

## Introduction

- Prostate cancer is the **most common cancer** and the **3<sup>rd</sup> leading cause of death by cancer** among Canadian men:
  - 1 in 8 Canadian men** will develop prostate cancer during their lifetime;
  - 27 900 Canadian men** are estimated to develop prostate cancer in 2024 (**22%** of all new cancer cases in men);
  - 5 000 deaths** by prostate cancer in 2024 in Canada (**11%** of all cancer deaths in men)<sup>1</sup>.
- In the last 12 years, treatment costs are **increasing** for prostate cancer due to the adoption of **novel therapies** like abiraterone or enzalutamide and the early prescription of these novel therapies.
  - In 2014, treatment of advanced prostate cancer costed \$416,3 millions in Canada<sup>2</sup>.
- Advanced prostate cancer is cancer that got out of the prostate and has spread to other parts of the body (metastasis)<sup>3</sup>.
- There is a need for **Canadian** economic evaluations to ensure an **efficient treatment** of prostate cancer in Canada.

## Objectives

- Characterize **Canadian costs** of prostate cancer management
- Characterize **Canadian costs** of prostate cancer management by **cancer stages** and **lines of treatment**
- Characterize resource utilization of prostate cancer management

## Methods

### Systematic literature review

**Research question:** What are the Canadian costs of prostate cancer diagnosis and treatment?

**Databases:** Embase, MEDLINE, Web of Science and CINAHL

**Search strategy concepts:** Prostate cancer, costs and Canada

**Research filters:** *Economic Evaluations & Models* of the Canadian Drug's Agency (CDA) for the costs concept

### Inclusion criteria:

- Economic analysis, cost analysis, cost-of-illness studies, cross-sectional studies, cohort studies, case-control studies, clinical trials and health technology assessments
- Direct and indirect Canadian costs
- Prostate cancer treatment, diagnosis and treatment's adverse events

### Exclusion criteria:

- Literature reviews, conference abstracts and posters
- Full-text unavailable
- Costs uniquely not Canadian
- Studies published before 2012 or in another language than French or English

**Study selection:** Two independent reviewers (FM and MB) using Covidence

**Data-collection process:** Two independent reviewers (FM and MB) using an extraction form developed for our study objectives

**Risk-of-bias assessment:** Two independent reviewers (FM and MB) using the Consensus on Health Economic Criteria (CHEC) extended checklist

Cancer de la prostate	1	exp Prostatic Neoplasms/	153396
	2	(prostat* adj (cancer or neoplasm* or tumor*)).tw,kf.	158539
	3	1 or 2	194621

Figure 1: Example of a concept from the search strategy

## Results

Table 1. Characteristics of retained studies concerning advanced prostate cancer

Reference	Study design	Year of study	Cancer stage	Data sources	Province	Year of costing
Beca et al., 2019 <sup>4</sup>	Economic evaluation	NR	mHSPC	Administrative data	Ontario	2017
Zhang et al., 2023 <sup>5</sup>	Retrospective cohort	2010 - 2019	Advanced (T3, T4)	Administrative data	Ontario	2021
Truong et al., 2019 <sup>6</sup>	Cost analysis	2011 - 2018	mCRPC	Administrative data	NR	NR
Sanyal et al., 2016 <sup>7</sup>	Cost analysis	NR	mCRPC	Published sources, Administrative data	NR	2014
Dragomir et al., 2014 <sup>2</sup>	Cost analysis	NR	mCRPC	Administrative data, RCT	Québec	2013
Saad et al., 2022 <sup>8</sup>	Economic evaluation	NR	mHSPC	Administrative data, RCT	Ontario	2019
Parmar et al., 2022 <sup>9</sup>	Economic evaluation	NR	mHSPC	Administrative data, RCT	NR	2020
Organ et al., 2013 <sup>10</sup>	RCT	2004 - 2006	CRPC	Administrative data, RCT	Nova Scotia	2009
Mittman et al., 2020 <sup>11</sup>	Retrospective cohort	2010 - 2015	Stage III/IV	Administrative data	Ontario	NR

NR: not reported; RCT: randomized control trial; mHSPC: metastatic hormone-sensitive prostate cancer; mCRPC: metastatic castration-resistant prostate cancer; CRPC: castration-resistant prostate cancer

Table 2. Standardized direct costs (2024 CAD) by treatment for advanced prostate cancer

References	Time period	RP	RT	ADT	Abi	Enza	Other
Beca et al., 2019	15 years			\$138,453			ADT + Doce: \$169,618
Zhang et al., 2023	1 year	≥ 65 years: \$24,368 < 65 years: \$23,469	≥ 65 years: \$34,301 < 65 years: \$32,551				
Truong et al., 2019	28 days				\$3,790	\$3,792	
Sanyal et al., 2016	1 year	\$11,275					RT + ADT: \$23,120 RT + ADT + BT: \$24,780
Dragomir et al., 2014	1 year			\$10,156	\$55,237		Doce: \$15,732
Saad et al., 2022	15 years			\$191,896		\$412,414	Apa: \$347,489
Parmar et al., 2022	20 years			\$42,585			ADT + Apa: \$297,579
Organ et al., 2013	2 years			Inter: \$4,206 Cont: \$11,073			
Mittman et al., 2020	1 year		Stage III: \$20,680 Stage IV: \$11,948				

RP: radical prostatectomy; RT: radiation therapy; ADT: androgen deprivation therapy; Abi: abiraterone; Enza: enzalutamide; Doce: docetaxel; Apa: apalutamide; BT: brachytherapy; Inter: intermittent; Cont: continuous

Figure 2: PRISMA flow diagram

- Of the 30 references included in the review, 12 addressed advanced prostate cancer
- 3 of these references are not reported in this analysis:
  - 1 focused on health states costs (Krahn,2013)
  - 1 focused on adverse events costs (Saad, 2018)
  - 1 focused on labor costs (Xie, 2014)
- 9 references on advanced prostate cancer treatment costs** are reported in this analysis (Table 1)
- Administrative data** are used in all 9 references included in this analysis
- The most common treatment reported is **androgen deprivation therapy (ADT)** with 5 references reporting ADT costs for advanced prostate cancer treatment

## Discussion

Last systematic review of prostate cancer treatment costs in Canada published in **2013** by Sanyal et al.<sup>5</sup>

- Costs information only for radical prostatectomy, radiation therapy, brachytherapy and androgen deprivation therapy
- Reports costs from **other countries** than Canada which are less accurate to represent the Canadian setting

### Our review's strengths:

- Captures the **novel therapies** developed and adopted **through the last 12 years** like abiraterone and enzalutamide
- Reports costs from **solely Canadian settings** which are the most accurate to represent the Canadian health system
- Follows a methodology in accordance with PRISMA guidelines and PROSPERO standards

### Limitations:

- Canadian literature** on prostate cancer treatment costs is relatively **sparse** and concentrated in Ontario
- Literature's heterogeneity** complexifies results comparison between the included studies and risk-of-bias assessment

### Research perspectives:

- New **Canadian economic evaluations** of prostate cancer treatment to **improve its efficiency**
- New **cost analysis** to improve our understanding of the economic burden of prostate cancer treatment in Canada

## References

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