Novo Nordisk Foundation
- our use of researchfish® as reporting platform for grant holders and data for research impact assessment

Henrik Barslund Fosse
Department of Impact
29 May, 2019
Our objectives

Corporate objective

• to provide a stable basis for the commercial and research activities of the Novo Group companies

Grant-giving objectives

• to support physiological, endocrinological, metabolic and other medical research,

• to support Danish research hospital activities within diabetes,

• to support other scientific, humanitarian and social purposes
Our vision

To contribute significantly to research and development that improves the lives of people and the sustainability of society.
Content

- researchfish®
- Collecting the data
- Supplement data
- Examples of use
researchfish®
- Online system to collect information on outputs and outcomes (and impact)

2007
Medical Research Council UK develops a reporting platform for collecting outputs, outcome (and impact)

2011
researchfish® spun out

2014
Adopted by Research Council UK

2015
Adopted by Novo Nordisk Fonden and other large Danish Foundations/organizations

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✓ Used across multiple research disciplines
✓ +100,000 awards annually
✓ +100,000 researchers
✓ +150 funding bodies
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Used across multiple research disciplines
+1000 awards annually
+3000 researchers
10 centers reporting
researchfish®
- multilayered reporting options

novo nordisk fonden

Individual grants
  - Innovation (Pre-seed)
    - PhD’s
    - Postdocs
  - Project
  - Investigator (career)
    - Challenge programs
  - Research center grants
    - Group 1
    - Group 2
    - Group 3
    - Group 4
  - Patient care (Steno Diabetes Centers)
    - Group 1
    - Group 2
    - Group 3
    - Group 4
DO NOT UNDERESTIMATE THE CHANGE IN CULTURE that researchfish® or similar systems bring
researchfish® is core output and outcome data

It allows us to find out

what did happen based on our grant (outputs and outcomes)

but not

what would happen without our grant (isolated or causal effect → impact)

and

no benchmarks → supplement data needed
NNF collection of data

Pre-grant

Internal data
- NORMA
- OMADA
- Paper/PDF

Grant start

- researchfish®

Grant end

External data
- Web of science, CWTS Leiden, Scopus, PubMed
- Patent data (EPO DOCDB)
- Research centres – supplement reporting
- Business registry
- Registry data (Statistics Denmark)
- Ad hoc data: Surveys, LinkedIn, web, CV's, documents etc.

Post-grant reporting
NNF collection of data

Pre-grant

Internal data
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Post-grant reporting
- Ad hoc data: Surveys, LinkedIn, web, CV’s, documents etc.

“Data warehouse”
Linking data:
Tracking funded research towards patents

NORMA
Omada

Person-level
Applicants & PI's

Grant-level
PI's, Grant area, instrument, size etc.

Publication-/patent-level

Institutional level

researchfish®

Team members

Grant-level reporting

Public research

Research collaboration

Patents

Inventors

Reported patent app's & grants

Private use of public research

Assignees
# QUESTION CATEGORIES IN RESEARCHFISH

**RF COMMON QUESTION CATEGORIES**

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<td>Additional question added by us</td>
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Number of people supported fully or partly by the Novo Nordisk Foundation

Number of people

- **Other persons in science**
- **Postdoctoral fellows**
- **PhD students**

<table>
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<tr>
<th>Year</th>
<th>PhD Students</th>
<th>Postdoctoral Fellows</th>
<th>Other Persons in Science</th>
<th>Total</th>
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<td>2014</td>
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<td>385</td>
<td>670</td>
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<td>2015</td>
<td>445</td>
<td>436</td>
<td>739</td>
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<td>374</td>
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<td>2017</td>
<td>425</td>
<td>555</td>
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</tr>
<tr>
<td>2018</td>
<td>506</td>
<td>719</td>
<td>1773</td>
<td>2998</td>
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Citation impact by grant type

- Novo Nordisk Foundation research centres
- Innovation grants
- Programme grants
- Investigator grants
- Steno Diabetes Center
- Project grants
- Postdoctoral fellowships

PP(top 10%) 2008-2013
PP(top 10%) 2014-2016
World average
Who delivers high-impact research? A small elite group?

Grant teams... …and their publications

27% of the articles in are PP (top 10%)
QUESTION CATEGORIES IN RESEARCHFISH

Publications
Collaborations
Further Funding
Next Destination & Skills
Engagement Activities
Influence on Policy
Research Tools & Methods
Research Databases & Models
Grant team members

Intellectual Property & Licensing
Medical Products, Interventions and Clinical Trials
Artistic & Creative Products
Software & Technical Products
Spin Outs
Awards and Recognition
Other Outputs & Knowledge
Use of Facilities & Resources
Number of medical products, interventions and clinical trials reported by grant holders
Example 1

3D printed, patient-fitted, resorbable bone implants

Associate Professor Morten Østergaard Andersen and his team have developed a new method and biomaterial for creating 3D-printed implants for replacement of resorbed or destroyed bones. The method involves designing a 3D model of the bone-implant from a computed tomography (CT) or magnetic resonance imaging (MRI) scan of the patient. Based on the 3D model, the specific bone for the patient can be 3D-printed. The bone is printed in a structure that allows room for blood vessels, nerves and bone marrow that are essential for the bone to function. The biomaterial is resorbable in the body, and the 3D bone will degrade slowly and be replaced by natural living bone.

This invention is expected to reduce the rate of complications and pain related to bone implants and reduce healthcare expenditure. The Exploratory Pre-seed Grant from the Foundation has funded a clinical trial on pigs. If the results are positive, the next step is to provide the first implants for human patients. The team has recently published the following article:

Example 2

Invasive methods were the only way to measure glyocalyx integrity until recently. With the newly developed camera and software (GlycoCheck™), the thickness of the glyocalyx layer can be measured non-invasively from the small blood vessels underneath the patients’ tongue.

Example 3

Preventing damage from diabetes

Blood vessels have a protective layer on the inside of the membrane called the glyocalyx. High blood glucose, which is common among patients with diabetes, can affect the glyocalyx and lead to damage of the small blood vessels. Changes in the composition or loss of the glyocalyx can be an early indicator of damage to the heart and kidney. The monitoring of the glyocalyx is therefore an important preventative measure for people with diabetes.

Invasive methods were the only way to measure glyocalyx integrity until recently. With the newly developed camera and software (GlycoCheck™), the thickness of the glyocalyx layer can be measured non-invasively from the small blood vessels underneath the patients’ tongue.

A team led by Peter Rossing at Sjøren Diabetes Center Copenhagen is now assessing the camera in a trial on healthy volunteers to investigate the reproducibility and the influence of daily lifestyle conditions such as smoking and exercise.

Treating people with head and neck cancer involves head or neck surgery, radiotherapy and chemotherapy. Because of the site of the cancer, the treatments can affect physical and mental health and well-being as well as social functioning after treatment. An instrument is needed to support healthcare professionals in assessing people’s needs to help them reduce their burden of symptoms and regain their ability to live a normal life.

Mary Jarden and her team at Dept. of Otorhinolaryngology, Head and Neck Surgery and Audiology at Rigshospitalet in Copenhagen have linguistically validated the Patient Concerns Inventory Instrument developed for people with head and neck cancer in Liverpool, United Kingdom and are developing an information technology solution that is applicable to clinical practice. Further, the team is assessing the usefulness of the tool in a randomized controlled trial.

Denmark has 1,300 new cases of head and neck cancer each year, and only 68% of these people are alive 5 years after diagnosis. The project has already highlighted the awareness of the complexity of the short and long-term struggles in rehabilitating people with head and neck cancer. The Foundation is supporting the project through a nursing research grant.
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Number spinouts based on Foundation-funded research

- Denmark
- Other Nordic countries
- Rest of the world

Number of spinouts based on Foundation-funded research:

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<th>Other Nordic countries</th>
<th>Rest of the world</th>
</tr>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>3</td>
<td>0</td>
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</tr>
<tr>
<td>2015</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>10</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>6</td>
<td>0</td>
<td>0</td>
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Patent activities reported by grant holders

- Patent application published
- Patent granted

Years: 2009 to 2018

- 2009: Patent application published = 4
- 2010: Patent application published = 1
- 2011: Patent application published = 1
- 2012: Patent application published = 1
- 2013: Patent application published = 7
- 2014: Patent application published = 6
- 2015: Patent application published = 27
- 2016: Patent granted = 4
- 2017: Patent granted = 3
- 2018: Patent granted = 2
Grants... delivering inventions... in these areas...

Pre-seed and exploratory pre-seed
Novo Nordisk Foundation Center for Biosustainability
Biotechnology-based synthesis and production
Clinical and basic biomedical research projects
Endocrinological and metabolic research
Other grant types

Medical or veterinary science
Biochemistry
Organic chemistry
Measuring; testing
Other

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Next steps

- Now we have volume and grants progressing in research
  - get to know the data better (dynamics, text mining, prediction)

- 100% of grant holders
  - Educational activities seem to be underreported
  - Learn why acknowledge of grants in publications do not respond 1:1 with the reporting of grant-relevant publications in researchfish®
Thank you!

http://impact.novonordiskfonden.dk
researchfish®
- multilayered reporting options

novo nordisk fonden

Individual grants
- Innovation (Pre-seed)
- Project
- PhD's
- Postdocs
- Investigator (career)
  - Challenge programs

Research center grants
- Group 1
- Group 2
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Patient care (Steno Diabetes Centers)
- Group 1
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Linking data:
Bibliometric analyses

Person-level
- Applicants & PI's

Grant-level
- PI's, Grant area, instrument, size etc.

Publication-level
- Articles & reviews

Institutional level
- Host institution

NORMA Omada
- researchfish®

Team members
- Grant-level reporting
- Collaborations, co-funders

- Person-level
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researchfish®
Team members

Grant-level reporting

Publication-level

Web of Science, Scopus, Dimensions

Articles & reviews

Citations, collaborations

Institutional level

Research collaboration
Linking data: Tracking funded research towards patents

NORMA Omada
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- In the Institutional level

researchfish®
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Patents
- Inventors
- Reported patent app's & grants
- Private use of public research
- Assignees

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