Towards a digital nutrition diary for patients after esophagectomy
Development of an interactive app evaluating postoperative nutrition

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Description of the initiative
- **Background / context**
Esophageal cancer is the 8th most occurring cancer in the world, and the 6th most lethal.[1] Only one third of patients is amenable for curative resection at the time of diagnosis. Most patients who underwent a successful resection of the esophageal cancer are confronted with continued weight loss due to the impaired motility in the gastric conduit used for reconstruction. Despite sustained enteral nutrition by usually feeding jejunostomy tubes, patients still need to regain full oral intake after some weeks.
- **Rationale for the initiative**
Although they are well looked after and stimulated during hospital admission, once patients go home, oral intake usually becomes a struggle. During this 'black spot' in patient care between hospital discharge and the first clinic appointment, currently a printed nutrition diary offers the only window onto oral intake and J-feeds after discharge. However, collecting amounts of food in grams in a textual way does not always reflect true oral intake, usually resulting in overestimation of energy intake from the patient's point of view.[2]
- **Objectives and scope**
In order to augment quality of self-reporting, visual aids could improve reproduction of oral intake. Available smartphone apps however are not intended for medical use. As the need exists for this specific patient group, our group aims to develop a dedicated app, combining **oral intake**, **enteral nutrition** delivered by the feeding catheter, **detection** of **feeding related problems** and **self-evaluation** of the patient. Ideally, pictograms and pictures of food are used to assess the amount of intake and types of food more accurately.[3]

Planned activities & deliverables
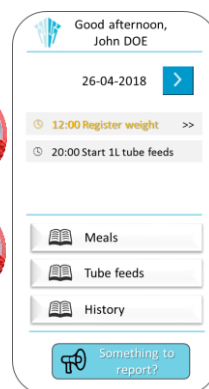- **Outline the steps to be taken**
  - creation of a **scenario/tender** of the needs, interactions and user experience tailored onto esophageal cancer patients by our medical team, based upon experience built-up with introduction of ERAS-program
  - search for and **attraction of app-building company**, based upon tender
  - **testing and tweaking** of initial app and back-office website
  - **roll-out** towards our patient cohort, providing the user interface in different languages
- **What are the concrete deliverables of the project?**
  - application available for download in Apple® App Store and Google® Play Store
  - App for smartphone and tablet
  - consultation of the self-reported content by the care givers through back-office web-platform
  - export to/integration into Electronic Patient Record (EPR)
  - comparison with current paper-based nutrition diary
- **What achievements are possible in the next 12 and 24 months?**
  - **0-3 months:** development of scenario
  - **3-6 months:** search for industry/IT-partner
  - **6-9 months:** development of app prototype
  - **9-12 months:** initial testing & tweaking; integration EPR; multi-language user interface
  - **12-18 months:** roll-out to patients
  - **18-24 months:** compare paper diary vs. app diary: user friendliness, completeness of data

Good afternoon, John DOE
26-04-2018
12:00 Register weight
20:00 Start 1L tube feeds
Meals
Tube feeds
History
Something to report?

Resources & enablers
- **Describe personnel, financial needs, and how the grant will be spent**
  - Main expenditure in this project will be the IT-team designing the app for the two most used platforms and back-office website, estimated at EUR 25.500,-.
  - Another 3.500 EUR will be invested in hospital IT-personnel for writing code to include data directly in the patient's health record, including testing and security.
  - The remaining 1.000 EUR will be attributed to coordinating costs and running the comparative study in the last 6 months of the project.
- **What factors will make it successful?**
  - From the *multidisciplinary team of care givers' perspective*:
    - This app will enable the care givers to keep a close **eye on the postoperative evolution** of this vulnerable group of patients once discharged.
    - The collected info will provide data to the multidisciplinary team of surgeons, cancer care coordinators, dieticians and home care nurses enabling them to encourage patients or, if necessary, **interfere earlier in the feeding regimen** than currently possible (first contact at clinic, 4 weeks after discharge), avoiding the 'black spot without interaction' after discharge.
  - From the *patient's perspective*:
    - The **visualisation** of the nutrition diary by food plates **facilitates** for patients **correct reproduction of intake** in comparison to a written diary, almost on-the-fly, without delay whilst e.g. reading the daily news paper on their smartphone during breakfast.
    - Patients and their family will experience the app as a means to **stay in contact with the care team** once discharged.
    - The app will **augment patient participation in their own care path** given a relatively low threshold of use, and responds to the current trend of m-health (mobile health apps), bringing the home care to a contemporary level.
    - By export to/central storage of the submitted information within the EPR, patients will experience the app as a **means of continued monitoring at home** of their recovery.

Results/outcomes & expected impact
- **How will the findings be implemented?**
  - Once finalised, the app will be implemented as part of the clinical routine in the currently existing Enhanced Recovery Program for patients undergoing esophagectomy in our institution.
  - If integration towards the EPR is finalised, patients should be able to link through to the app via the already available hospital app.
- **How will this project advance patient care / contribute to optimal nutritional care?**
  - Patients with esophageal cancer are a vulnerable group throughout their care path, and this vulnerability for malnutrition is augmented by the operation they undergo. Our project will augment patient involvement in their own care once discharged, improve interaction between patients and care team and provide the care givers with important information on patient's nutritional status in the home setting.
- **What makes the project innovative?**
  - To our experience, only rather generalised and often commercially inspired nutrition apps are available for download. Our project aims to design an app for a specific and vulnerable patient group at risk for (postoperative) malnutrition from cancer, continuing the initiated Enhanced Recovery care path from the hospital towards the home setting. Moreover, our app also bears in mind a possibility to interact with the care givers in an easy way, augmenting the level of independency and recovery of patients following esophagectomy.
- **Will the project be likely to influence national nutrition policy?**
  - Our group performs half of the number of esophagectomies for cancer in Belgium and has optimal relations with the national scientific society on Upper GI surgery and other national high-volume centers performing esophagectomies. In this perspective, we believe our group has the potential to disseminate the technology in order to augment benefit for other patients in our country as well.
- **Is the project transferable to other settings / countries?**
  - As the application stores are worldwide available, once cleared and offered in the respective national app stores, the app should be widely available for download by the intended patients group. The international scientific network our group is part of can be of use to transfer the investments delivered for the project towards other health care systems. Technical implementations like pdf-export or HL7-linkage should provide easy implementation in EPRs worldwide.

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