Background and Purpose
For prostate cancer patients with a large rectum at planning, a risk of geometric miss has been suggested in recent literature. We also previously reported a significant decrease in freedom from failure in case of a large rectum at planning after a median follow-up of 51 months, for a subgroup of 349 patients with an estimated risk of >25% for Seminal Vesicle involvement (Heemsbergen 2007). In these prior investigations the location of progression was not included.

In the current study, we evaluated whether a large rectum at planning was associated with local failure, regional/distant failure, and/or prostate cancer (PC) related death, after 110 months follow-up.

Patients and Methods
- 349 patients (Table 1) from a randomized trial (68 Gy vs 78 Gy) with 68-78 Gy to Seminal Vesicles (estimated risk involvement >25%), mainly T2B-T3B.
- CTV-PTV margin of 1 cm (0 - 0.5 cm for 10 Gy boost), offline setup verification.
- Investigated risk factors: 1) rectal volume ≥90 cm³ and diarrhea reported during treatment (RF1, n=87), 2) cross-sectional area (CSA) >8 cm² (RF2, n=83).

Results
- There were 68 cases of PC related death, 26 cases of local failure as first event, and 73 cases of regional/distant failure as first event (HR’s risk factors in Table 2).
- Increased failure risk for a distended rectum at planning appeared to be associated with regional/distant failure rather than local failure (Table 2, Figure 1).
- At 10y, difference in PC related death was 14% for RF2 (Figure 1), corresponding difference in Overall Survival was only 6%.

Conclusions
Prostate cancer patients with a large rectum at planning:
- Had no increased risk for local failure.
- Had an increased risk for failure outside the prostate.

Apparently the local tumor was not missed during treatment. Hypothesis of “geometric miss” is declined in this study.

Discussion
- The hypothesis of local miss is illustrated in Figure 2. Our results do not support this hypothesis, since we found no decrease in local control for the patients at risk. Simulations also showed that such large systematic prostate shifts due to rectal fill variation are very unlikely.
- An alternative hypothesis is illustrated in Figure 3: a large rectum at planning could be associated with unfavorable dose distributions outside the prostate leading to less dose in areas with (not targeted) extraprostatic disease in e.g. lymph node areas.