

# Quantitative methods for improved error detection in dose-guided radiotherapy

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## Quantitative methods for improved error detection in dose-guided radiotherapy

Cecile J.A. Wolfs

1. Development of clinical decision models based on portal dosimetry is only possible when the uncertainties of the portal dosimetry system are known.  
*This thesis*
2. The sensitivity and specificity of threshold based classification methods for portal dosimetry depend on the combination of portal dosimetry method, gamma criteria and threshold that is used, and these factors should be optimized for different error detection purposes.  
*This thesis*
3. Deep learning is a promising powerful tool for detecting treatment errors with portal dosimetry.  
*This thesis*
4. Underlying differences in data, but also in clinical protocols and clinical interpretation, make transferring models for error detection with portal dosimetry difficult.  
*This thesis*
5. With uncertainty quantification and advanced methods for error detection, portal dosimetry can become an even more effective method for verifying radiotherapy treatment and detecting errors, thereby improving overall patient treatment.  
*This thesis (Valorization)*
6. Adaptive radiotherapy has the potential to considerably improve the accuracy of radiotherapy, reducing the exposure of organs at risk, facilitating safe dose escalation, and improving local control as well as overall survival.  
*Sonke & Belderbos (2010)*
7. *In vivo* dosimetry must become an essential element of modern radiation therapy.  
*Olaciregui-Ruiz et al. (2020)*
8. Machine learning is poised to solve multiple long standing problems and improve workflow efficiency [in radiation oncology].  
*Thompson et al. (2018)*
9. The sun, it rises slowly as you walk, away from all the fears and all the faults you've left behind.  
*Mumford & Sons, The Cave*
10. Books! And cleverness! There are more important things – friendship and bravery.  
*Hermione Granger (J.K. Rowling, Harry Potter and the Philosopher's Stone)*
11. Es iech 't mer haol!  
*Margriet Smeets-Rondagh*