HDR brachytherapy boost in Gleason 9-10 prostate cancer

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Background

High risk prostate cancer:

- ≥T3a, Gleason≥8, PSA≥20

Treatment options:

- radical prostatectomy
- radical RT: EBRT alone
  brachy + EBRT
  - LDR I-125 seeds
  - HDR Ir-192 via afterloader
- palliative approaches eg ADT alone

Which is better?

- ASCENDE-RT: Androgen Suppression Combined with Elective Nodal and Dose Escalated Radiation Therapy (2017)
  - RCT 398 pt high and intermediate risk prostate cancer
  - all received ADT then 46Gy/23# to prostate + LNs
    - then either 32Gy/16# EBRT
    - or LDR boost I-125 115Gy
  - 9 yr bPFS: 83% vs 62% in favour of brachy boost
  - HR 2.04 biochemical failure with EBRT alone
  - no OS difference

Gleason 9-10

- Kishan et al (2018)
  - retrospective cohort study 1809 pt with Gleason 9-10 prostate cancer
    - radical prostatectomy
    - ADT + EBRT
    - ADT + EBRT + brachy (62% LDR, 38% HDR)

Kishan et al (2018)

- prostate cancer-specific mortality at 5 yr
  - 12% RP vs 13% EBRT vs **3% EBRT + brachy**
- distant metastases at 5 yr
  - 24% RP vs 24% EBRT vs **8% EBRT + brachy**
- all cause mortality at 7.5 yr
  - 17% RP vs 18% EBRT vs **10% EBRT + brachy**

Meta-analysis Tang et al (2023)

- Systematic review of 8 retrospective studies of Gleason 9-10 prostate cancer
  - 1393 pt ADT + EBRT
  - 877 pt ADT + EBRT + BT

- Higher distant metastasis-free survival
  - 81.8% (EBRT + BT) vs 66.1% (EBRT) at 10 yr $p<0.001$
  - no difference in prostate cancer-specific survival or overall survival

Audit question

Do patients with Gleason 9-10 prostate cancer have better disease control after EBRT with a brachytherapy boost vs EBRT alone, as observed in trials?

Audit

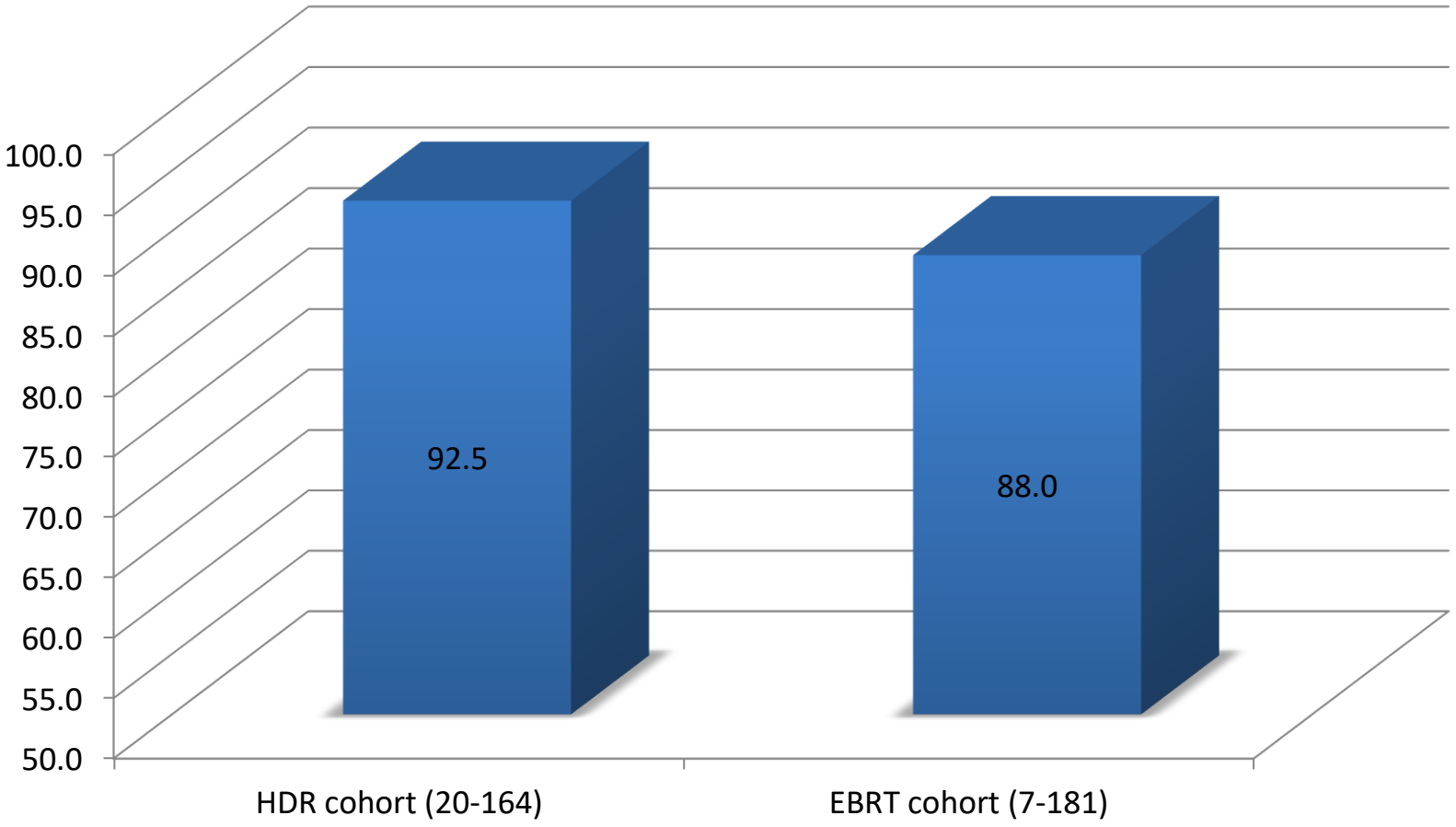
- Based on dataset of 4254 pt receiving prostate radiotherapy at ULH Nov 04-Jun 23

- Inclusion criteria: Gleason 9 or 10
  T1-4 N0 M0
  treated radically 2009-2018

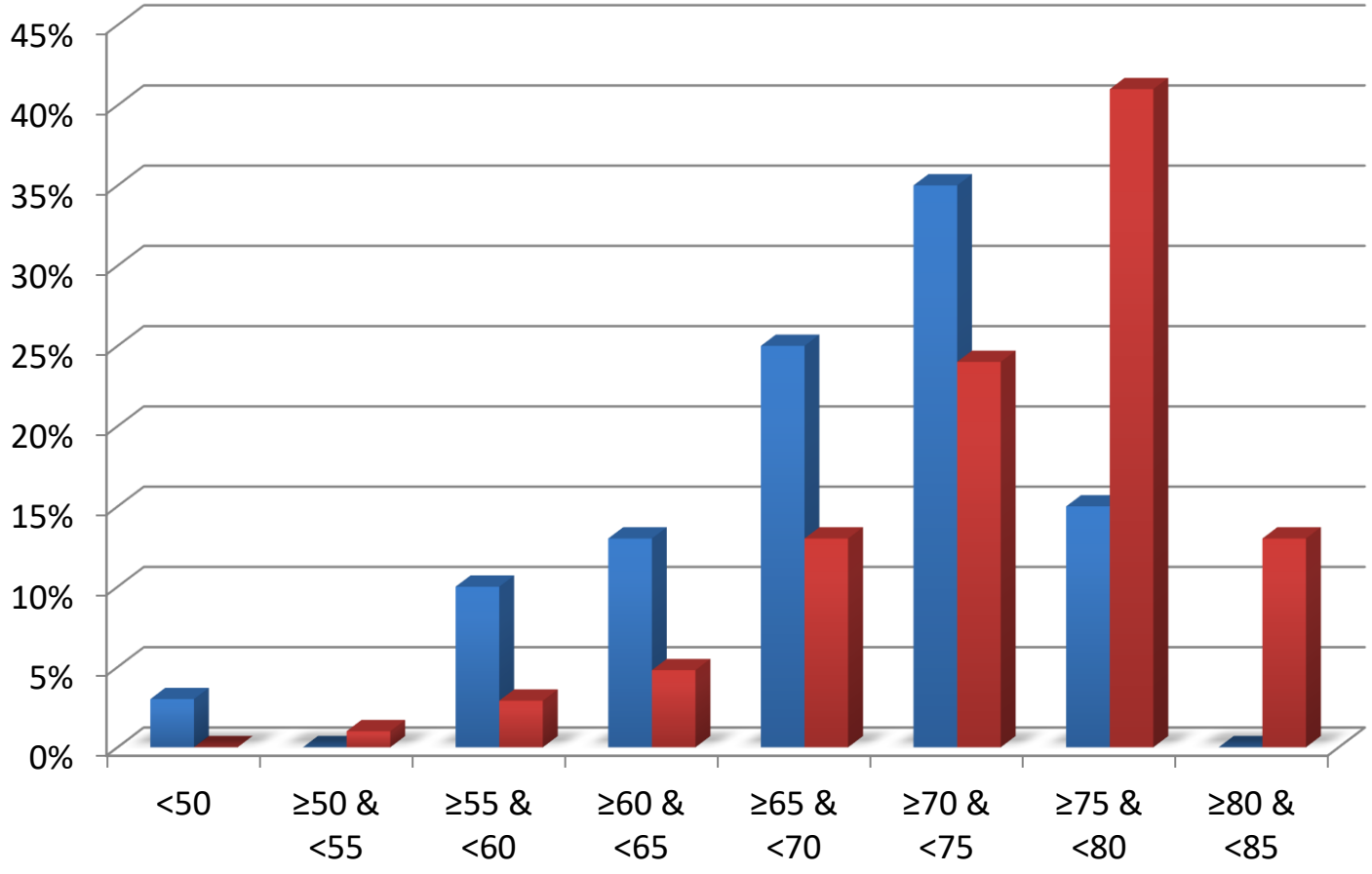
- Exclusion criteria: post prostatectomy
  nodal involvement
  RT not completed
  neoadjuvant hormones > 250 days

- HDR cohort: 40 pt
  - HDR as boost followed by EBRT
- EBRT alone cohort: 105 pt
  - EBRT alone

Follow up (months)

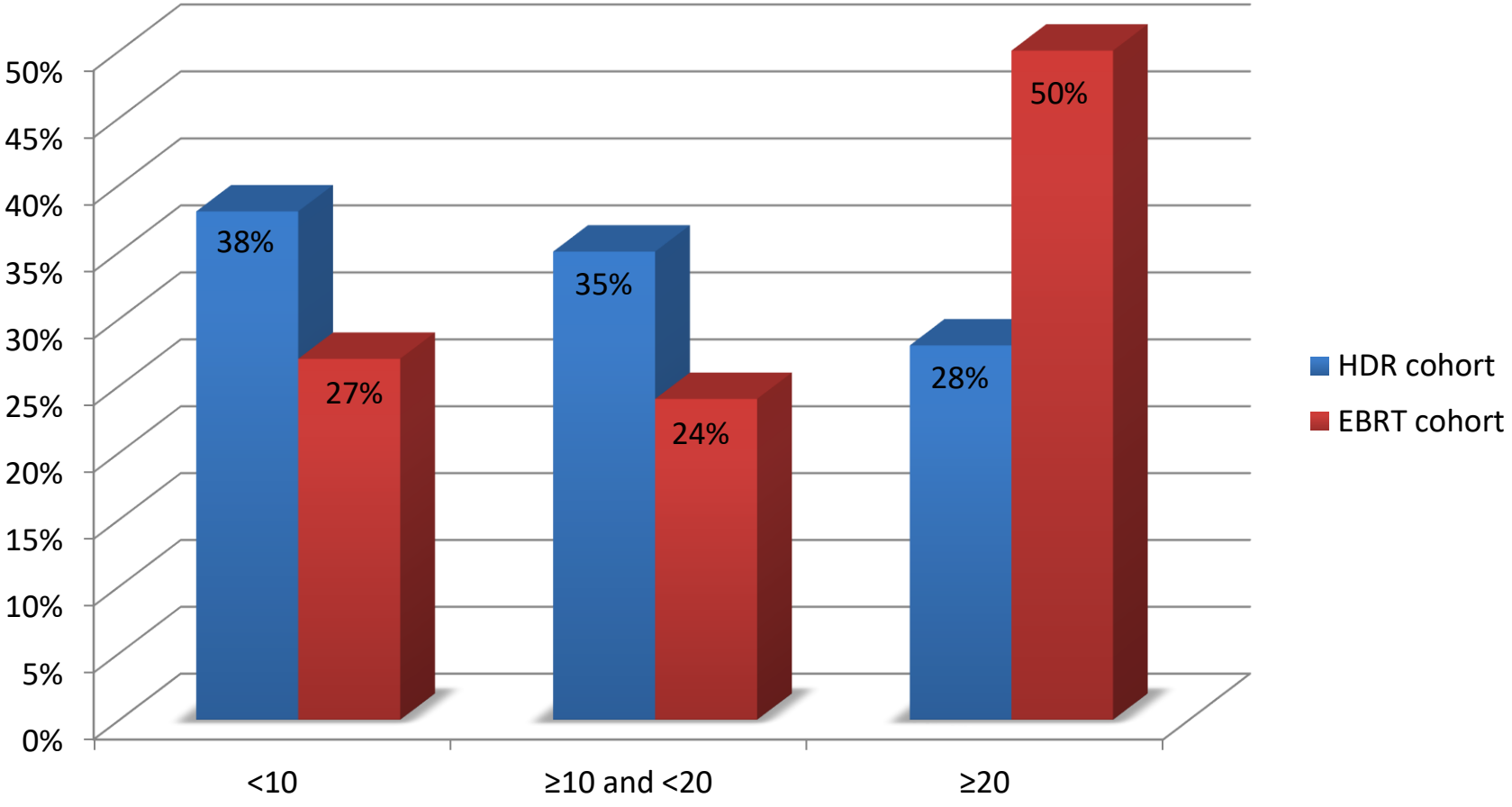


Age



Median age
HDR 69.5 yr
EBRT 75.0 yr

PSA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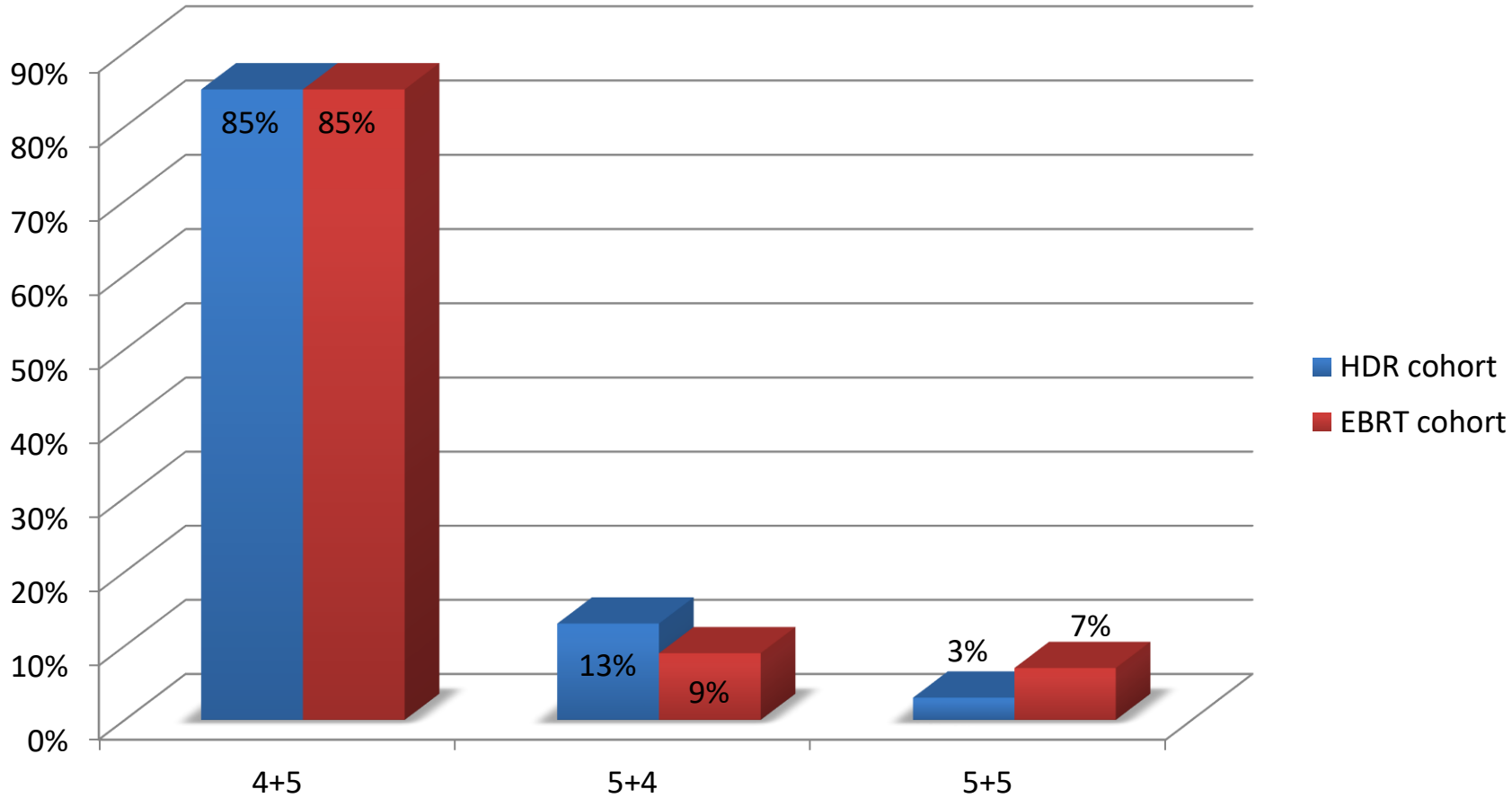
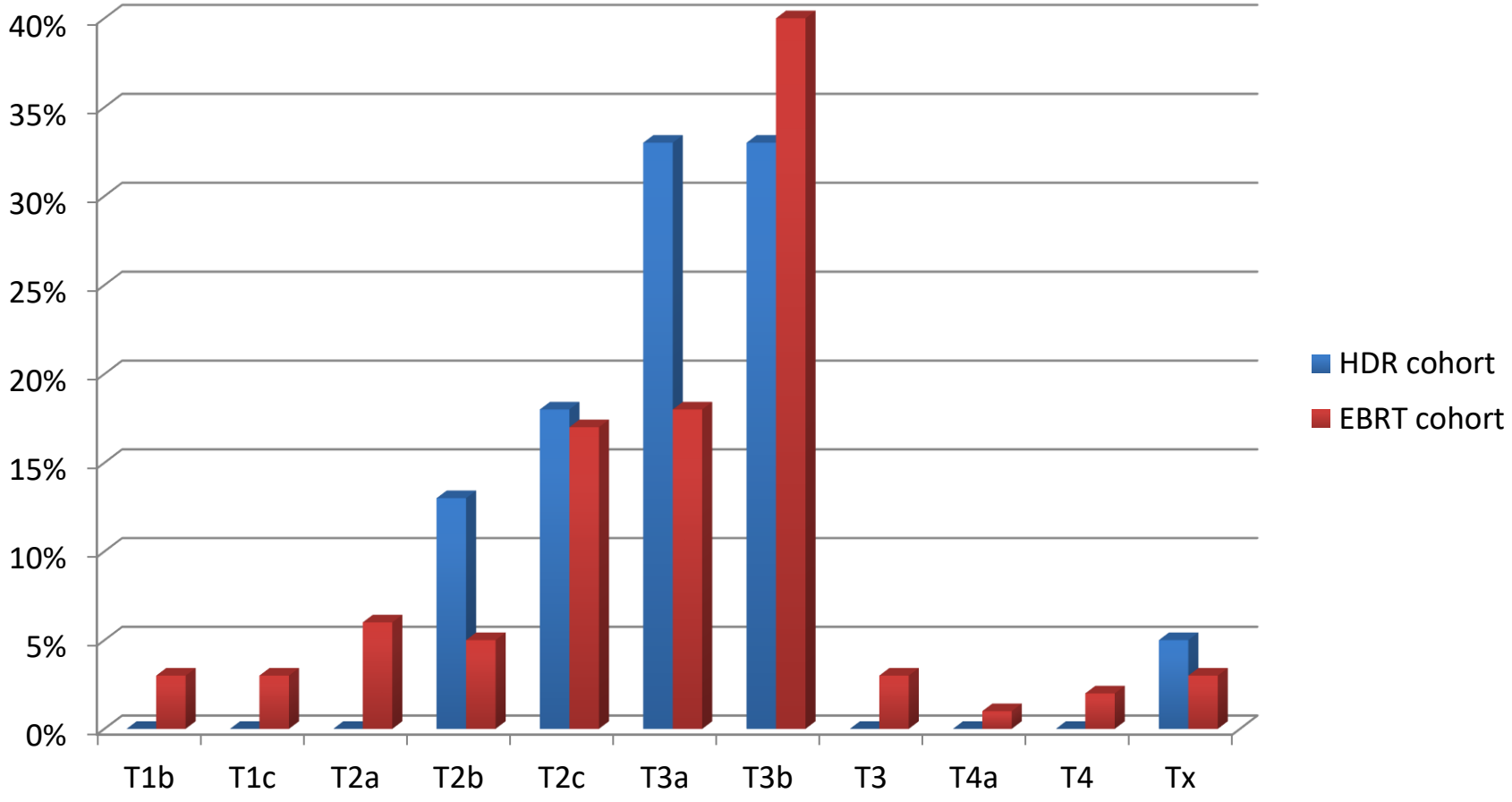
≥10 and <20
≥20
HDR cohort
EBRT cohort

Gleason score



Stage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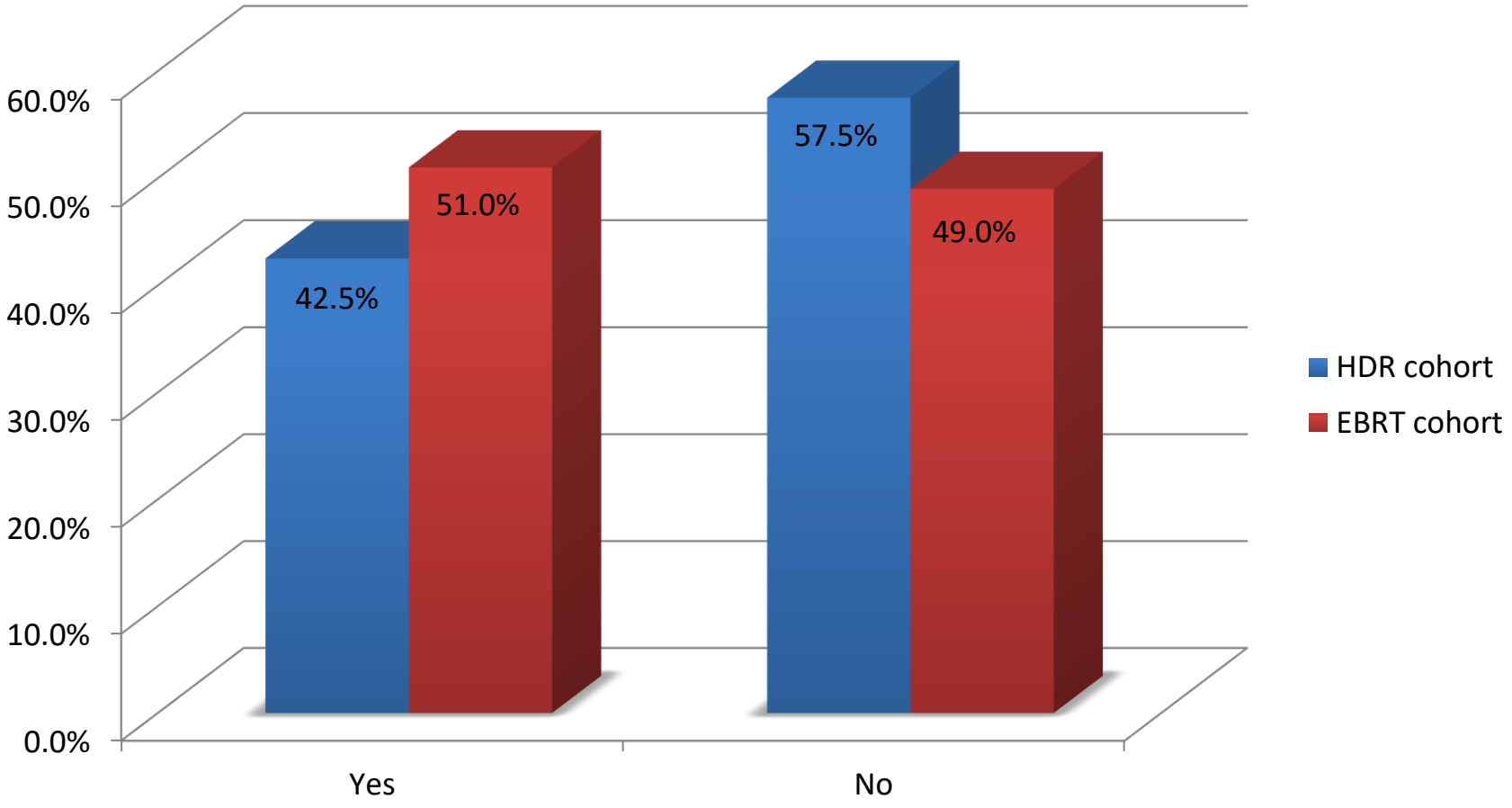
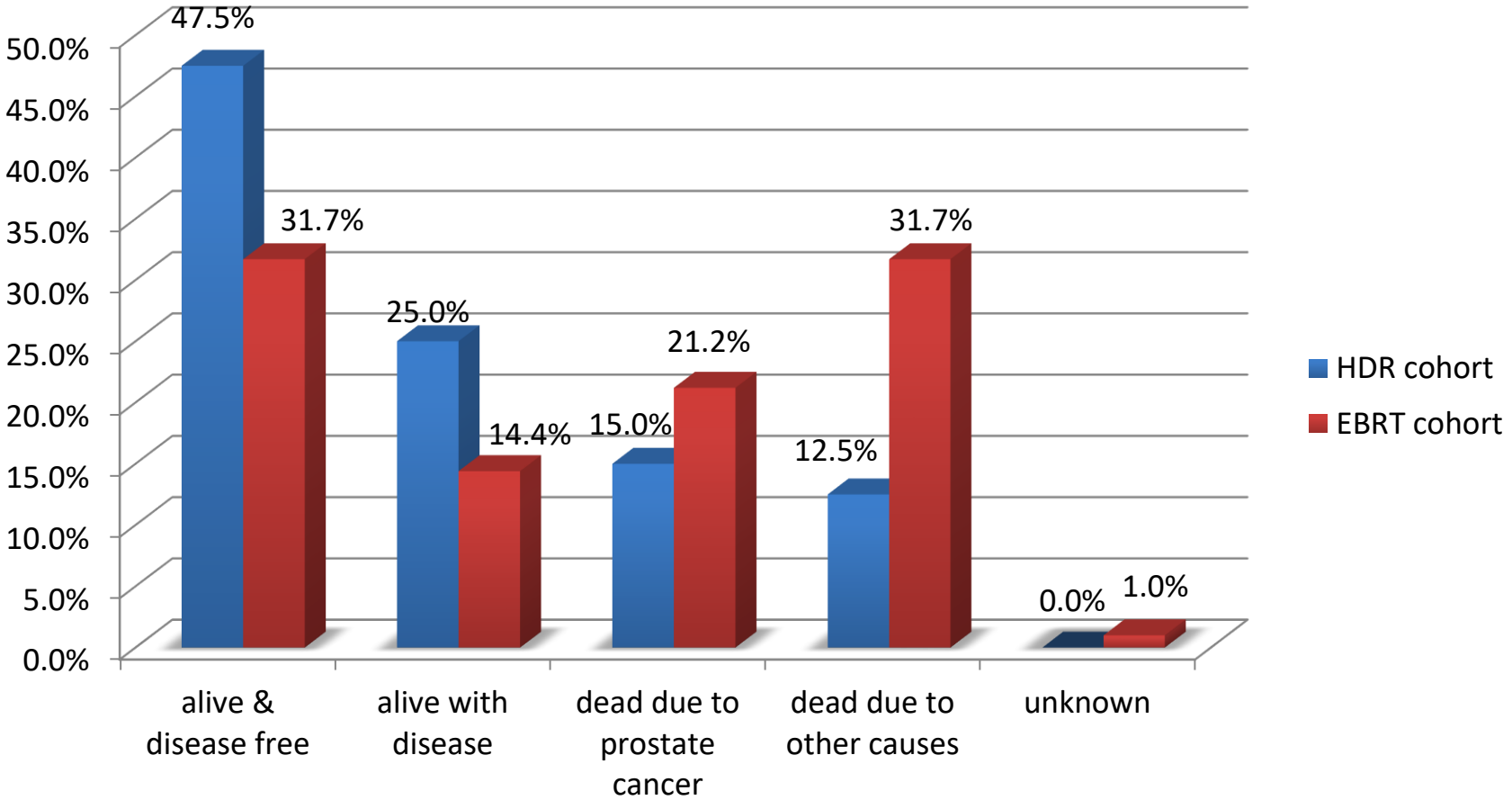
T4
Tx
HDR cohort
EBRT cohort

Pelvic nodal radiotherapy



Outcomes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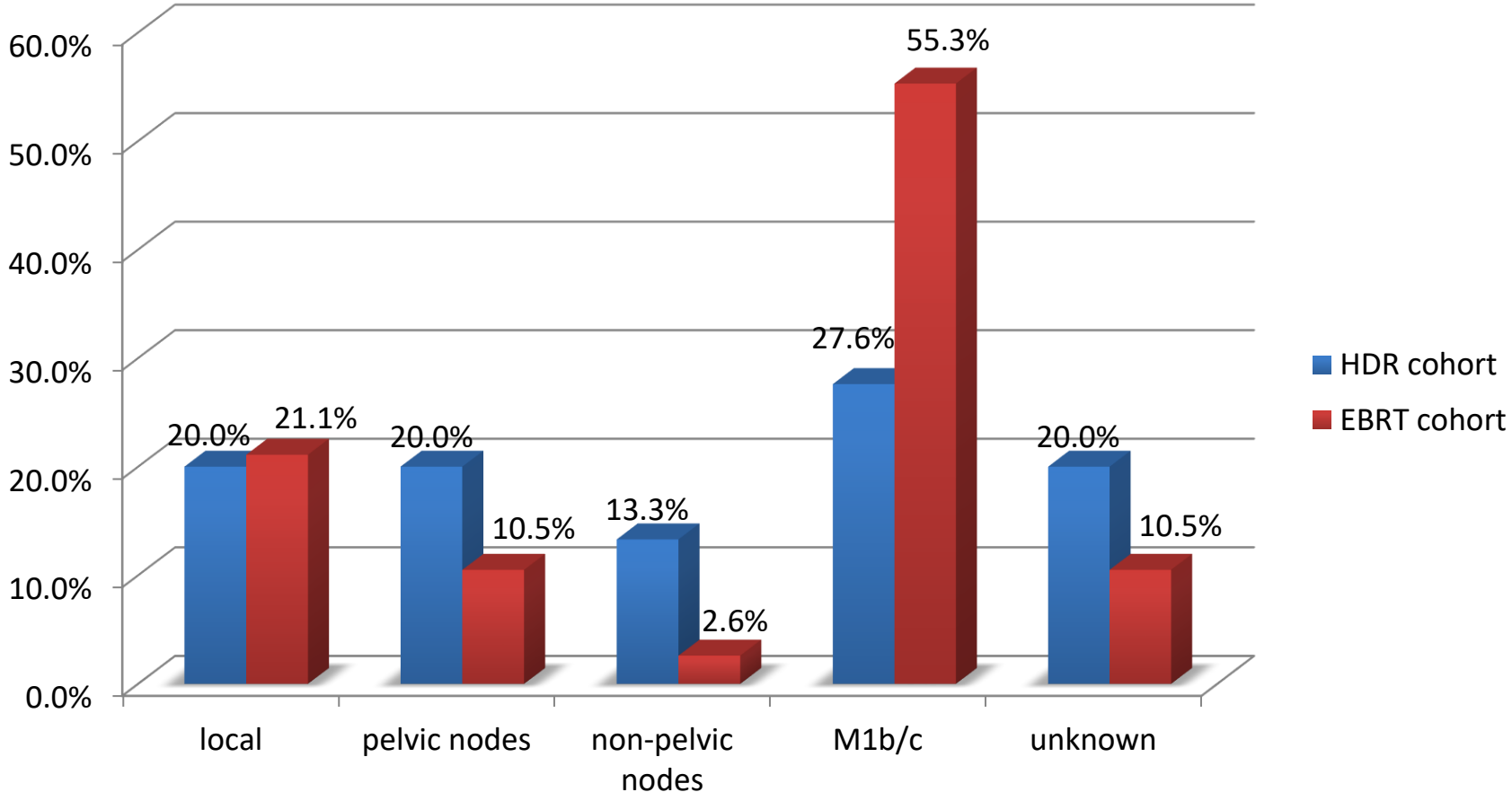
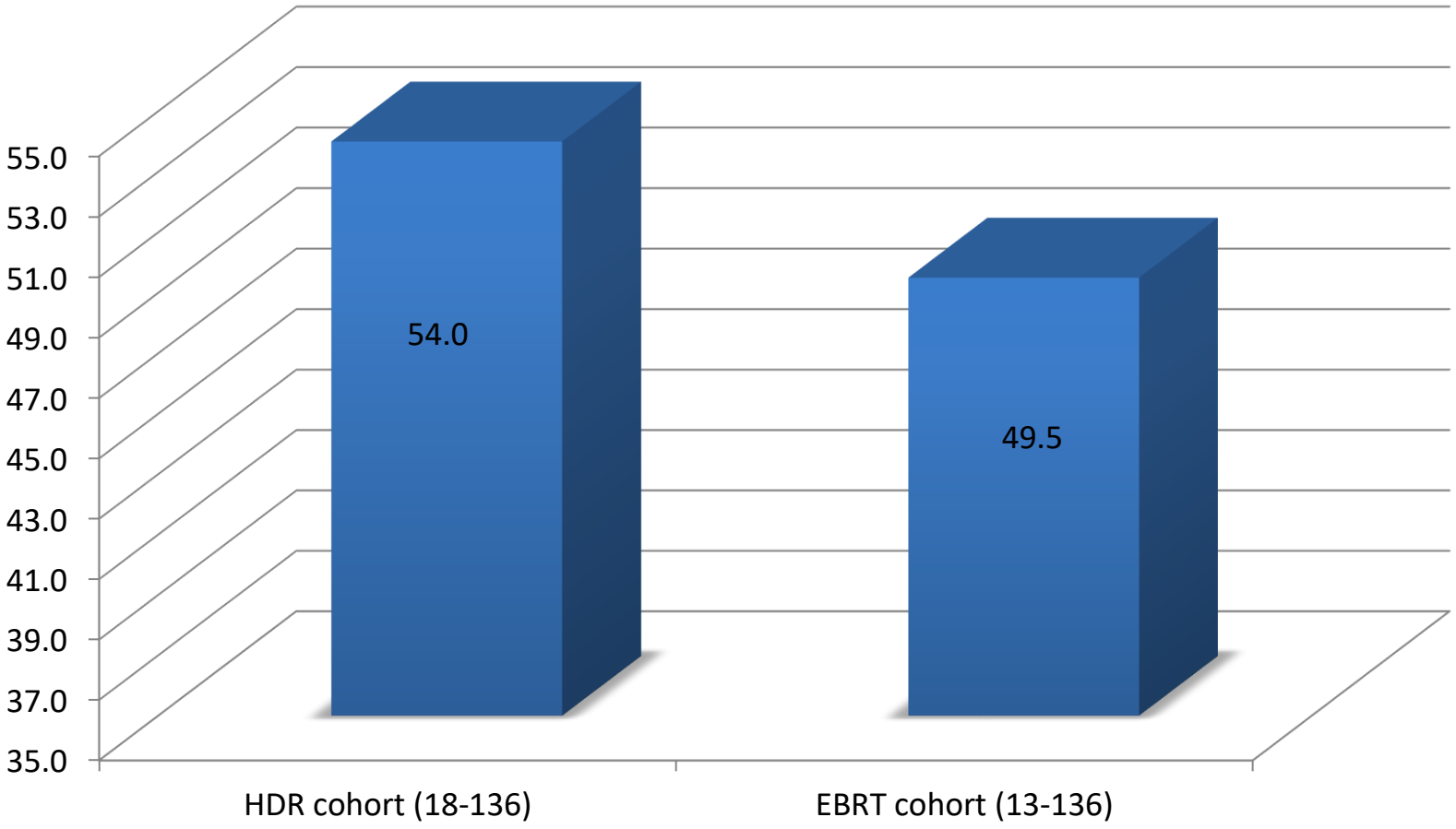
47.5%
31.7%
25.0%
14.4%
15.0%
21.2%
12.5%
31.7%
0.0%
1.0%
alive & disease free
alive with disease
dead due to prostate cancer
dead due to other causes
unknown
HDR cohort
EBRT cohort

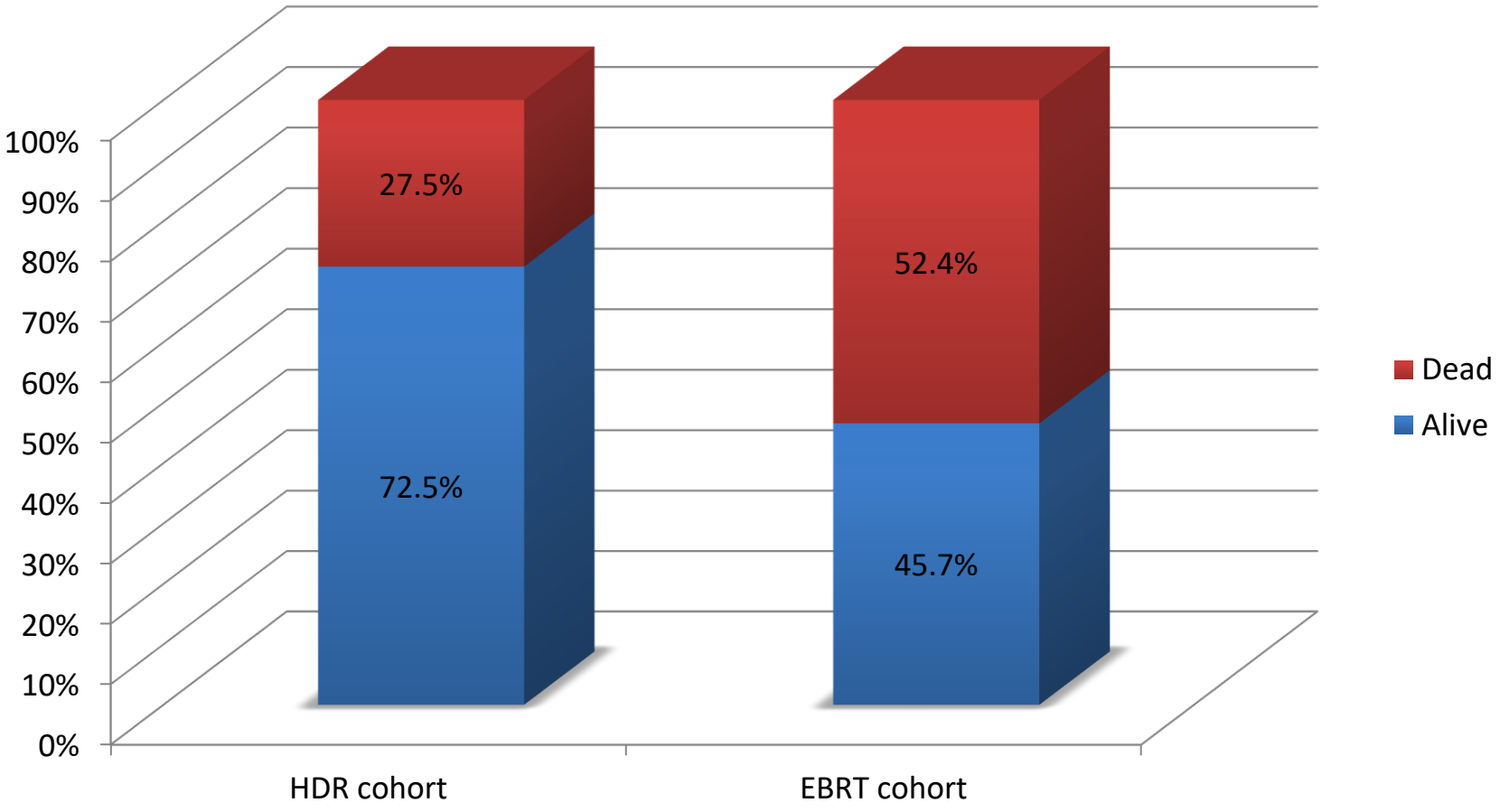
Recurrence pattern



Time to recurrence (months)



Overall survival



Limitations

- Statistical analysis not performed
- Toxicity outcomes not assessed
- Shift towards greater use of PSMA PET may produce different data regarding site of recurrence

Key findings

- Patients treated with HDR boost are more likely to be alive & disease free
- More deaths from other causes in the EBRT cohort might reflect the older age and likely increased comorbidities of these patients
- Whilst outcome metrics are not equivalent, a similar trend towards better results seems to match published evidence

References

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