

# Expanding Global Radiotherapy Access by Adopting Hypofractionated Radiotherapy and Combination Immunotherapy for Breast and Prostate Cancer

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## INTRODUCTION

Previous studies demonstrate non-inferior clinical outcomes using hypofractionation (HF) EBRT for breast and prostate cancer cases. In a recently published Journal of Global Oncology Review, we estimated the cost savings and radiotherapy (RT) access increase in African Low-and-Middle-Income Countries (LMICs) if RT clinics in those regions were to adopt curative hypofractionated RT (HFRT) as standard breast and prostate cancer treatment. Here we also explore the use of single fraction RT (SFRT) in combination with immunotherapy as a developing new approach. We hope to encourage the adoption of HFRT in LMICs to address the significant disparity of healthcare resources in those regions.

## AIM

Determine the overall national cost savings and RT access increases if clinics were to adopt HFRT or combination SFRT immunotherapy.

## METHOD

- ❖ Conventional, HF, and SF RT schedule costs for breast and prostate in African LMICs were calculated by the International Atomic Energy Agency (IAEA) Radiotherapy Cost Estimator tool. (Figures 1 & 2)
- ❖ The activity-based-costing model was based on a single linear accelerator facility at full operation.
- ❖ The maximum potential cost-savings in each country over 7 years for breast and prostate RT were estimated using the Global Cancer Observatory incidence projection estimations under appropriate utilization rates. (Table 1)
- ❖ The increase in RT access was estimated using national capacity estimates from the IAEA Directory of Radiotherapy Centres. (Table 1)

## RESULTS

- ❖ HFRT can be delivered to breast and prostate cancers at 67% and 57%, respectively, the cost of utilizing typical CFRT scheduling.
- ❖ Adopting HFRT in African LMICs can increase treatment access to patients by up to 25% for breast RT and 36% for prostate RT.
- ❖ Implementing SFRT would reduce RT costs to less than 30% the cost of CFRT with no more than an additional \$200 to administer immunotherapeutic smart radiotherapy biomaterials.
- ❖ Further investigation is needed to determine the cost-effectiveness of combination SFRT and immunotherapy as it continues to develop as a modality.

Table 1: A partial chart of LMIC African country cumulative benefits between 2019-2025 to adopting HF-RT for breast and prostate cancer treatment.[Irabor et al.]

Country	2019 National RT access (%)	Breast Cancer (2019-2025)			Prostate Cancer (2019-2025)		
		Projected National cost for full access to breast RT at CF (US\$ million)	Projected National cost-savings with HF breast RT (US\$ million)	Potential increase in RT access with HF (%)	Projected National cost for full access to prostate RT at CF (US\$ million)	Projected National cost-savings with HF prostate RT (US\$ million)	Potential increase in RT access with HF (%)
Algeria	9.4	180	71.2	6.9	420	20	9.8
Botswana	10.5	2.8	1.1	7.8	1.1	0.5	11.1
Libya	34.2	110	4.6	25.4	4.9	2.3	36
Mauritius	19.7	9.5	3.8	14.6	2.8	1.4	20.6
Angola	1.6	360	14.5	1.2	33	1.6	1.7
Cameroon	2	530	21.1	1.5	34	16	2.1
Egypt	17.8	360	142.8	13.2	49	23.3	18.7
South Sudan	5.7	23	9	4.2	11	5.3	5.9
Tanzania	1.6	50	20.2	1.2	68	32.7	1.7
Uganda	1.1	40	16	0.8	33	15.8	1.1
Zimbabwe	1.4	31	12.5	1	19	9.1	4.6

Figure 1: The estimated RT course cost in low-income countries (LICs) and high-income countries (HICs) given the total number of treatment fractions.[Irabor et al.]

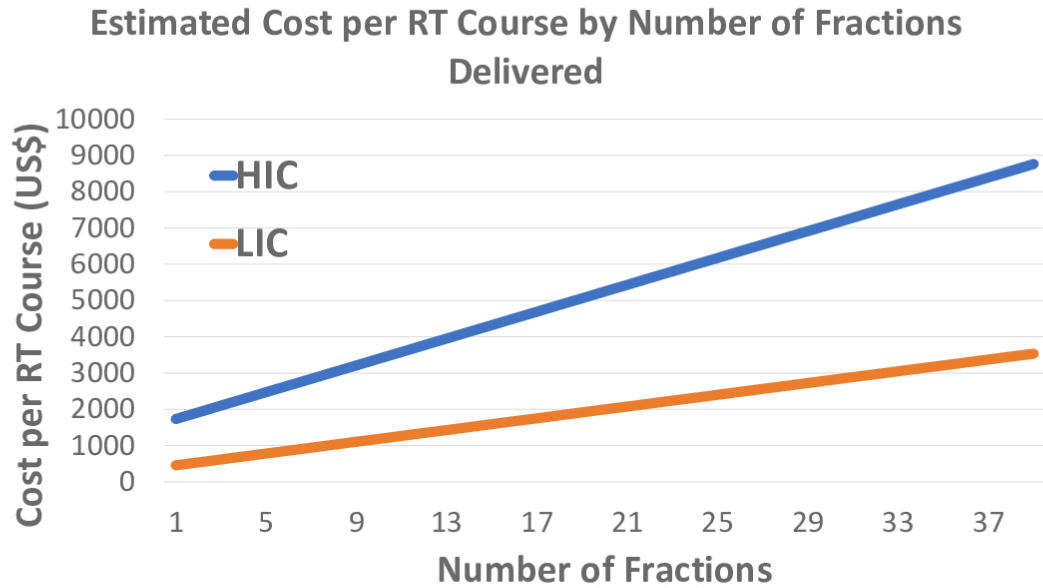
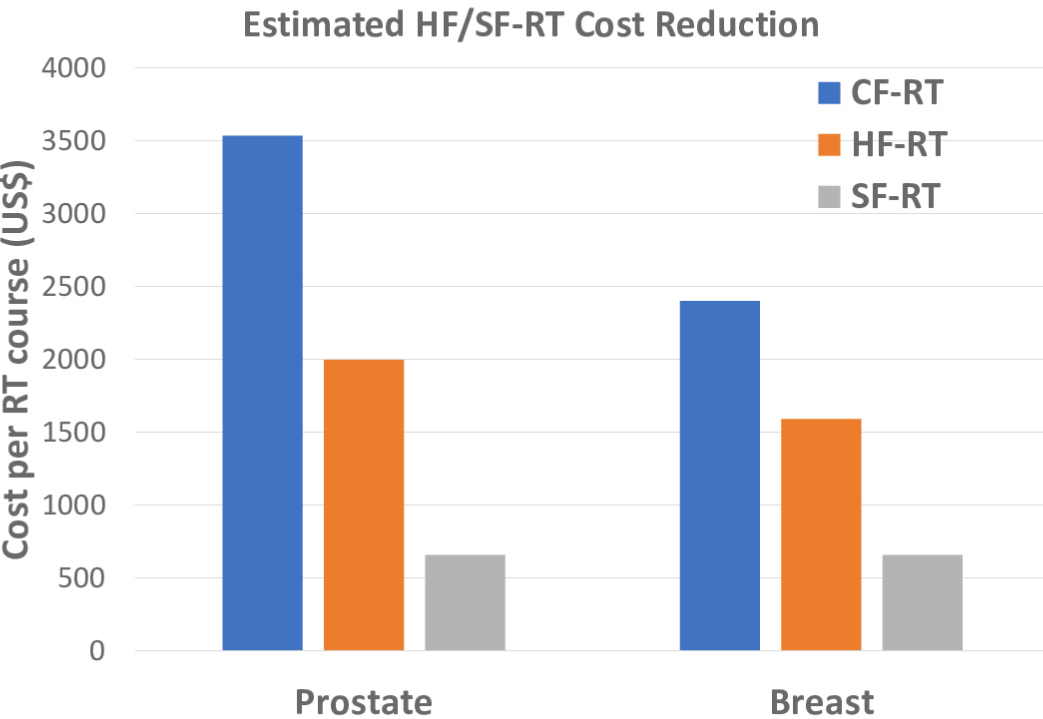


Figure 2: A comparison of RT course cost for prostate and breast treatment given a conventional fractionation (CF), hypofractionation (HF), or single-fraction (SF) schedule.[Irabor et al.]



## CONCLUSIONS

Delivering fewer RT fractions allows, at reduced cost, clinics to treat more patients in the same amount of time, increasing treatment accessibility in LMIC clinics where patient burden is high

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