in working age, and (2) morbidity (sickness absence and permanent incapacity/disability) of people of working age

# Efficiency of cancer care spending and patient outcomes

- Constrained resources and increasing demand for health care
- Costs from investing in different areas of cancer care need to be weighed against potential improvements in patient outcomes
- Use of scarce resources in a cost-effective and efficient way to ensure value-for-money for patients and taxpayers



# Patient access - immunotherapy medicines (volume)




Large differences in uptake even within country groups

Low uptake in Portugal

Uptake of immunotherapy medicines expressed as sales in SWD per 100,000 inhabitants, 2018

Notes: SWD = standard weekly dose
Source: IQVIA

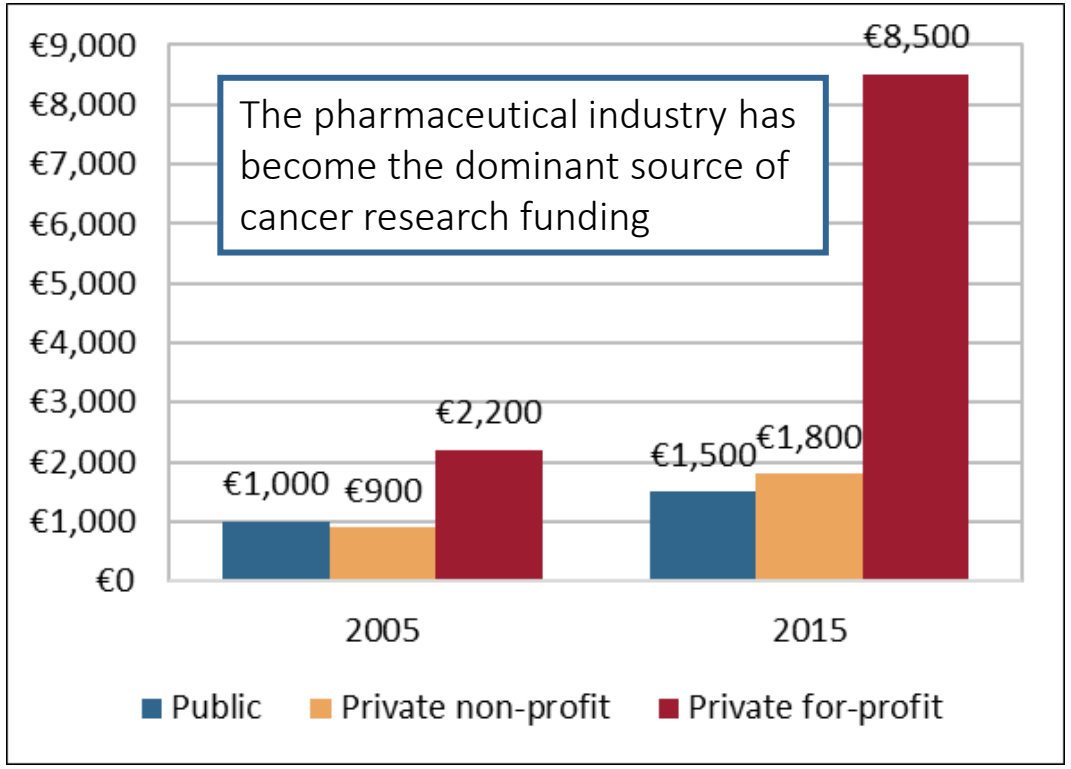
# Cost effectiveness of cancer medicines

- Access to cancer medicines is important for improving patient outcomes
  - Personalized treatment might support efficient spending
  - Increasing number of medicines, used in combination and sequence, creates more alternative uses of resources and makes it more difficult to evaluate cost-effectiveness

- Societal perspective in health economic evaluations is important
  - Cost changes outside the health care system (formal social care, productivity loss, informal care) should not be neglected

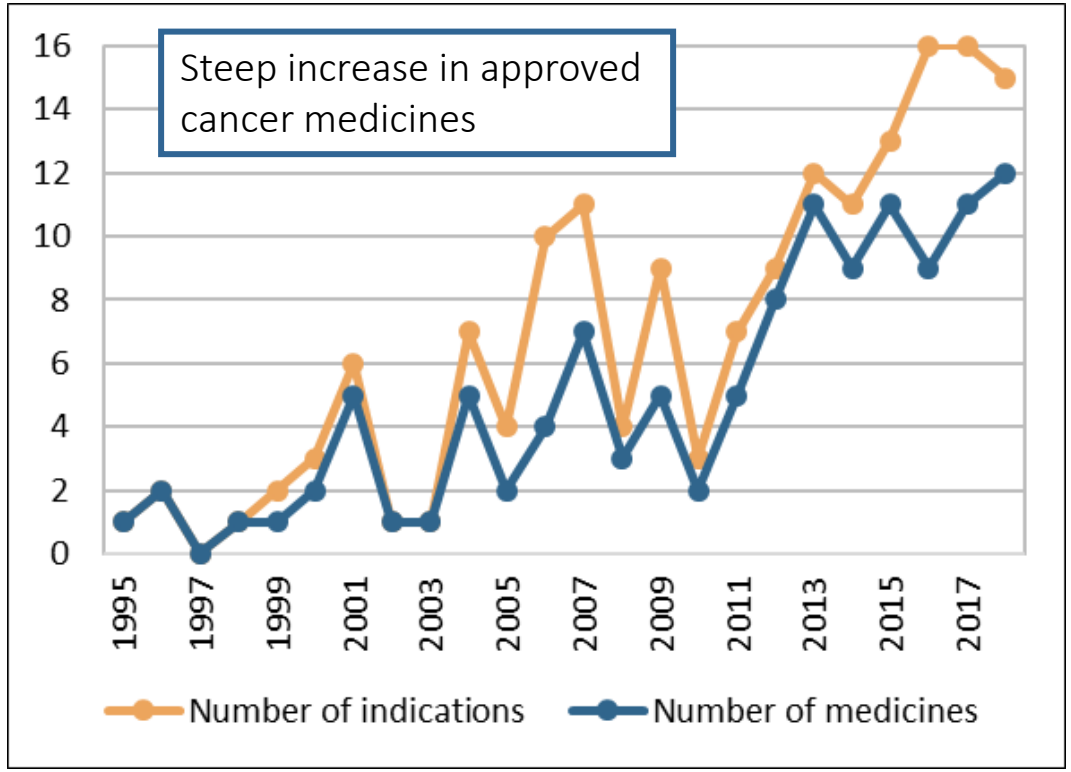
- Trade-off for new medicines between early access and evidence on value to patients
  - Many medicines lack evidence of additional clinical benefits (such as OS) at EMA approval, which creates a demand for:
    - (1) Follow-up studies of patient outcomes in clinical practice (collection of RWD)
    - (2) Mechanisms for adjusting pricing and payments based on such studies (shared risk between payers & producers)
    - → Could lead to a faster and more equal uptake of innovative medicines that provide most value to patients and health care systems

# Innovation happens at an accelerating pace




Funding of cancer research in the EU (in million €), 2005 & 2015

Notes: Private for-profit funding in 2015 was estimated to lie between €8.5-13.5 billion.
Source: Jönsson et al (2019)




Number of EMA-approved cancer medicines & indications, 1995–2018

Notes: Indications refer to label extensions to cancer types in addition to the initially approved cancer type
Source: EMA

# Translating research into value for patients

- Incentivize innovation of valuable medicines through outcome-based payment models
- Encourage payers to implement innovative and timely pricing and reimbursement approaches
- Novel approaches to pricing, valuation, and payment of are needed for:
  - CAR T-cell therapies
  - Combination treatments
  - Multi-indication treatments

# Tools for improving efficiency

- National Cancer Control Programme / Cancer Plans
  - Comprehensive (from prevention to palliative care)
  - Evidence-based measures
  - Financing plan
- Nationwide population-based cancer registries of high quality
  - Detailed level of diagnosis
  - All treatments given
- Disease-specific health accounts to monitor the costs
  - Ideally within the System of Health Accounts (SHA) framework

# The full report is available at: https://ihe.se/en/publicering/comparator-report-on-cancer-in-europe-2019/

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