Target audience and scope

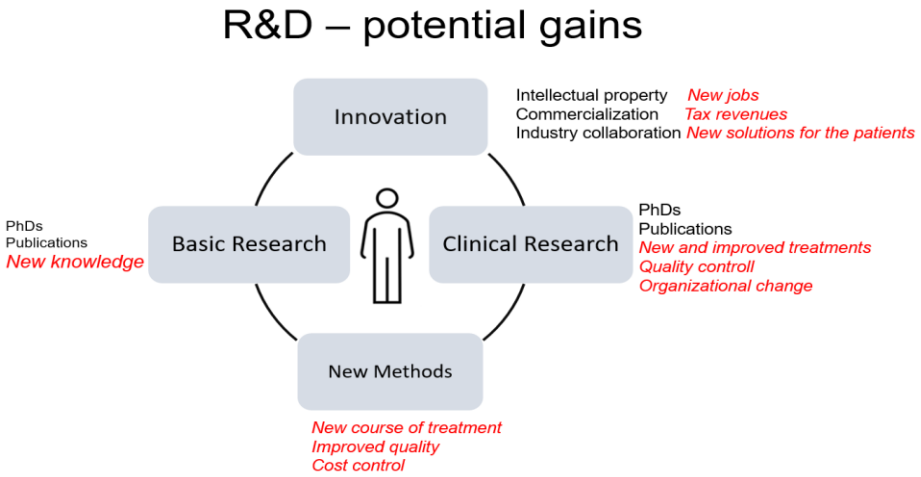
The target audience for the plan document is primarily leaders in the Technology and Innovation Clinic (TIK). All employees in the clinic are covered by the measures. The overall responsibility for the implementation of the strategy with an action plan lies with the clinic manager, staff leaders, and department heads.

Background for the plan

TIK was established in 2021, and since then, the achievement of goals from the previous strategic period has been evaluated. The Research Committee and clinic manager have considered this as part of the process of developing an initial version of the research action plan in the clinic. The Research Action Plan 2022-2025 at TIK is based on the Research Strategy 2021-2025 and the Research Action Plan 2021-2023 for Oslo University Hospital HF (OUS), as well as its own priorities. It must also be viewed in conjunction with other plan documents and sub-strategies relevant to research. For example, the Innovation Strategy with an action plan, Education Strategy with an action plan, and the annual revised area plan for ICT and medical equipment.

Research - a part of the core business in TIK:

- Clinical and technological research
- Development and innovation
- Part of the R&D value chain (Figure 1)



Figur 1. The R&D value change in the health sector

Goals and action plan

The action plan describes the key research strategic goals and measures for TIK in the period 2022-2025 with distributed responsibility for goal achievement.

Table refers to abbreviations

AL	- Head of Department
F	- Researchers
FGL	- Research Group Leader
FK	- Administrative Research Cordinator
FL	- Research Leader
FU	- TIK Research Committee
KL	- Head of division

Important for all our goals and tasks is that:

- The value system in TIK forms the basis for R&D.
- Project implementation in TIK follows project templates.
- User perspective is considered in all phases of R&D.
- Members of the research groups contribute to each other's success and collaboration opportunities across departments and research groups by: working together, sharing resources, and leveraging the clinic's interdisciplinary expertise, generosity, and showcasing each other's and the clinic's research.
- Department heads are supported in fulfilling their research obligations as determined by OUS.
- Active efforts are made to attract the best researchers and research environments.
- Research groups are supported in competing for external research and innovation funding.
- Necessary infrastructure is made available to conduct research.
- Collaboration with the business sector and innovation is an integral part of the activity.

1. Strengthen the focus on clinical research in collaboration with users, the business sector, and the public sector.					
Subgoal	***Measure***	***Indicator***	***Responsibility***	***Deadline***	***Comment***
1a. Increase the number of clinical studies and the number of included patients in all relevant subject areas - both investigator-initiated and industry-funded studies.	i. Strengthen interdisciplinary collaboration internally within the clinic and at OUS. ii. Establish meeting points for knowledge exchange between technologists, clinicians, and researchers in the clinic. iii. Enhance the international network and collaboration.	• Conduct 3 randomized clinical trials. • Initiate and conduct at least 4 clinical multicenter studies. • At least 3 PhD candidates through collaboration with the business sector. • At least 2 clinical or industry-funded studies initiated by departments outside the research environments at the Intervention Center and Medical Technology Department, preferably through collaboration.	KL, AL, FL, FGL, FU, F		
1b. Implement new models for clinical studies that take into account developments in personalized medicine, and incorporate more interdisciplinary aspects into clinical studies.	i. Investigates how AI and ICT can support research, including the release of resources for the development, implementation, and maintenance of AI infrastructure, including establishing Risk and Opportunity Management (ROS) capacity. Ref. Framework for digital collaboration | Digdir	• Establish an efficient data infrastructure for the application of artificial intelligence (AI). • At least 70% of clinical research should take place through interdisciplinary collaboration with technology environments within the division.	KL, AL, FGL		
1c. Ensure high-quality and treatment-oriented research in all fields and build more outstanding clinical research environments.	i. Establish, systematize, and utilize common functions within internal research support. ii. Further develop TIK as a research arena for the hospital where the clinic's interdisciplinary environments are even more closely connected with the clinical environments. iii. Provide relevant expertise and infrastructure for technological and clinical research. iv. Support and develop existing outstanding environments. v. Utilize experiences from established environments to develop new, effective clinical research environments. vi. Facilitate and allocate time for grant writing, e.g., through leave of absence and buyout with external funding. vii. Establish a mentorship program for researchers and clinicians.	• Increased share of externally funded projects and studies by 20% distributed across all fields.	KL, FL, FGL, AL, F		

1d. Expand national and international collaboration on clinical multicenter studies.	i. Establish a clinical research network within the clinic. ii. Establish a coordinating unit with support functions, including a mentorship program for clinical multicenter studies in TIK. iii. Actively participate in industry collaboration through organizations such as Norway Health Tech, Nordic Proof, Health2B.	• Coordinate or be a partner in at least 3 EU-funded international multicenter studies. • 6 national multicenter studies in clinical research.	KL, FU, FGL, FL, F		
2. Strengthen translational research as an essential link between basic research and clinical practice.					
Subgoals	***Measurements***	***Indicator***	***Responsibility***	***Deadline***	***Comment***
2a. Promote strong collaboration, including effective meeting places and combined positions, between basic research and clinical practice.	i. Apply for external funding with the aim of promoting collaboration between basic research and clinical practice through initiatives like UiO Life Science convergence environment. ii. Strengthen contacts/collaboration with the Faculty of Mathematics and Natural Sciences at UiO, and technology environments at NTNU. iii. Advocate for a more equitable relationship between the Faculty of Mathematics and Natural Sciences and OUS, similar to the Faculty of Medicine and OUS. iv. Enhance international collaboration in clinical and technological research. v. Establish more shared positions between the clinic and research. vi. Create more shared academic positions between UiO Faculty of Mathematics and OUS. vii. Utilize the Norwegian Research Council's new initiative regarding public PhDs to encourage more permanent clinic staff to pursue a doctoral degree. viii. Provide internal seed and startup funds within the clinic. ix. Strengthen technology-intensive research groups, including technological basic research to support clinical research/method development, such as AI (algorithm development/programming), sensor technology, data analysis, patient-specific anatomical 3D models, 3D modeling and printing as research tools, navigation and visualization, medical imaging, as well as robotics and automation.	• • 4 PhD and 4 Post-Doc positions during the period through collaboration between medical/technological basic research and clinical research. • • 40 articles applying medical/technological basic research to clinical issues. • • 10 new projects in research-driven innovation within basic, clinical, and technological research and method development. • • Establish the master's degree program "Medical Technology and Equipment" at the Faculty of Mathematics and Natural Sciences, UiO, open to students with various backgrounds in health and natural sciences. Linked to the Life Science Building. • • Establish a dedicated initiative in medical technology research, development, and innovation with designated permanent resources in the form of 1-2 positions from OUS - TIK and UiO - MatNat. • • Annual research seminar open to all within the clinic.	KL, AL, FL, FU, FGL, F		

2b. Facilitate the further development of general biobanks and associated research registries to ensure the best possible access to materials and data for translational research.	*i.* Gain a good overview of the clinic's needs for AI infrastructure for technological and clinical research. *ii.* Ensure that AI infrastructure is developed, established, and operated to meet new needs in R&D and industry collaboration. Ref. Framework for digital collaboration | Digdir iii. Allocate sufficient internal resources and acquire necessary external resources. iv. Establish an interdisciplinary competence group within the clinic.	• Establish 3 clinical databases for the use of AI, similar to those in the BiGMED, COMET, and NEWCOMET projects. • Data from at least 50% of the patients treated in the clinic should be included in such databases.	KL, AL, FL, FU, FGL		
2c. Support curiosity-driven, long-term research by creating good and predictable frameworks for excellent environments.	i. Expand the center model at IVS in collaboration with the hospital. ii. Ensure stable operation where research and the clinic synergize. iii. Knowledge transfer and collaboration between research environments.	• Establish at least 2 academic positions through collaboration between OUS and MATNAT. • Increase the percentage of Post-Docs and large-scale grants (NFR, EU) by at least 20%.	KL, AL, FL, FGL		
2d. Ensure infrastructure and core facilities that make advanced and resource-intensive methodology quickly accessible for basic and clinical research.	i. Increase contact and collaboration with the IVS core facility and other departments in TIK, as well as other internal and external actors, including innovation and business arenas. ii. Establish an efficient framework for joint applications and agreements with internal and external collaborators. iii. Strengthen established structures and contacts within UiO research infrastructure, such as the Department of Physics, Department of Informatics, as well as NTNU and OsloMet.	• • Adequate external funding (at least NOK 30 million/year), including large-scale infrastructure, through organizations such as NRF and UiO research infrastructure. • • Establish a dedicated cell lab at the Department of Physics for interdisciplinary basic research and strengthen the connection between the Faculty of Medicine and the Faculty of Mathematics and Natural Sciences. • • Expand to 6 advanced operating rooms at IVS. • • Ensure sufficient staffing to operate all operating rooms. • • Establish AI infrastructure and upgraded equipment in the IVS core facility.	KL, AL, FL, FGL, FU		
3. Further development of opportunities for data handling, data analysis and data sharing					
Subgoals	***Measurements***	***Indicator***	***Responsibility***	***Deadline***	***Comment***
3a. Work towards an overarching plan for the use of health data for research..	i. Ensure effective collaboration between internal and external stakeholders in ICT.	• Have tested and developed data infrastructure for internal use at OUS, through, for example, a testbed in TIK.	KL, AL, FL, FGL, FU		

		• Internal, regional, and national drivers in ICT processes related to the use of health data for research.			
3b. Facilitate open research and develop data-sharing systems that safeguard privacy.	i. Disseminate information and guidance for data sharing and privacy. ii. All researchers and personnel involved in clinical research should have Good Clinical Practice (GCP) training.	• • 20% increase in the number of articles containing de-identified personal data shared between different research environments. • • Establish 4 large training datasets for AI/"BIG data." • • 5 publications using data from the Clinical Data Warehouse (KDVH). • • Share at least 4 datasets with de-identified data for international use.	AL, FGL, FL, FU		
3c. Facilitate the development and use of supercomputing, including artificial intelligence, in both clinical research and translational research, as well as a tool for treatment.	i. Establish an efficient AI infrastructure for research and the clinic. ii. Organize an annual interdisciplinary seminar on AI in collaboration with internal and external stakeholders. iii. Strengthen the connection between various AI actors nationally and internationally. iv. Highlight the regional and national needs and secure sufficient funding. v. Establish contact with DScience to initiate a study on supercomputing and AI in the clinic.	• Initiated at least 10 new AI projects in translational and clinical research. • Established at least 2 AI methods that can be applied in the clinic. • Have established at least 1 project through collaboration with DScience at UiO.	KL, AL, FL, FU, FGL, F		
3d. Facilitate the automation of data flow between patient records and registries to the greatest extent possible.	i. i. Establish a PVO-approved test arena for data flow and data integration in the clinic. ii. ii. Make the clinical data warehouse available to researchers. iii. iii. Strengthen the connection with PVO and research support in the development and use of data sharing systems.	• Utilized patient records and the clinical data warehouse in at least 10 research projects.	KL, AL, FU		
3e. Contribute to the achievement of national quality registries' goals for complete and representative data collection, analysis, feedback to users, and research.	i. i. Streamline collaboration and interaction between TIK and Sykehuspartner. ii. ii. Establish user groups in TIK for data collection and analysis.	• Have contributed to the achievement of national quality registries' goals.	KL, AL, FU		
3f. Support researchers with practical, improved, and secure ICT systems for research, including solutions for data extraction and storage, as well as web-based solutions for national and international collaboration.	i. TIK drives to strengthen the collaboration between the clinic/users, other AI environments at OUS, TIK, Sykehuspartner, the Norwegian Health Network, and the Directorate of e-Health.	• Clinical data warehouse fully developed and made available to researchers. • Research PACS established with at least 5 publications through TIK. • Established a testbed AI infrastructure at IVS. • Testing of AI infrastructure for clinical research at OUS.	KL, AL, FL, FU		

3g. Implement electronic, dynamic patient consent.	i. Adequate resources allocated in the clinic.	• Implemented during the period.	KL, AL		
4. Systematically conduct career guidance for researchers and targeted recruitment for research.					
Subgoals	***Measurements***	***Indicator***	***Responsibility***	***Deadline***	***Comment***
4a. Establish support schemes for the career development of young researchers in all professions.	i. Strengthen the mentorship system and promote the career development program. ii. Regular employee and career development discussions. iii. Utilize the NFR's career planning form for postdocs, including career development and qualification for promotion as a separate point in employee discussions.	• Implemented individual career and development plans for postdocs and early-career researchers, including career planning, networking, grant writing, and science communication. • Increased the number of senior researchers in the clinic by 20%.	AL, FGL, FL, F		
4b. Facilitate shared positions between research and the clinic immediately after completing a Ph.D. degree.	i. Support long-term research and postdocs for young researchers after completing their Ph.D. ii. Increase the proportion of external funding through close collaboration between research and the clinic. iii. Enhance collaboration with academic institutions (UiO/OsloMet/NTNU, etc.) and the business sector. iv. Strengthen internal networking within the hospital.	• Increase by 2 combined academic positions. • Increase the number of shared positions between OUS and academic institutions in Norway as well as the business sector. • Formalize allocated research time in researcher positions after completing a Ph.D.	KL, AL, FU		
4c. Motivate for a greater degree of internationalization, establishment of international research networks, and researcher mobility.	i. Facilitate time and resources for grant writing and networking. ii. Networking with international research communities, national, and international industries.	• At least 2 grants awarded through the EU's Horizon Europe framework program. • Applied for and awarded a project through the SFF and SFI programs during the period. • Organize at least one international research conference. • Continue and strengthen the network through involvement in the "Journal of Electrical Bioimpedance."	AL, FL, FU, FGL, F		
4d. Increase international recruitment of researchers.	i. Further develop and strengthen established international research environments in the clinic. ii. Promote TIK internationally through seminars, congresses, and researcher networks.	• Further develop 1-2 research environments to become world-leading in their field. • • Recruit at least 5 Ph.D. and 4 postdocs from international environments through EU projects, international clinical multicenter studies, and collaboration with the business sector.	FGL,FU, FL, F		

5. Ensure research activities in and towards new buildings at OUS and the Life Science Building at the University of Oslo.					
Subgoals	***Measurements***	***Indicator***	***Responsibility***	***Deadline***	***Comment***
5a. Ensure good research facilities and sufficient research space in new hospital buildings at Aker and Rikshospitalet, as well as in relocation and relocation projects during the construction period, with the involvement of researchers.	i. Active participation in input rounds and in relevant working groups.	• Plan for integrating R&D into the clinic's and hospital's efforts on New OUS. • Expand IVS with an advanced hybrid operating room. • Transfer experience from TIK testbed and research infrastructure in the planning of research facilities in new hospital buildings.	KL, AL, FL, FU		
5b. Review the current organizational structure of research laboratories at the hospital in preparation for research in future buildings, including the collaboration axis with the new Life Science Building at the University of Oslo.	i. Contribute to working groups and input rounds related to research areas in New OUS and the Life Science Building. ii. Strengthen research collaboration with BI (Business School).	• Identify the clinic's needs regarding the Life Science Building and core facilities in New OUS. • 1 PhD in organizational research in collaboration with the BI (Business School).	KL, AL, FL, FU		
5c. Establish appropriate infrastructure, including storage facilities, for research biobanks.	i. Active participation and input rounds in all relevant working groups in New OUS.	• Have specified the clinic's needs for laboratory access and biobank in new hospital buildings and New OUS.	KL, AL, FL, FU		
5d. Ensure good interfaces between research environments located at the hospital, including environments at the University of Oslo and OsloMet, which are located at OUS.	i. i. Invite collaborators in applications, including large-scale applications (EU, NRF).	• Increase the number of collaborative projects with other clinics by 10% during the period. • Have established 3 collaborative projects with OsloMet, 3 with the Faculty of Medicine at UiO, and 10 with other faculties at UiO.	AL, FGL, FL, FU, F		