Self-evaluation

GROW-Research Institute for Oncology and Reproduction
Maastricht University

2018-2023

Creating impact through collaboration and community building

PART A
Documentation at the level of the research institute

5.3 Case studies

We have selected 6 case studies representing topics that illustrate that scientific and societal impact of GROW (Table 1 and Case studies).

Case studies representing topics addressing GROW Oncology and GROW Reproduction	
Cancer and pregnancy	Receiving a cancer diagnosis has an enormous impact on someone's life, at any age. A cancer diagnosis at a young age has a huge personal, societal, and economic impact, but also a reproductive impact. GROW's multidisciplinary breast cancer research group has been studying 1) the risk and preservation of infertility following breast cancer treatment, 2) prevention of hereditary breast and ovarian cancer by PGT and the risks of ovarian stimulation, and 3) the prevalence of malignancy suspicious NIPT. This case study shows the unique collaboration of medical oncologists, gynaecologists, clinical geneticists and embryologists in improving the care for breast cancer patients and families by performing scientific research.
MUMC+ Centres of Expertise for Rare Diseases	In the Netherlands, more than 1 million people suffer from rare diseases. There are about 8000 rare diseases and although rare themselves, 6-8% of our population is affected by one of these rare disorders. Care for these patients is complex and highly specialized and often the initial diagnosis is incorrect. To improve the care for patients with rare diseases, national Centres of Expertise for Rare Diseases (ECZA) and European Reference Networks (ERNs) have been established to share knowledge and data develop care standards and guidelines based on scientific research. This case study illustrates how GROW Oncology and Reproduction scientists are contributing to the MUMC+ ECZA's.
GROW affiliation professors	GROW is closely collaborating with scientists working in hospitals in the region Southeast Netherlands, including VieCuri Medical Center (Venlo), Catharina Hospital (Eindhoven) and Máxima Medical Center (Eindhoven). These collaborations are being formalized by the appointment of affiliation professors on topics of common and/or complementary interests, such as abdominal cancer, AI in cancer imaging and benign gynaecological diseases. This case study introduces the GROW affiliation professors and describes the collaborations.
Case studies representing GROW Oncology topics	
The Netherlands Cohort Study	The prospective Netherlands Cohort Study on diet and cancer (NLCS) was initiated in 1986 by Prof. Piet van den Brandt and Dr Sandra Bausch-Goldbohm (TNO). The study population originated from 204 municipal population registries throughout the Netherlands and aimed to study the relationship of dietary habits and other risk factors for cancer (e.g. smoking, physical activity, family- and medical history, education and occupational history) and cancer incidence. Throughout the years, biological material (toenails and tumour tissue) have been collected for molecular pathological epidemiology (MPE) studies. This case study describes scientific discoveries on diet, lifestyle and molecular alterations and cancer obtained in the NLCS in the last 38 years the scientific output and future research questions that can be explored in this unique cohort.
Advanced modelling as a multidisciplinary approach to improve diagnostics, treatment evaluation and outcome prediction for clinical and preclinical studies	Fundamental research and accurate modelling are essential for technology development and play a major role in cancer diagnostics, treatment evaluation and outcome prediction. For example, in radiotherapy, understanding the physics of interactions between radiation and human tissues, as well as the biological mechanisms affecting cell repair and the effectiveness of these interactions, is crucial when the goal is to eliminate tumours with radiation. In this case study we highlight the development of hardware, software, and biological models by a multidisciplinary team from various departments, working with pre-clinical studies in collaboration with industry partners.
Case studies representing GROW Reproduction topics	
Creating communities in obstetrical care: Geboortezorg Limburg and the EXPECT study	Fetal growth deviations are associated with short- and long-term health consequences for both mother and child. Fetal growth is determined by a complex interplay of genetic factors, uterine conditions, environmental factors, fetal syndromes, hormones, pregnancy complications, and maternal characteristics. Early and correct identification of women at risk would enable personalized follow-up management, which helps to avoid adverse perinatal outcomes and to efficiently and cost-effectively manage health care.

	This case study describes how GROW Reproduction scientists have developed and implemented prediction models for risk assessment of pregnancy outcomes and developed a care community including all regional obstetric caregivers and stakeholders to improve obstetric health care.
Preterm birth	Preterm birth is the most important cause of perinatal morbidity and mortality in developed countries. Of all children born in the Netherlands, more than 7% are preterm. Advances in perinatal medicine, including improvements in respiratory support, resulted in the fact that even the sickest and smallest babies nowadays often survive. However, surviving preterm infants are at increased risk for life-long disability. This case study describes how GROW Reproduction scientists study longitudinal lung- and brain development using innovative ovine models to gain insights in the mechanisms underlying the multifactorial pathogenesis of prematurity-associated respiratory and cerebral diseases and the effect of stem cell therapy on these conditions.

Table 1: Selected cases studies representing topics that connect GROW Oncology and GROW Reproduction