Fardeau et évolution du cancer de la prostate dans le canton de Fribourg

Master Thesis Defense

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#Pop Health Lab

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Plan of the presentation

- **Background**
- Methods
- Results
  - Mean number of new cases and deaths
  - Standardised incidence and mortality
  - Age at diagnosis
  - TNM Stage at diagnosis
  - Method of detection
- Discussion
- Take-home messages

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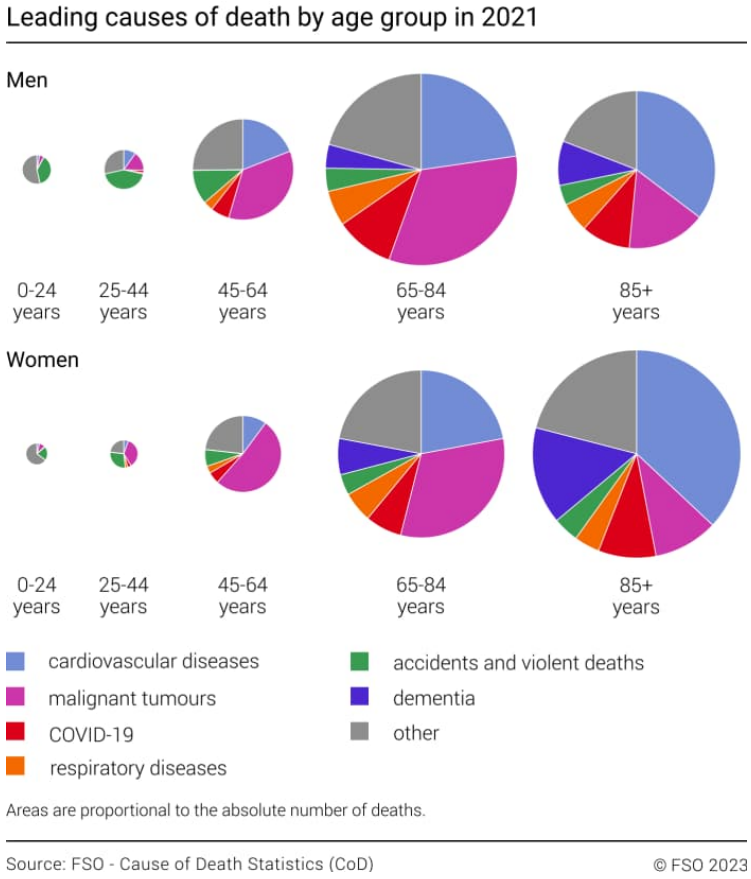
Cancer in Switzerland and worldwide

- Major public health issue
- **Worldwide** (2022)
  - Close to **20 millions** of **new cases**
  - Amongst the leading causes of mortality
    - **9.7 million deaths** from cancer
- **Switzerland** (2017-2021)
  - **46’000 new cases** each year
  - 2nd cause of mortality
    - **17’000 deaths** from cancer each year
    - 26% of deaths in men and 21% of deaths in women due to cancer (2021)



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Prostate cancer worldwide

- **2nd most frequent cancer** (men, 2022)
  - Behind lung cancer
  - **1.5 million new diagnoses**
- **5th cause of cancer mortality** (men, 2022)
  - Nearly **400'000 deaths**
- **Incidence rates** worldwide vary by a **factor ten**
  - Highest: Northern/Western Europe, Australia/New Zealand, North America, Caribbean
  - Lowest: several countries in Asia and North Africa
  - Inequalities in medical infrastructure, access to healthcare, screening practices, quality of cancer registries…
  - Europe: increase (1990s), then stabilization and decrease.
- **Mortality rates : favorable trends** since the 1990s in most countries

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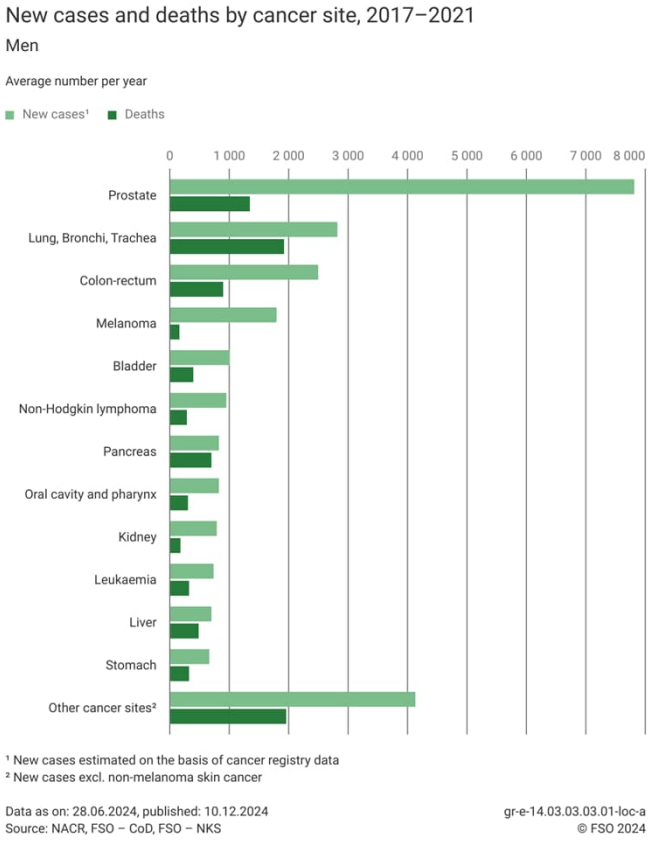
Prostate cancer in Switzerland

- **Most common cancer** (men)
  - Ahead of lung and colorectal cancers
  - **7800 new diagnoses** each year (2017–2021)
- **2nd** leading cause of **cancer-related death** (men)
  - Behind lung cancer
  - **1350 deaths** each year (2017-2021)
- **Incidence rate :**
  - Increase between 1988 and 2007, followed by a decrease
  - New increase since 2017
- **Mortality rate : decreasing** since 1992



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Risk factors and prevention of prostate cancer

- Non modifiable risk factors :
  - **Age** : increasing incidence from the age of **55**
  - **Family history** of prostate cancer
    - close relatives : father, brother
  - **Genetic** predisposition

→ **No well-established** possibilities for **primary prevention**

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Evolution mode of prostate cancer

- **Slow progression**
  - Dysplastic lesions can precede cancer by several years
  - Mostly detected as a localized disease
  - Early stages mostly asymptomatic
    - Possible urinary tract symptoms in advanced stages
- **Heterogeneous** disease process
  - **Asymptomatic** cancers
    - Detected at autopsy in 30–70% of men over 60 years old
  - **Metastatic** cancers leading to death
    - Most common localisations: lymph nodes, bones

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Screening of prostate cancer

- **Early detection** through measure of **PSA** (prostate specific antigen) level
  - **Good sensitivity, low specificity**
  - False positive : benign prostatic hyperplasia, intense exercise, recent ejaculation…
  - No distinction between indolent and aggressive cancers
- Risk of **overdiagnosis** and **overtreatment**
  - Slow progression and many subclinical cases → Detection of cancers that would not have caused symptoms and do not benefit of treatment
- Widely adopted in the **1990s → Increase** in **incidence rate**
- **Uncertain** reduction in **mortality**

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Aim of this thesis

- Analyze the **burden of prostate cancer** in the canton of **Fribourg**
  - Evolution of **incidence** and **mortality** from 2006 to 2021
- Redaction of a **“Brève”** summarizing the relevant elements
  - **Information** about the current situation of prostate cancer in the canton
  - For health care professionals and the general public

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Data sources

- **Registre Fribourgeois des tumeurs**
  - Prostate cancer, localisation C61 according to the International Classification of Diseases for Oncology (ICD-O)
  - 2006-2021
  - Residents of the canton Fribourg
- **Office fédéral de la statistique**
  - Mortality data
- Institut National pour l'Epidémiologie et l'Enregistrement du Cancer (**NICER**)
  - Comparison with Switzerland : standardized incidence and mortality rates

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Data

- **3741 new diagnoses** (Registre Fribourgeois des tumeurs)
- **588 deaths** due to prostate cancer (Office fédéral de la statistique)
- **Variables used** :
  - Year of diagnosis
  - Age
  - Detection mode
  - TNM stage
  - Year of death

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Data analysis

- **Retrospective** statistical analysis with **R Studio**
  - Annual mean number of new cases and deaths
  - Incidence rate
  - Mortality rate
  - Age standardization (European standard population of 1976)
  - Age and TNM stage at diagnosis
  - Method of detection
  - Evolution over time : 4-year intervals

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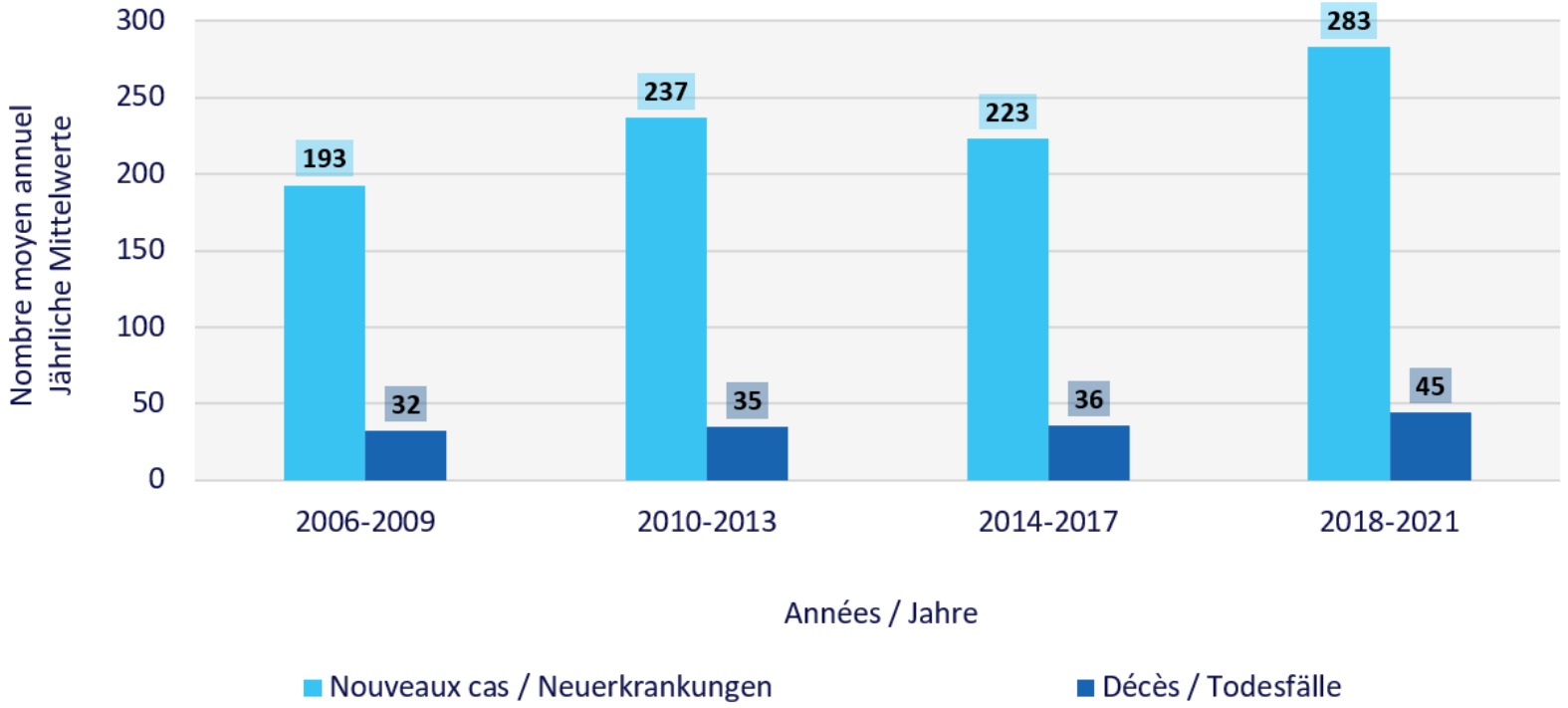
Mean annual number of cases and deaths

- **Increasing** since 2006



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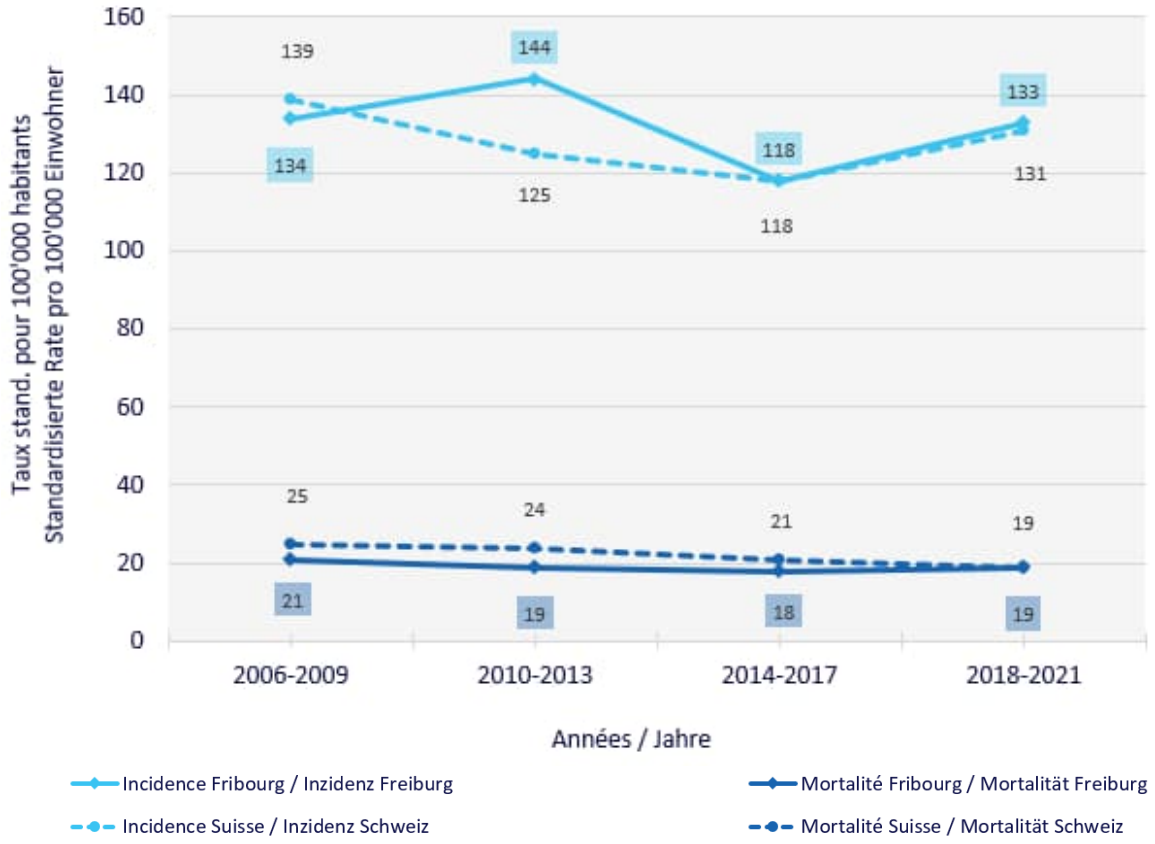
Standardised incidence and mortality

- Rapid **fluctuations** of standardized **incidence rate**
- **Decrease** of standardized **mortality rate**
- Similar trends between Fribourg and Switzerland



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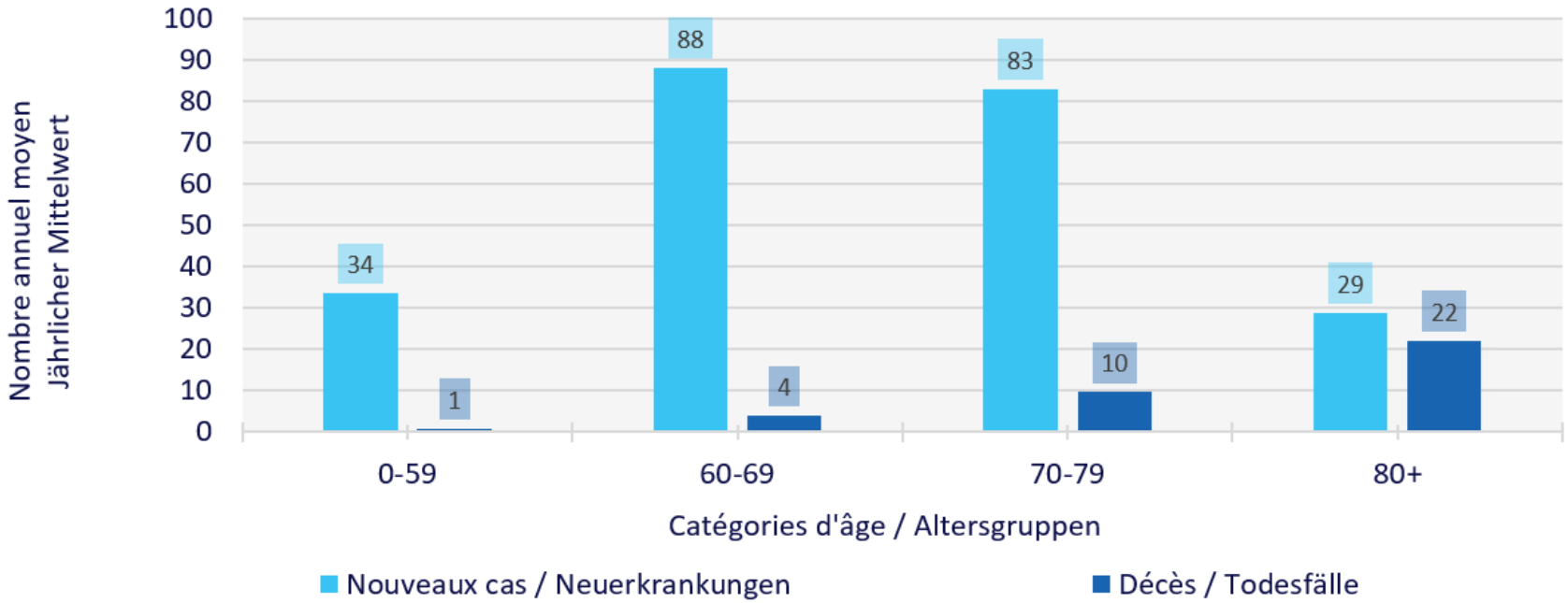
Age and prostate cancer

- **73%** of **new diagnoses** occured in men aged **60-80 years** *
- **60%** of **deaths** occured in men aged **80+ years** *



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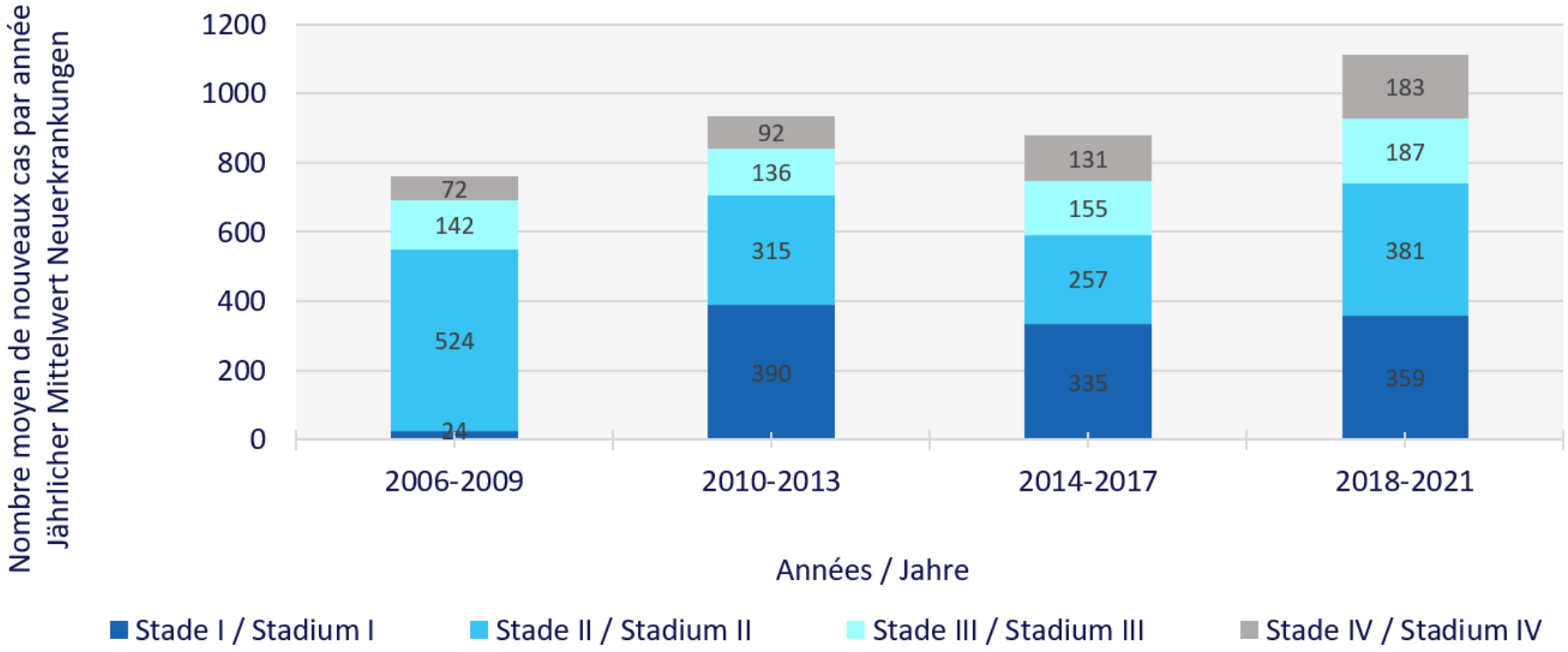
* 2006-2021

TNM stage at diagnosis

70 % of prostate cancer diagnosed in **stage I or II** *



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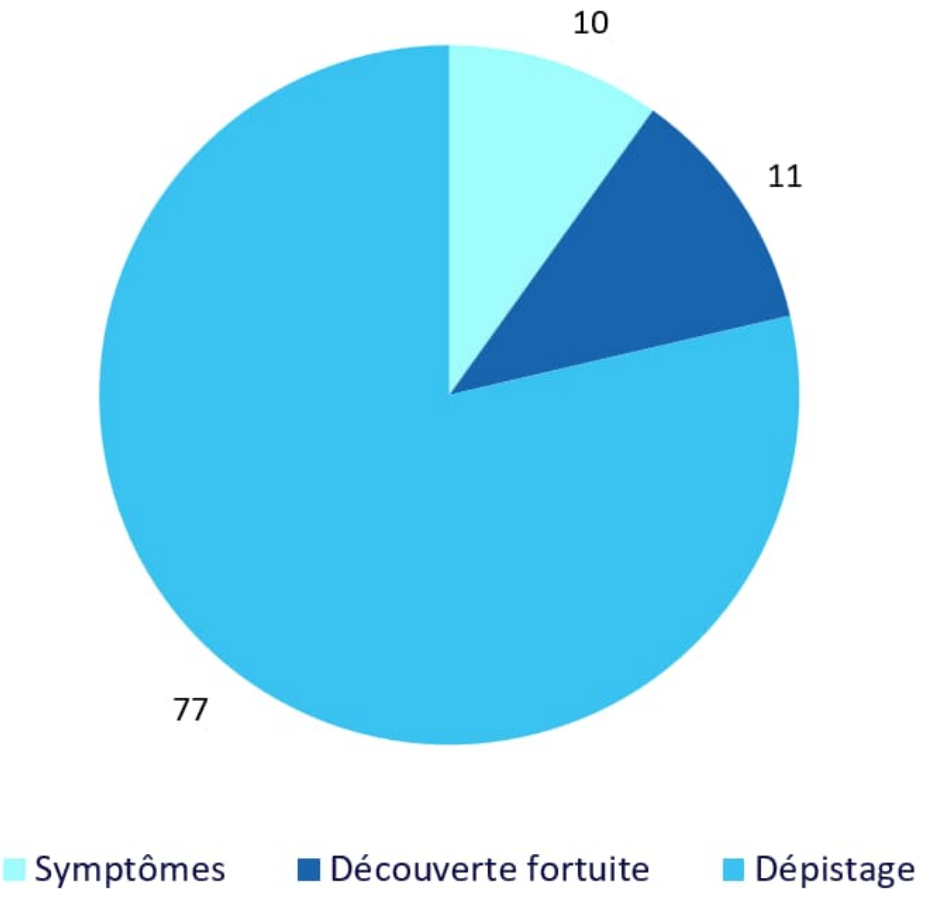
* 2006-2021

Detection mode

- **77%** of new cases detected by screening *
  - 11% incidental findings
  - 10% by symptoms



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* 2006-2021

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Prostate cancer trends, Fribourg, 2006-2021

- Average annual number of new cases : **increasing**
- Average annual number of deaths: **increasing**
- Standardized incidence rate : **rapid fluctuations**
  - Increase → decrease → increase
- Standardized mortality rate **: decreasing**

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Absolute numbers and demographic trends

- Prostate cancer mainly affects the elderly population
- Demographic shift : population **growth** and **ageing**
  → **Increasing number** of diagnoses and deaths due to prostate cancer
  → Growing burden on the healthcare system
- Projections to **2040 :** prostate cancer cases worldwide **doubled**
  → Number of cases and deaths are **likely to continue rising**
- Improved **early diagnosis algorithms** needed in the future
  - Facilitate early detection of clinically significant prostate cancers
  - Limit over-diagnosis and the unnecessary treatment
  - Integration of MRI, more specific biomarkers, genetic tests, artificial intelligence

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Incidence and screening practices

- PSA screening widely adopted in the **1990s**
  → **increase** of prostate cancer **incidence**
- **Absence of a clear consensus** on the benefits of screening
  → More nuanced recommendation → **Reduced use** of PSA measurement
  → **Decrease** in prostate cancer incidence
- **Swiss society of urology** (2012) : recommends a **cautious use**
  - Informed patients, 50-75 years, life expectancy > 10 years
  - From 45 years in case of family history or urinary symptoms

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Mortality and therapeutic improvement

- **Decreasing mortality rate in Fribourg and Switzerland**
  - Does not follow the fluctuations of incidence !
- **Therapeutic improvement**
  - Drugs
  - Radiotherapy technologies
  - Surgery technologies
- Possible impact of screening

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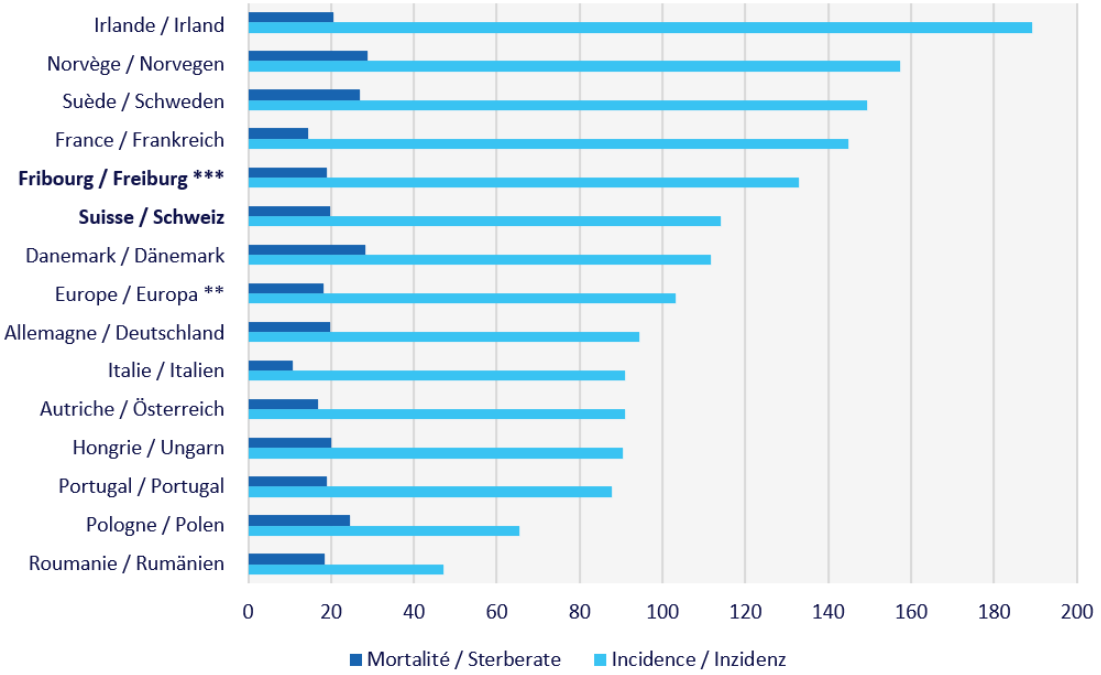
International comparison : incidence



- **Standardized incidence** (2018) :
  - Fribourg 133/100'000
  - CH 114/100'000
  - EU 103/100'000
- Variation by a **factor 5** within Europe
  - Highest in western and northern Europe
  - Lowest in central and eastern Europe
  - Variable screening practices :
    - socio-economic inequalities
    - Healthcare system structures (family doctors as «regulators»)

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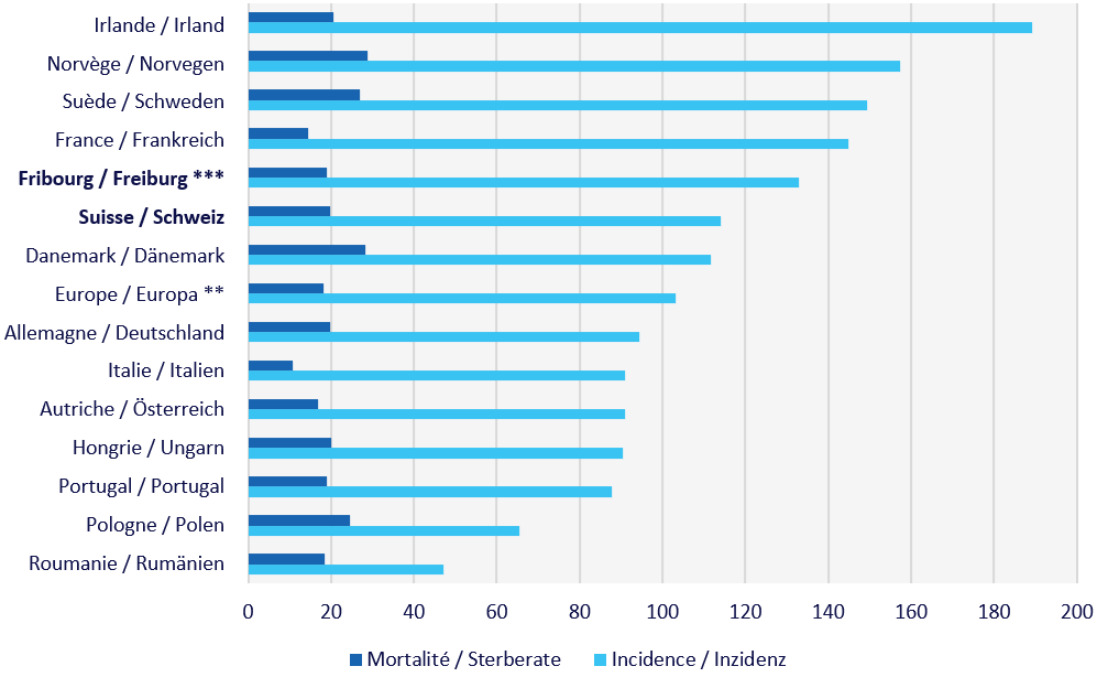
International comparison : mortality



- **Standardized mortality** (2018):
  - Fribourg 19/100’000
  - CH 20/100’000
  - EU 18/100’000
- Less variations

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Limitations

- No data prior to 2006
- Change in legislation during the analysis period
  - Loi sur l'enregistrement des maladies oncologiques
  - Obligation to declare since 2020 : influence on the number of cases recorded?

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Take-home messages

- **Prostate cancer trends (canton of Fribourg, 2006-2021)**
  - **Rising number of cases and deaths**
    - Trend expected to continue due to **demographic shifts**
    - Growing burden on the healthcare system
    - Need for improved early diagnosis algorithms
  - **Rapid fluctuations of the incidence rate** related to screening
  - **Decreasing mortality rate related** to therapeutic progress
- **No well-established primary prevention** of prostate cancer
- **Absence of clear consensus on screening**
  - Essential to inform patients of risks and benefits
  - Individual risk factors (family history) need to be taken into account

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Thank you for your attention.

Questions ?

Sources

- Pinsky Paul F., Parnes Howard. Screening for Prostate Cancer. N Engl J Med. 2023;388(15):1405-14.
- World Cancer Research Fund/American Institute for Cancer Research. Prostate cancer | What causes prostate cancer? [Internet]. [cité 30 juin 2024]. Disponible sur: https://www.wcrf.org/diet-activity-and-cancer/cancer-types/prostate-cancer/
- World Cancer Research Fund/American Institute for Cancer Research. Continuous Update
- Project Expert Report 2018: Diet, nutrition, physical activity and prostate cancer [Internet]. 2018 [cité 30 juin 2024]. Disponible sur: dietandcancerreport.org
- Chiolero A, Paccaud F, Aujesky D, Santschi V, Rodondi N. How to prevent overdiagnosis. Swiss Med Wkly. 2015;145:w14060.
- Wala J, Nguyen P, Pomerantz M. Early Treatment Intensification in Metastatic Hormone-Sensitive Prostate Cancer. J Clin Oncol. 2023;41(20):3584-90.
- Tikkinen KAO, Dahm P, Lytvyn L, Heen AF, Vernooij RWM, Siemieniuk RAC, et al. Prostate cancer screening with prostate-specific antigen (PSA) test: a clinical practice guideline. BMJ. 2018;362:k3581.
- James ND, Tannock I, N'Dow J, Feng F, Gillessen S, Ali SA, et al. The Lancet Commission on prostate cancer: planning for the surge in cases. The Lancet. 2024;403(10437):1683-722. Welch HG, Kramer BS, Black WC. Epidemiologic Signatures in Cancer. N Engl J Med. 2019;381(14):1378-86.
- Gasser T, Iselin C, Jichlinksi P, Kreienbühl B, Merz V, Recker F, et al. Dosage du PSA - Recommandations de la Société suisse d'Urologie. Forum Med Suisse. 2012;12(06).
- Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A Cancer Journal for Clinicians. 2024;74(3):229-63.
- Culp MB, Soerjomataram I, Efstathiou JA, Bray F, Jemal A. Recent Global Patterns in Prostate Cancer Incidence and Mortality Rates. Eur Urol. 2020;77(1):38-52.
- Office fédéral de la statistique. Indicateurs et types de cancer [Internet]. [cité 20 mars 2025]. Disponible sur: https://www.bfs.admin.ch/content/bfs/fr/home/statistiques/sante/etat-sante/maladies/cancer/indicateurs-types.html
- Ferlay J, Colombet M, Soerjomataram I, Dyba T, Randi G, Bettio M, et al. Cancer incidence and mortality patterns in Europe: Estimates for 40 countries and 25 major cancers in 2018. European Journal of Cancer. 2018;103:356-87.
- Office fédéral de la statistique. Indicateurs et types de cancer [Internet]. [cité 20 mars 2025]. Disponible sur: https://www.bfs.admin.ch/content/bfs/fr/home/statistiques/sante/etat-sante/maladies/cancer/indicateurs-types.html