



DZHK

DEUTSCHES ZENTRUM FÜR
HERZ-KREISLAUF-FORSCHUNG E.V.

Die Zentralisierung der DZHK Heart Bank: Qualität und Effizienz durch Kompetenz

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24. September 2024



- seit **1997** SHIP „Study of Health in Pomerania“
- seit **2011** GANI_MED
- erstes vollautomatisiertes Biobankmodul
(Kapazität: 500.000 Aliquote)
- seit **2012** DZHK
- seit **2013** NAKO
- seit **2016** zweites vollautomatisiertes Biobankmodul
(Kapazität: 2.500.000 Aliquote)
- **2017-2020** Verbundpartner der „German Biobank Alliance“ im Rahmen des BMBF-Projektes: „Ertüchtigung deutscher Biobank-Standorte zur Anbindung an BBMRI“
- **2020-2025** Partner des „Netzwerk Universitätsmedizin“ (NUM); gefördert durch das BMBF
- **2024-2029** Zentralisierung der DZHK Heart Bank



Kennzahlen der Integrated Research Biobank (IRB) des IKCL:

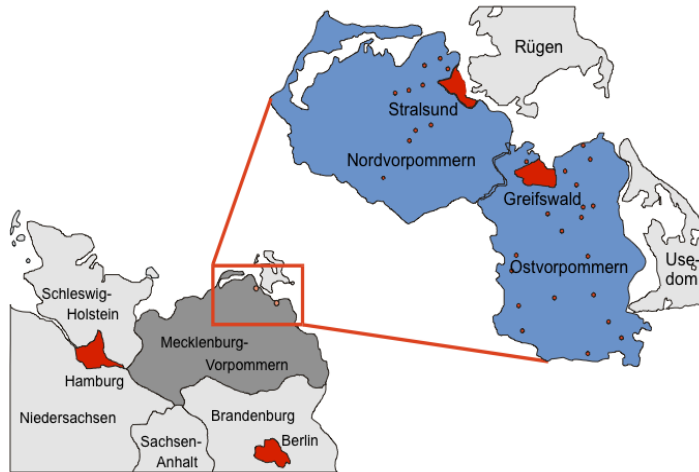
- Einlagerung: ca. 100.00 Cryogefäße pro Jahr
- Auslagerung: ca. 70.000 Cryogefäße pro Jahr

Grundfinanzierung des Biobankings im IKCL durch die Fakultät:

- 1,0 VK (E13)
- 1,0 VK MTL für Biobanking
- Wartungskosten der Biobankgeräte

- alle weiteren Personen und Investitionen werden durch Drittmittel finanziert

Study of Health in Pomerania (SHIP)

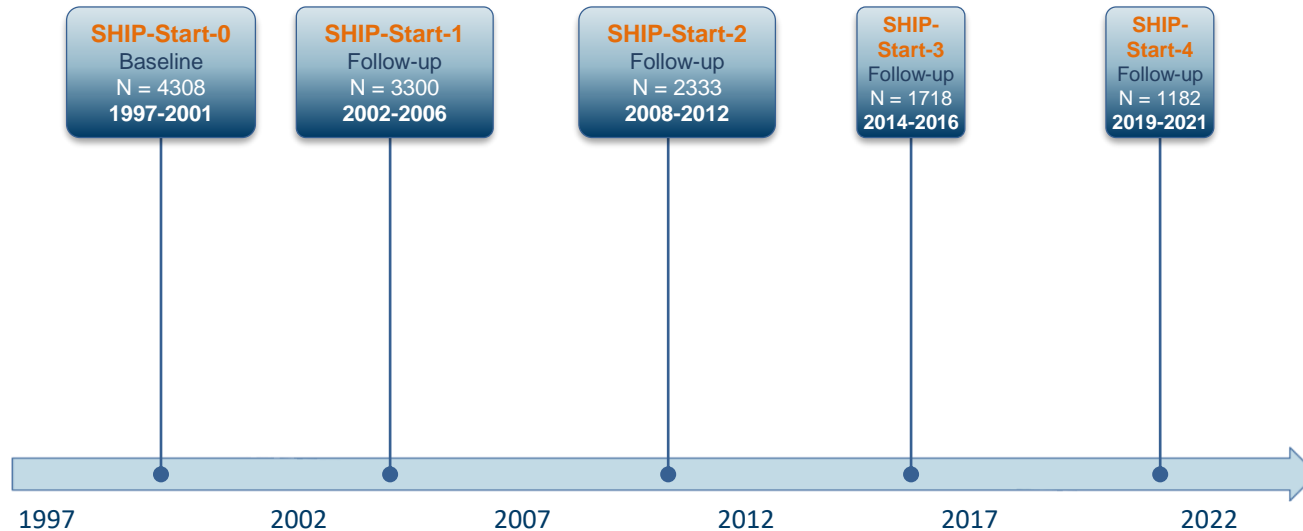


- longitudinale epidemiologische Studie
- populationsbasiert
- Altersbereich: 20 - 79 Jahre zur Basiserhebung
- 1997 erste Basiserhebung (Response: 68,8%)

Hauptziele:

- Bestimmung der Prävalenz und Inzidenz allgemeiner Risikofaktoren sowie die Erfassung subklinischer und klinisch manifester Erkrankungen
- Untersuchung komplexer Assoziationen zwischen Risikofaktoren, subklinischen und klinischen Erkrankungen

- bevölkerungsrepräsentative **Längsschnittstudie**
- alterstratifizierte randomisierte Selektion nach MONICA
(12 Alter- und Geschlechtsstrata)
- Ziehung mit Hilfe der Einwohnermeldeämter

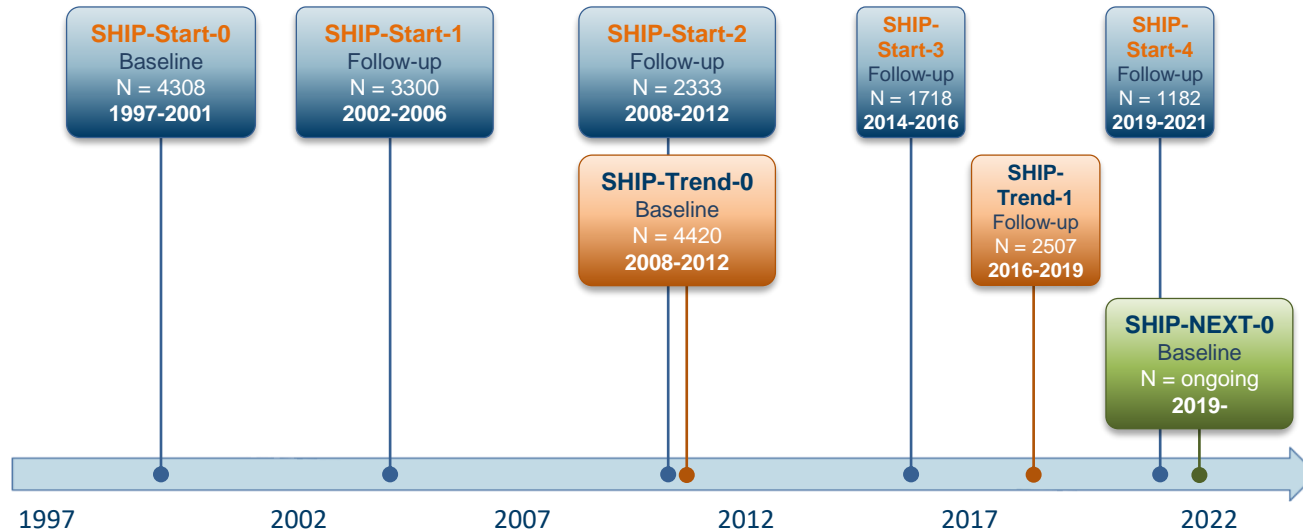


- bevölkerungsrepräsentative **Längsschnittstudien**:

SHIP-Start

SHIP-Trend

SHIP-Next



Study of Health in Pomerania (SHIP): a health examination survey in an east German region: objectives and design

Ulrich John¹, Birgit Greiner¹, Elke Hense¹, Jan Lüdemann¹, Marion Plek¹,
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Ursula Haertel⁴, Hans-Werner Hense⁵, Johannes Haerting⁶, Stefan Willich⁷,
Christof Kessler⁸

Originalartikel | original article

Summary

Objectives: The reason for the Study of Health in Pomerania (SHIP) is the lack of epidemiological studies with a broad range of health indicators. Furthermore, in Germany there is a need for studies that take into account the particular situation of life after the reunification. One objective of SHIP is to provide prevalence estimates on a broad range of diseases, risk and health factors for a defined region in the former GDR.

Methods: A sample of 7 008 women and men aged 20 to 79 years in a north-east region of Germany, 4 900 expected participants. The sample was drawn in two steps: First, 32 communities in the region were selected. Second, within the communities a simple random sample was drawn from residence registers, stratified by gender and age. The data collection and instruments include four parts: oral health examination, medical examination, health-related interview, and a health- and risk-factor-related questionnaire. The oral health examination includes the teeth, periodontium, oral mucosa, craniomandibular system, and prosthodontics. The medical examination

includes blood pressure measurements, electrocardiography, echocardiography, carotid, thyroid and liver ultrasound, neurological screening, blood and urine sampling. The computer-aided health-related interview includes cardiovascular symptoms, utilisation of medical services, health-related behaviours, and socioeconomic variables. The self-administered questionnaire comprises housing conditions, social network, work conditions, subjective well-being and individual consequences from the German reunification.

Key Words: Health examination survey – Germany – Prevalence – Oral health – Carotid arteries ultrasound – Echocardiography.

The research work reported is funded by grants from the German Federal Ministry for Education and Research (BMBWF) grants no. 0122608/01 of the Ministry for Education, Research and Cultural Affairs and the Ministry for Social Affairs of the State of Mecklenburg-Vorpommern as well as the Municipal Hospital of Stralsund GmbH.

John, et al. *Soz Präventivmed* 2001;46(3):186-94.

Völzke, et al. *Int J Epidemiol* 2011;40(2):294-307.

Völzke, et al. *Int J Epidemiol* 2022;51(6):e372-e83.

COHORT PROFILE

Cohort Profile: The Study of Health in Pomerania

Henry Völzke,^{1,2*} Dietrich Alte,¹¹ Carsten Oliver Schmidt,¹ Dörte Radke,¹ Roberto Lorbeer,¹ Nele Friedrich,² Nicole Aumann,¹ Katharina Lau,¹ Michael Piontek,¹ Gabriele Born,¹ Christoph Havemann,¹ Till Ittermann,^{1,2} Sabine Schipf,¹ Robin Haring,² Sebastian E Baumeister,¹ Henri Wallaschofski,² Matthias Nauck,² Stephanie Frick,³ Andreas Arnold,¹ Michael Jünger,³ Julia Mayerle,⁴ Matthias Kraft,⁴ Markus M Lerch,⁴ Marcus Dörr,² Thorsten Refellmann,⁵ Klaus Empen,⁵ Stephan B Felix,⁵ Anne Obst,^{1,5} Beate Koch,⁵ Sven Gläser,⁵ Ralf Ewert,⁵ Ingo Fietze,⁶ Thomas Penzel,⁶ Martina Dören,⁷ Wolfgang Rathmann,⁸ Johannes Haerting,⁹ Mario Hannemann,¹⁰ Jürgen Röpel, Ralf Puls,¹⁵ J Christian Sch, Dieter Rosski, Wolfgang Ho

KEY MESSAGES

- The Study of Health in Pomerania is a population-based project, which consists of two independent cohorts (SHIP and SHIP-TREND). The SHIP investigates common risk factors, subclinical disorders and manifest diseases in the high-risk population of northeast Germany.
- A particular characteristic of SHIP is that it does not specifically address one selected disease. It rather attempts to describe health-related conditions with the widest focus possible.
- Besides the comprehensiveness of information on risk factors, subclinical disorders and manifest diseases, the population representativeness, the high level of quality assurance, particularly in standardization of non-invasive examination methods and data management represent further strengths of the study.

Cohort Profile Update: The Study of Health Pomerania (SHIP)

Henry Völzke,^{1,2*} Janka Schössow,¹¹ Carsten Oliver Schmidt¹, Clemens Jürgens,¹ Adrian Richter,¹ André Werner,¹ Nicole Werner,¹ Dörte Radke,¹ Alexander Teumer^{1,2}, Till Ittermann,¹ Birgit Schauer,¹ Vivien Henck,¹ Nele Friedrich,³ Anke Hannemann,^{2,3} Theresa Winter,³ Matthias Nauck,^{2,3} Marcus Dörr,^{2,4} Martin Bahls^{2,4}, Stephan B. Felix,^{2,4} Beate Stubbe,⁴ Ralf Ewert,⁴ Fabian Frost⁵, Markus M. Lerch,⁵ Hans J. Grabe,^{6,20} Robin Bülow⁶,^{2,7} Markus Otto,⁷ Norbert Hofer,⁷ Wolfgang Rathmann⁸, Ulf Schminka⁹

Key Features

- The Study of Health in Pomerania (SHIP) is a population-based project, which consists of the two independent cohorts: SHIP-START and SHIP-TREND. SHIP investigates common risk factors, subclinical disorders and manifest diseases in the high-risk population of Northeast Germany.
- A particular characteristic of SHIP is that it does not specifically address one selected disease. It rather attempts to investigate health-related conditions with the widest scope possible.
- New examination waves of both cohorts were conducted to ensure longitudinal analyses.
- One new research focus has been laid on omics research. Information is available on genome-wide genotyping, whole-blood-transcriptome and methylome, plasma circulating miRNome, plasma proteome, plasma, urine and saliva metabolome as well as stool and saliva microbiome.
- The SHIP project has several collaborations and is part of many research consortia. Further collaborations are welcome; please contact Henry Völzke (voelzke@uni-greifswald.de).



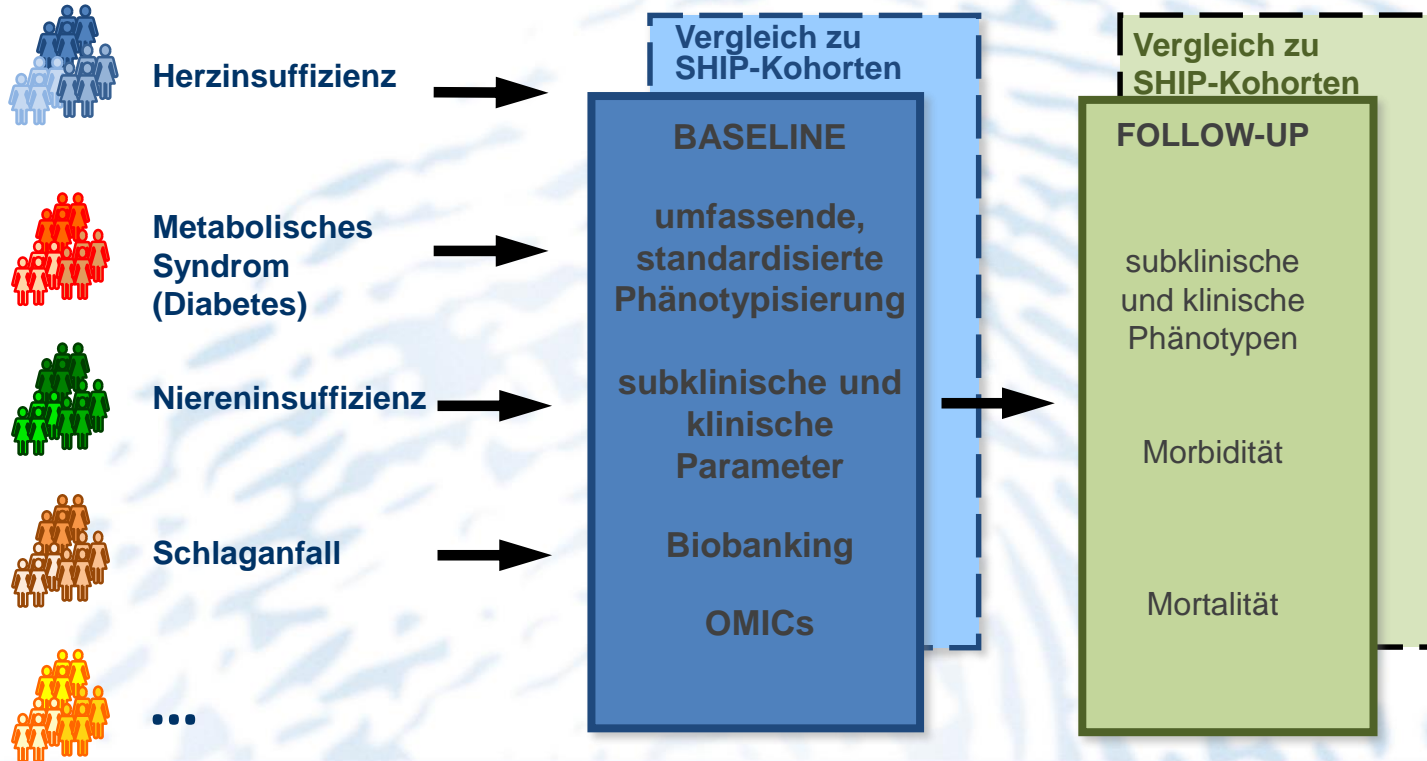
GANI _ MED

Greifswald Approach to Individualized Medicine

Das Ziel besteht darin, moderne state-of-the-art Diagnostik und neue therapeutische Interventionen anhand der spezifischen Anforderungen und Charakteristika des individuellen Patienten anzuwenden, um dadurch die Effektivität der Behandlung zu optimieren, unerwünschte Wirkungen zu vermeiden und Kosten im Gesundheitssystem zu sparen.

Rekrutierung der Patientenkohorten

(in Übereinstimmung mit Methoden und Standards von SHIP)



Grabe et al. *Journal of Translational Medicine* 2014, 12:144
<http://www.translational-medicine.com/content/12/1/144>



PROTOCOL

Open Access

Cohort profile: Greifswald approach to individualized medicine (GANI_MED)

Hans J Grabe^{1*}, Heinrich Assel², Thomas Bahls^{3,4}, Marcus Dörr^{4,5}, Karlhans Endlich⁶, Nicole Endlich⁶, Pia Erdmann⁷, Ralf Ewert⁸, Stephan B Felix^{4,9}, Beate Fiene⁹, Tobias Fischer¹⁰, Steffen Flessa¹¹, Nele Friedrich^{4,12}, Mariacarla Gadebusch-Bondio^{10,29}, Manuela Gesell Salazar¹³, Elke Hammer^{4,13}, Robin Haring¹², Christoph Havemann³, Michael Hecker¹⁴, Wolfgang Hoffmann^{3,4,7}, Birte Holtfreter¹⁵, Tim Kacprowski¹³, Kathleen Klein¹⁶, Thomas Kocher¹⁵, Holger Kock¹⁷, Janina Krafczyk³, Jana Kuhn⁶, Martin Langanke², Uwe Lendeckel¹⁸, Markus M Lerch⁹, Wolfgang Lieb^{3,20}, Roberto Lorbeer⁷, Julia Mayerle⁷, Konrad Meissner¹⁹, Henriette Meyer zu Schwabedissen^{16,31}, Matthias Nauck^{4,12}, Konrad Ott^{10,32}, Wolfgang Rathmann²¹, Rainer Rettig²², Claudia Richardt³, Karen Salje¹⁶, Ulf Schminke²³, Andrea Schulz¹, Matthias Schwab^{24,25}, Werner Siegmund¹⁶, Sylvia Stracke⁹, Karsten Suhre^{26,33}, Marius Ueffing^{27,34}, Saskia Ungerer²³, Uwe Völker^{4,13}, Henry Völzke^{3,4}, Henri Wallaschofski^{4,12}, Vivian Werner³, Marek T Zygmunt²⁸ and Heyo K Kroemer^{1,6,35}

Abstract

Background: Individualized Medicine aims at providing optimal treatment for an individual patient at a given time based on his specific genetic and molecular characteristics. This requires excellent clinical stratification of patients as well as the availability of genomic data and biomarkers as prerequisites for the development of novel diagnostic tools and therapeutic strategies. The University Medicine Greifswald, Germany, has launched the "Greifswald Approach to Individualized Medicine" (GANI_MED) project to address major challenges of Individualized Medicine. Herein, we describe the implementation of the scientific and clinical infrastructure that allows future translation of findings relevant to Individualized Medicine into clinical practice.

Methods/design: Clinical patient cohorts (N > 5,000) with an emphasis on metabolic and cardiovascular diseases are being established following a standardized protocol for the assessment of medical history, laboratory biomarkers, and the collection of various biosamples for bio-banking purposes. A multi-omics based biomarker assessment including genome-wide genotyping, transcriptome, metabolome, and proteome analyses complements the multi-level approach of GANI_MED. Comparisons with the general background population as characterized by our Study of Health in Pomerania (SHIP) are performed. A central data management structure has been implemented to capture and integrate all relevant clinical data for research purposes. Ethical research projects on informed consent procedures, reporting of incidental findings, and economic evaluations were launched in parallel.

Keywords: Personalized Medicine, Individualized Medicine, Epidemiology

Grabe, et al. *J Transl Med* 2014;12:144.

Die NAKO Gesundheitsstudie



200.000 Probanden
18 Studienzentren

Major diseases:

- ▶ CVD
- ▶ Diabetes mellitus
- ▶ Cancer
- ▶ Neurologic and psychiatric diseases
- ▶ Respiratory diseases
- ▶ Infectious diseases

Major exposures and risk factors:

- ▶ Body composition
- ▶ Physical activity
- ▶ Physical fitness
- ▶ Diet
- ▶ Smoking and alcohol consumption
- ▶ Psychosocial factors
- ▶ Socioeconomic status
- ▶ Sleep-related characteristics
- ▶ Chronic infections, immune factors, and microflora
- ▶ Occupational and environmental exposures

Bundesgesundheitsbl 2012 · 55:781–789
DOI 10.1007/s00103-012-1499-y
Online publiziert: 7. Juni 2012
© Springer-Verlag 2012

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Die Nationale Kohorte

Chronische Krankheiten sind in Deutschland ebenso wie in anderen westlichen Industrieländern die Haupttodesursache. Durch den demografischen Wandel wird die Bedeutung dieser sogenannten Volkskrankheiten in den kommenden Jahrzehnten weiter zunehmen und eine große Belastung für das Gesundheitssystem darstellen. Eine starke Erhöhung der Pa-

zische Untersuchungen, wiederholte Befragungen und Entnahmen von Blutproben Informationen über die Studienteilnehmer vor der eventuellen Diagnose einer Krankheit gesammelt werden. Somit können für eine Vielfalt von Gesundheitszuständen oder Krankheitskombinationen (Multimorbidität) die Auswirkungen von Lebensstil, Umwelt

tiert wurden (vor bis zu 25 Jahren), als zahlreiche der heute üblichen Untersuchungstechniken noch nicht verfügbar waren. Des Weiteren werden bei einigen der größeren deutschen Kohortenstudien die Bioproben der für die Forschung interessanten Personen in den nächsten zehn bis 20 Jahren größtenteils aufgebraucht sein.

European Journal of Epidemiology (2022) 37:1107–1124
<https://doi.org/10.1007/s10654-022-00890-5>

COHORT PROFILE



Framework and baseline examination of the German National Cohort (NAKO)

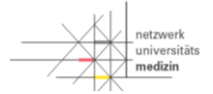
Annette Peters^{1,2} · German National Cohort (NAKO) Consortium³ · Annette Peters^{1,2} · Karin Halina Greiser⁴ · Susanne Göttlicher¹ · Wolfgang Ahrens² · Maren Albrecht^{1,7} · Fabian Bamberg⁶ · Till Bärnighausen² · Heiko Becher¹⁰ · Klaus Berger¹¹ · Achim Beule^{12,13} · Heiner Boeing¹⁴ · Barbara Bohn² · Kerstin Bohner² · Bettina Braun¹¹ · Hermann Brenner⁸ · Robin Blülow² · Stefanie Castel¹⁶ · Antje Dammis-Machado⁵ · Marcus Dörr¹⁷ · Nina Ebert¹⁸ · Margrit Ecker² · Carina Emmel¹⁹ · Beate Fischer²⁰ · Claus-Werner Franke²¹ · Sylvia Gastaldello²² · Guido Gianfranceschi²³ · Matthias Günther²³ · Kathrin Günther²⁴ · Klaus-Peter Günther²⁴ · Johannes Haerting²⁵ · Ulrike Haug⁵ · Iris M. Heid¹⁶ · Margit Heier^{1,27} · Diana Heinemeyer³ · Thomas Hense^{1,28} · Florian Herbolzheimer⁴ · Jochen Hirsch²³ · Wolfgang Hoffmann²⁹ · Bernd Holleczek³⁰ · Heike Hölling³¹ · Andreas Hörlein¹ · Karl-Heinz Jöckel¹⁹ · Rudolf Kaaks⁴ · André Karch¹¹ · Stefan Karrasch^{1,32} · Nadja Kartschmitz²⁵ · Hans-Ulrich Kauzior³ · Thomas Keil^{33,34,64} · Yvonne Kemmling¹⁶ · Bianca Klee²⁵ · Birgit Klüppelholz¹⁸ · Alexander Kluttig²⁵ · Lisa Kofink³ · Anna Köttgen³⁵ · Daniel Kraft⁴ · Gérard Krause¹⁶ · Lisa Kretz⁹ · Lilian Krist³³ · Jan Kühnisch³⁶ · Oliver Kuß¹⁸ · Nicole Legath¹¹ · Anna-Therese Lehnich¹⁸ · Michael Leitzmann²⁰ · Wolfgang Lieb³⁷ · Jakob Linseisen^{38,39,40} · Markus Loeffler⁴¹ · Anke Macdonald³ · Klaus H. Maier-Hein^{4,42} · Nina Mangold^{2,59} · Claudia Meinke-Franze⁵⁹ · Christa Meisinger^{2,39,64} · Juliane Melzer⁴ · Björn Mergarten³ · Karin B. Michels²¹ · Rafael Mikolajczyk²⁵ · Susanne Moebus⁴³ · Ulrich Mueller⁴⁴ · Matthias Nauck⁴⁵ · Thoralf Niendorf⁴⁶ · Konstantin Nikolaou⁴⁷ · Nadia Obi¹⁹ · Stefan Ostrzinski²⁹ · Leo Panreck⁴ · Iris Pigeot⁴⁸ · Tobias Pischon^{48,49,63} · Irene Pschibul-Thamm^{1,59} · Wolfgang Rathmann¹⁸ · Achim Reineke⁹ · Stefanie Roloff⁴⁹ · Dan Rujescu⁵¹ · Stefan Rupp⁵² · Oliver Sander⁵³ · Tamara Schikowski⁵⁴ · Sabine Schipf⁵⁹ · Peter Schirmacher² · Christopher L. Schlett⁶ · Borge Schmidt¹⁹ · Georg Schmidt⁵⁵ · Martin Schmidt⁶ · Gina Schöne³¹ · Holger Schumacher⁵⁶ · Matthias B. Schulze^{2,58} · Alexandra Schwab⁵⁷ · Anja M. Sedlmeier²⁹ · Sanja Seljak²⁹ · Julia Six-Merker¹ · Ramona Sowade² · Andreas Stang¹⁹ · Oliver Stegle⁴ · Karen Steindorf⁶ · Gunthard Stübbs²⁹ · Enno Swart⁵⁸ · Henning Teismann¹¹ · Inke Thiele¹ · Sigrid Thiery⁵⁹ · Marius Ueffing⁶⁰ · Henry Völzke²⁹ · Sabina Waniek³⁷ · Andrea Weber²⁹ · Nicole Werner²⁹ · H.-Erch Wichmann¹ · Stefan N. Willich³³ · Kerstin Wirtkner⁴¹ · Kathrin Wolf¹ · Robert Wolf²⁹ · Hajo Zeeb⁵ · Melanie Zinkhan⁶¹ · Johannes Zschocke^{25,62}

Received: 29 March 2022 / Accepted: 14 June 2022 / Published online: 19 October 2022
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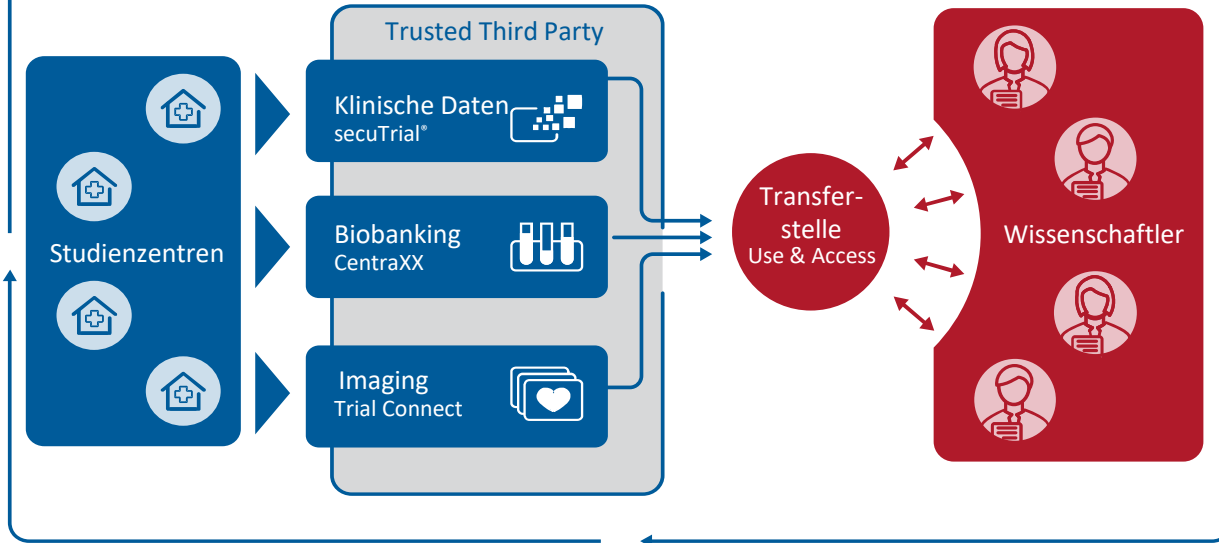
Abstract

The German National Cohort (NAKO) is a multidisciplinary, population-based prospective cohort study that aims to investigate the causes of widespread diseases, identify risk factors and improve early detection and prevention of disease. Specifically, NAKO is designed to identify novel and better characterize established risk and protection factors for the development of cardiovascular diseases, cancer, diabetes, neurodegenerative and psychiatric diseases, musculoskeletal diseases, respiratory and infectious diseases in a random sample of the general population. Between 2014 and 2019, a total of 205,415 men and women aged 19–74 years were recruited and examined in 18 study centres in Germany. The baseline assessment included a face-to-face interview, self-administered questionnaires and a wide range of biomedical examinations. Biomaterials were collected from all participants including serum, EDTA plasma, buffy coats, RNA and erythrocytes, urine, saliva, nasal swabs and stool. In 56,971 participants, an intensified examination programme was implemented. Whole-body 3T magnetic resonance imaging was performed in 30,861 participants on dedicated scanners. NAKO collects follow-up information on incident diseases through a combination of active follow-up using self-report via written questionnaires at 2–3 year intervals and passive follow-up via record linkages. All study participants are invited for re-examinations at the study centres in 4–5 year intervals. Thereby, longitudinal information on changes in risk factor profiles and in vascular, cardiac, metabolic,

Extended author information available on the last page of the article



Ethik | Datenschutzkonzept | Use & Access Politik



Clinical Research in Cardiology
<https://doi.org/10.1007/s00392-023-02177-5>

ORIGINAL PAPER

The DZHK research platform: maximisation of scientific value by enabling access to health data and biological samples collected in cardiovascular clinical studies

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Received: 19 December 2022 / Accepted: 20 February 2023
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SPONSORED BY THE



Federal Ministry of Education and Research

European Journal of Epidemiology (2022) 37:849–870
<https://doi.org/10.1007/s10654-022-00996-z>

COHORT PROFILE



The German National Pandemic Cohort Network (NAPKON): rationale, study design and baseline characteristics

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Received: 21 January 2022 / Accepted: 22 June 2022 / Published online: 29 July 2022
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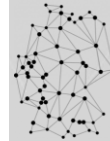
Abstract

The German government initiated the *Network University Medicine* (NUM) in early 2020 to improve national research activities on the *Severe Acute Respiratory Syndrome Coronavirus 2* (SARS-CoV-2) pandemic. To this end, 36 German Academic Medical Centers started to collaborate on 13 projects, with the largest being the *National Pandemic Cohort Network* (NAPKON). The NAPKON's goal is creating the most comprehensive *Coronavirus Disease 2019* (COVID-19) cohort in Germany. Within NAPKON, adult and pediatric patients are observed in three complementary cohort platforms (Cross-Sectoral, High-Resolution and Population-Based) from the initial infection until up to three years of follow-up. Study procedures comprise comprehensive clinical and imaging diagnostics, quality-of-life assessment, patient-reported outcomes and biosampling. The three cohort platforms build on four infrastructure core units (Interaction, Biosampling, Epidemiology, and Integration) and collaborations with NUM projects. Key components of the data capture, regulatory, and data privacy are based on the *German Centre for Cardiovascular Research*. By April 01, 2022, 34 university and 40 non-university hospitals have enrolled 5298 patients with local data quality reviews performed on 4727 (89%); 47% were female, the median age was 52 (QR: 36–62) and 50 pediatric cases were included. 44% of patients were hospitalized, 15% admitted to an intensive care unit, and 12% of patients deceased while enrolled. 8845 visits with biosampling in 4349 patients were conducted by April 03, 2022. In this overview article, we summarize NAPKON's design, relevant milestones including first study population characteristics, and outline the potential of NAPKON for German and international research activities.

Trial registration <https://clinicaltrials.gov/ct2/show/NCT04768998>, <https://clinicaltrials.gov/ct2/show/NCT04747366>, <https://clinicaltrials.gov/ct2/show/NCT04679584>

Keywords COVID-19 · SARS-CoV-2 · Prospective national cohort · Longitudinal study · Epidemiology · Cross-sectoral · Population-based

Extended author information available on the last page of the article



NAPKON
 NATIONALES
 PANDEMIE
 KOHORTEN
 NETZ

GEFÖHRT VOM



Bundesministerium für Bildung und Forschung

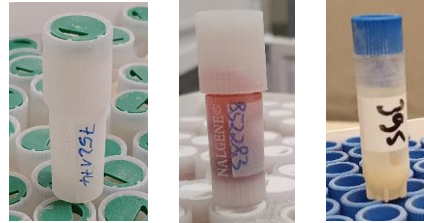


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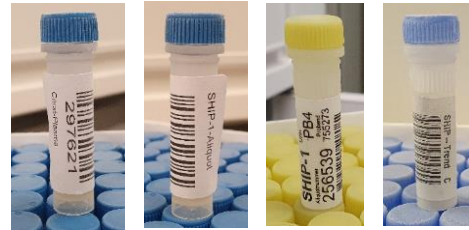


Cryogefäße im Wandel der Zeit I

SHIP-Start-0

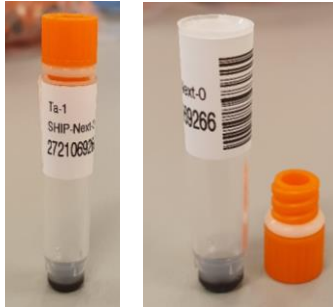


SHIP-Start-1



Innengewinde

ca. 5 mm 



SHIP-Next-0
(2011)

Außengewinde



ab 2013



ab 2020

Effizienzsteigerung:
bei 500 µl Cryotubes: + 15%
bei 300 µl Cryotubes: + 20%

Leistungsverzeichnis / Anforderungskatalog

LN₂-Gasphasen-geeignete Cryo-Röhrchen (CR) für die Nationale Kohorte

Stand: 15.11.2013



DE GRUYTER

J Lab Med 2019; 43(6): 339–345

Biobanking

Edited by: M. Kiehnkopf

Astrid Petersmann, Theresa Winter, Sophia Lamp and Matthias Nauck*

Relevant criteria for the selection of cryotubes. Experiences from the German National Cohort

<https://doi.org/10.1515/labmed-2019-0172>

Received October 8, 2019; accepted November 6, 2019; previously published online November 29, 2019

Abstract

Background: The storage of different biomaterials over long time periods is one of the main requirements of biobanking ensuring that modifications in the composition or any other change of the biomaterials have to be avoided. In the German National Cohort samples from around 200,000 participants are processed and stored long term.

Methods: A tender for cryotubes and racks was performed in 2013 setting up several characteristics that were judged against each other. Tubes and racks were evaluated regarding the performance and handling in connection with the main biorepository. With a 5-year experience using the selected tubes we are able to reflect some of the criteria of the tender.

Results: At the end of the decision, the former company FluidX, in the meantime taken over from Brooks (Brooks Life Sciences, Manchester, UK), received the order. The experience with the external testing of the tube was useful.

Conclusions: Overall, the experience with the cryotubes is good and their mechanical handling at the different sites is routine in the meantime. There are some aspects that we recommend for future tenders. Further research is necessary to learn more about the cryotubes and the labware in general in the field of biobanking to store our samples as safely as possible.

Keywords: automatization; biobanking; cryotubes; German National Cohort; tender.

Introduction

The storage of different biomaterials over long time periods – up to decades – is one of the main requirements of biobanking. The aim of the storage has to be that modifications in the composition or any other changes of the biomaterials have to be avoided. Therefore, one of the approaches to achieve this goal is the storage at low temperatures, down to around -195 °C in the gas phase of liquid nitrogen. These low temperatures have positive effects in view of the sample quality, but the applied

250 µl Füllvolumen

18.6
mm



500 µl Füllvolumen

36.5
mm



fluidK

Zusätzliches Labeln der Biobanking-Sets (Vergangenheit)



Zusätzliches Labeln mit Papieretiketten:

- LIMS-Auftragsnummer mit Materialkennung
- für den Menschen lesbare Informationen



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DZHK-Biobanking: Sets

Serum
EDTA-Plasma
Zitrat-Plasma
Urin



Buffy Coat



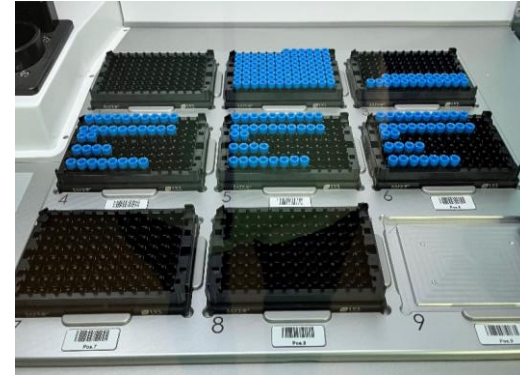
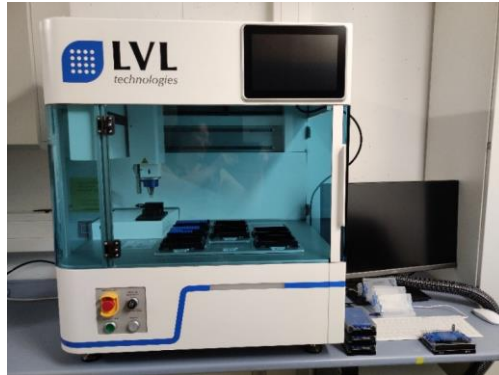
300 µl

- zentrales Labeln und Versand
- Entscheidung für ein dezentrales Biobanking



individuelles Labeln von Cryotubes mit Laser-Technologie

Laser & Pick Place



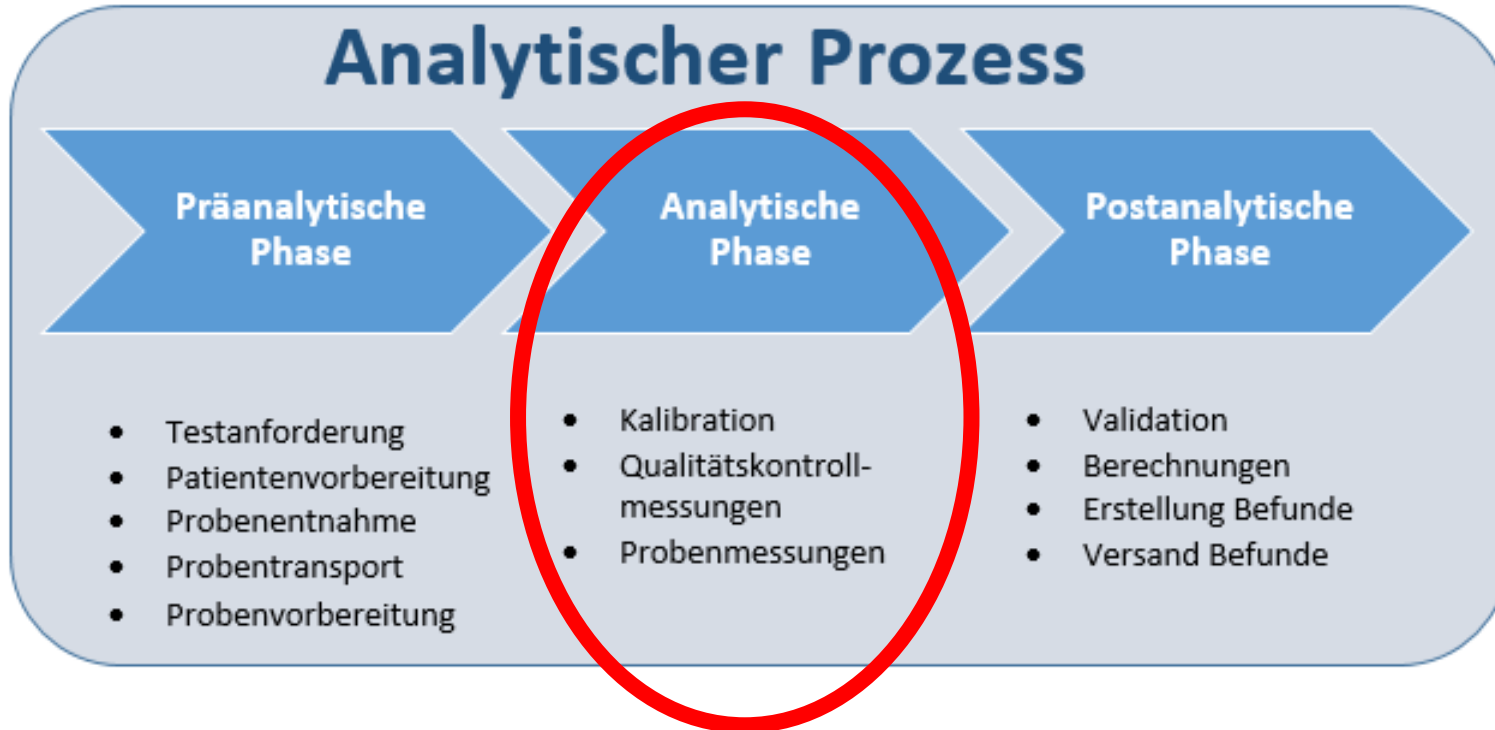


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Individuelles Laser Labeln







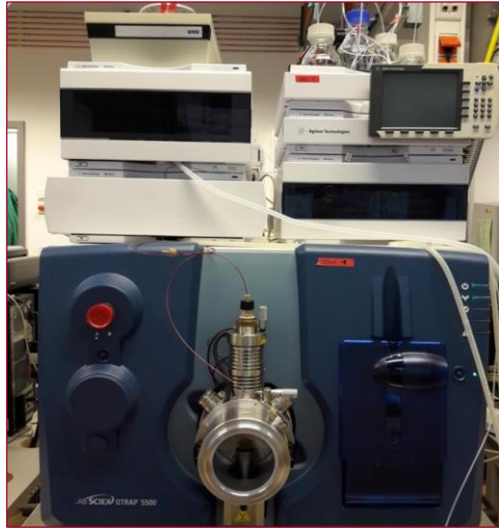
Nutzung von IT

- **Workflows** gewährleisten Prozesssicherheit
- hohe **Prozesssicherheit** durch multiples Scannen
- Sicherstellung hoher **Probenqualität**
- **Laborautomatisierung** und intelligente **IT-Struktur** führen zu einer effizienten und hochwertigen Laboranalytik, die **Studienstandards** erfüllt





Massenspektrometrie



ABSciex QTRAP 5500 (Sciex)

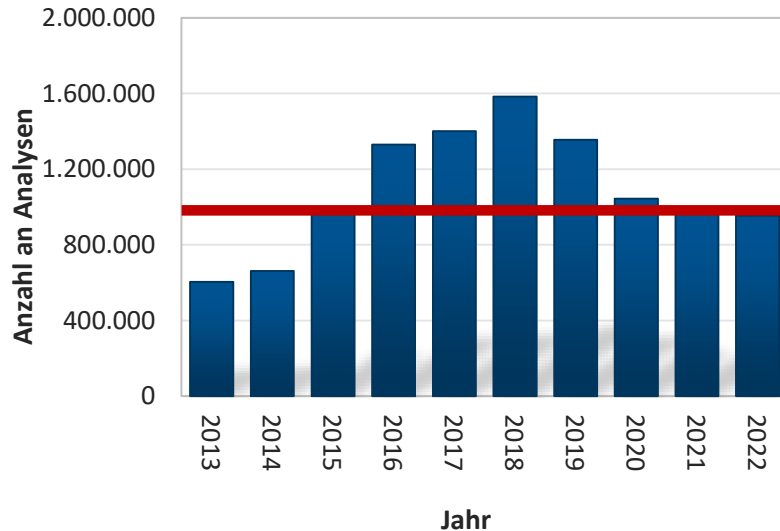
NMR-Spektroskopie



AVANCE-NEO 600 MHz (Bruker)



Forschungsanalysen am IKCL



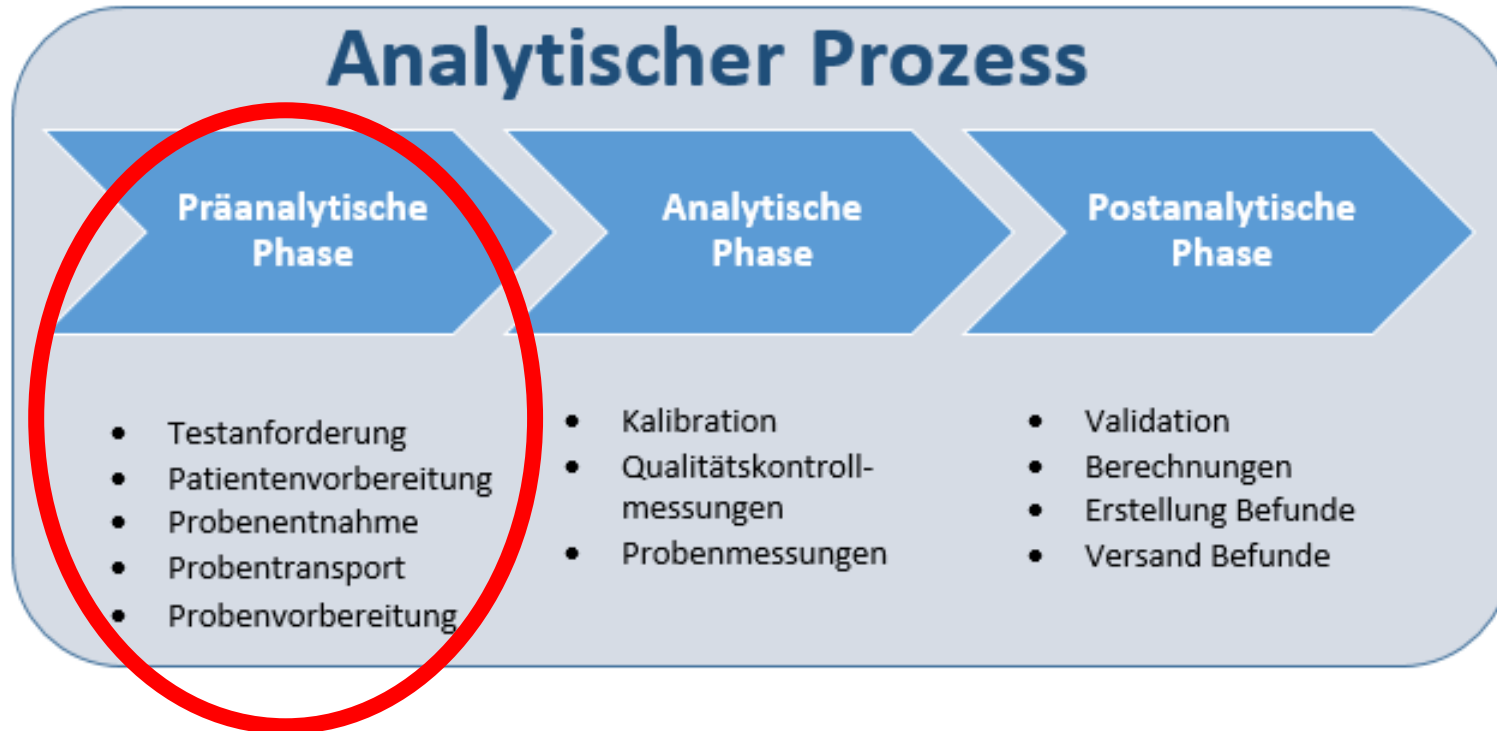
ca. 1.000.000 Analysen pro Jahr

Sofortanalytik in SHIP und NAKO

In SHIP und NAKO		Nur in SHIP	Nur in NAKO
Kleines Blutbild	Calcium	Differentialblutbild	Antikörper SARS CoV-2
ALAT	Chlorid	aPTT	
ASAT	Kalium	Quick	
gamma-GT	Magnesium	TPO-AK	
Glukose	Natrium	alpha-Amylase	
oGTT Glukose	Albumin	Creatinkinase	
HbA1c	Kreatinin	Ferritin	
Cholesterol	Cystatin C	Fibrinogen	
HDL-Cholesterol	Harnsäure	U-Albumin	
LDL-Cholesterol	Harnstoff	U-Kreatinin	
Triglyzeride	hsCRP	pH [U-Status]	
AP	LDH		
fT3	Lipase		
fT4	Cholinesterase		
TSH	Gesamtprotein		

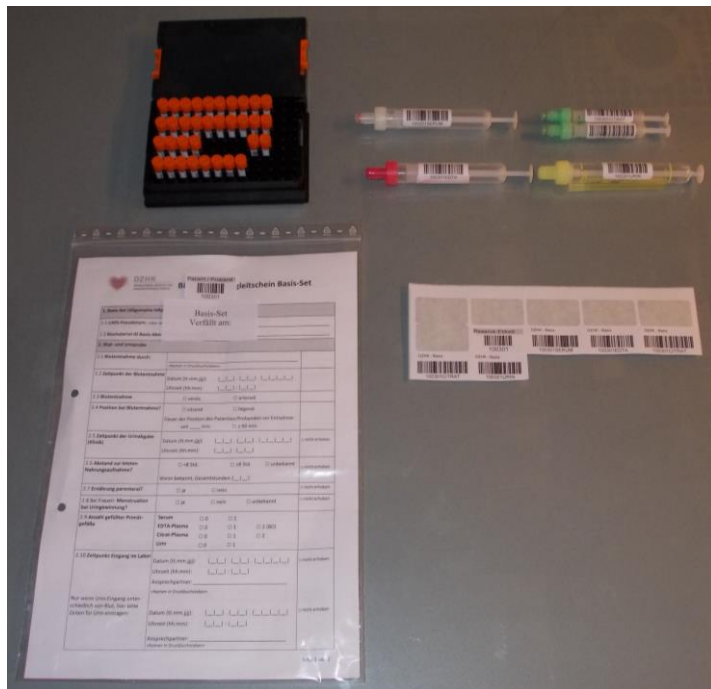


Analyse aus Biomaterial direkt
aus den Cryogefäßen





Basis-Set



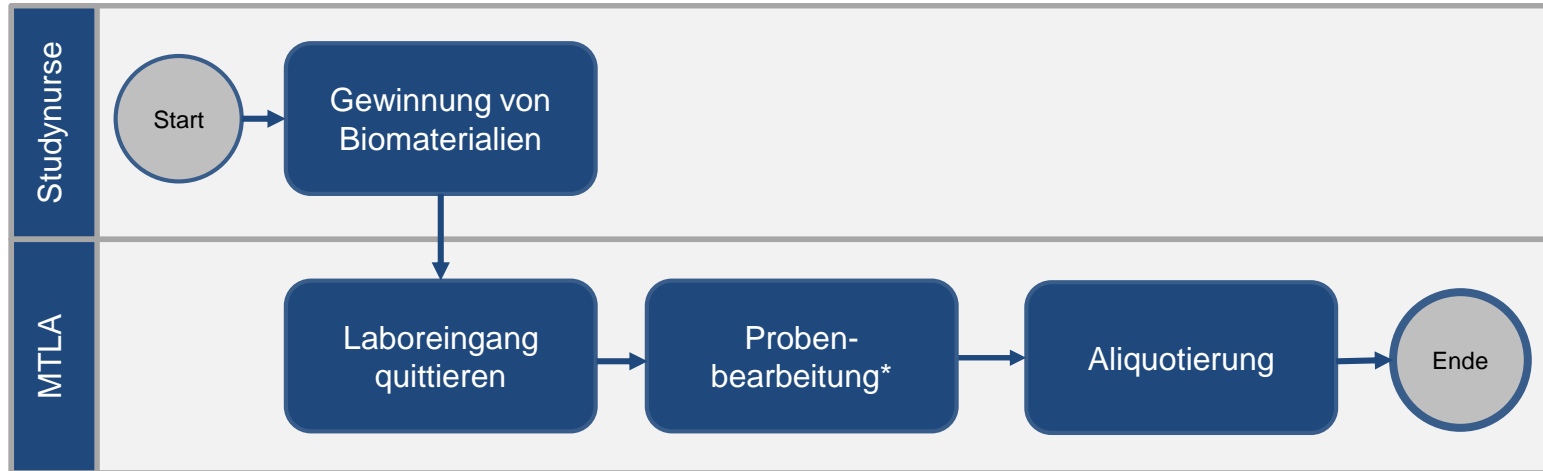
Studien-Set (Transition CHF)





Voraussetzung

- Proband inkl. Consent im LIMS



* Je nach gewonnenem Material kommt ein spezifischer Workflow zum Einsatz, um die Zentrifugation und Probeneigenschaften zu dokumentieren



DZHK-LIMS: Vorbereitung von Proben-Kits

Probenart	Proben ID	Volumen		
Serum	10000012-0-01	10.0 ml	Kopie Etikett	-
EDTA-Plasma	10000012-1-02	4.0 ml	Kopie Etikett	-
EDTA-Plasma	10000012-2-02	4.0 ml	Kopie Etikett	-
Citrat	10000012-3-03	3.0 ml	Kopie Etikett	-
Citrat	10000012-4-03	3.0 ml	Kopie Etikett	-
Urin	10000012-5-04	11.0 ml	Kopie Etikett	-

Probenart	Proben ID	Volumen		
EDTA-Plasma	10000013-0-02	7.5 ml	Kopie Etikett	-
Citrat	10000013-1-03	3.0 ml	Kopie Etikett	-

Primärproben-Etiketten DZHK-Biobanking

Etikettengröße: 30mm hoch
32 mm breit

geschwärzter Farbbalken Freies Farbfeld (je nach Material) geschwärzter Farbbalken

lims_338789400 LIMS-Pseudonym

DZHK-Basis Bezeichnung Abnahme-Set

Alliquote: 5x 500µl Aliquotier-Information

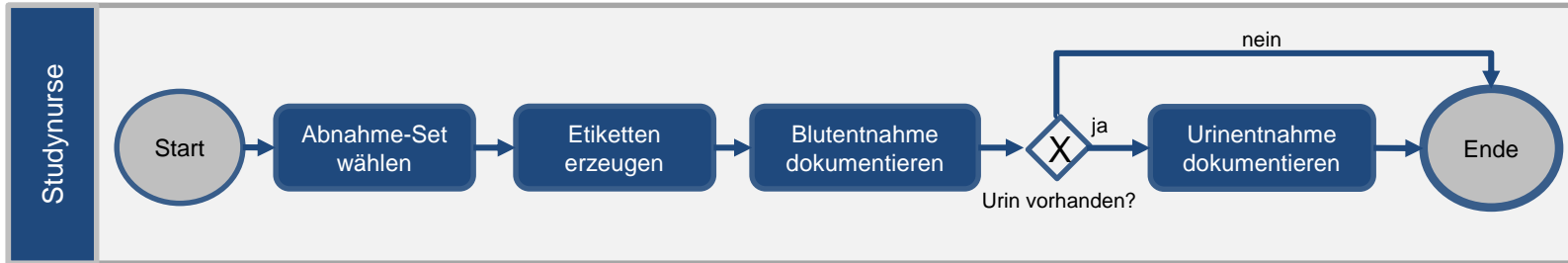
Barcode Primärprobe 10-Stellige ID Typ: Code128

1000500403

Citrat (grün) Materialbezeichnung und Deckelfarbe



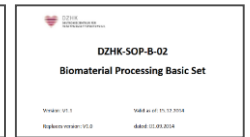
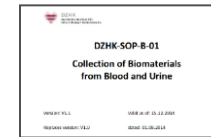
Workflow – Gewinnung von Biomaterialien



- **Abschluss**
 - automatische Zuordnung der Proben zu Probanden
- **Dokumentationspunkte u.a.**
 - Entnahmezeitpunkte für Blut und Urin
 - Position bei Blutentnahme
 - Visite (Baseline, Studiervisite ...)
 - Art der Blutentnahme (venös, ZVK, ...)
 - Abstand zur letzten Mahlzeit
 - Speicherung nach Abschluss direkt an Probe oder als strukturierter Messbefund



- Bioproben werden lokal in den rekrutierenden Zentren gelagert
- die notwendigen Daten zur Gewinnung und Prozessierung der Bioproben befinden sich in einem zentralen IT-System
- die Probengewinnung und -verarbeitung ist anhand von Workflows sehr gut standardisiert
- Das DZHK ist Eigentümer des Basis-Biobankings, das in DZHK-Studien gewonnen wurde.
- Zentralisierung erfolgt am IKCL in Greifswald



300 µl



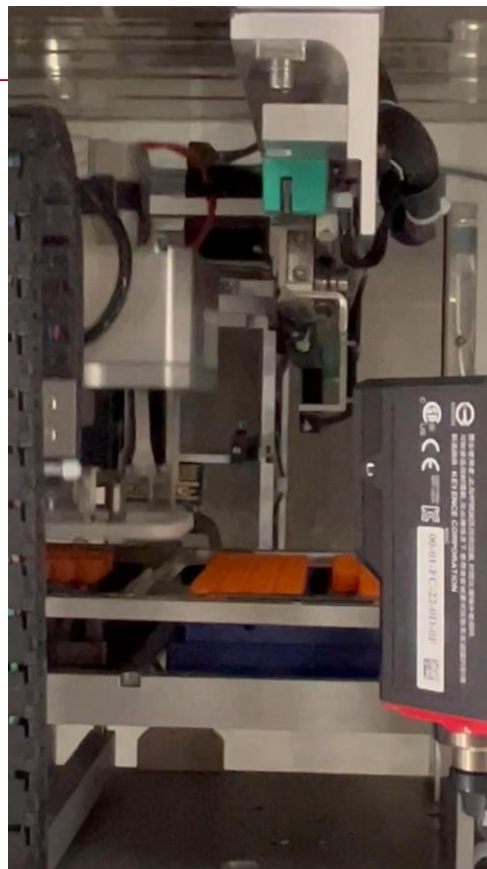




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Automatisiertes Picken





Beschaffungen im Biobanking an der UMG 2023



ASKION C-line® H200 System



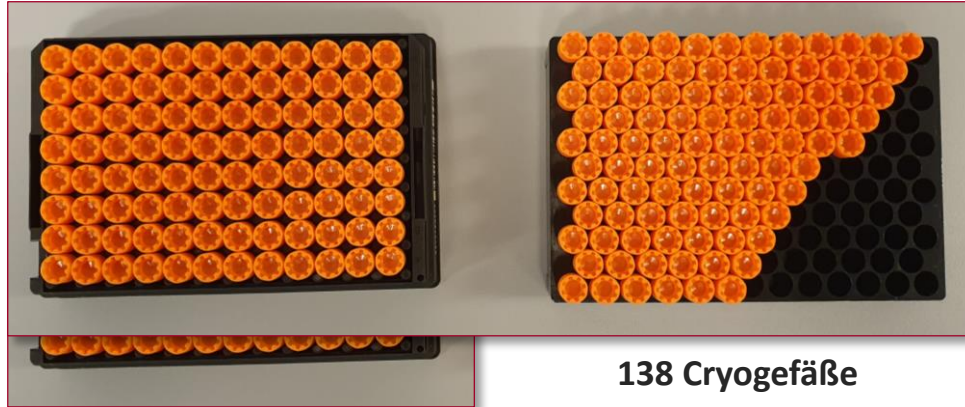
ASKION C-line® Workbench



LVL: Tube Laser Marker (TLM)



Verwendung von High Density (HD) Racks

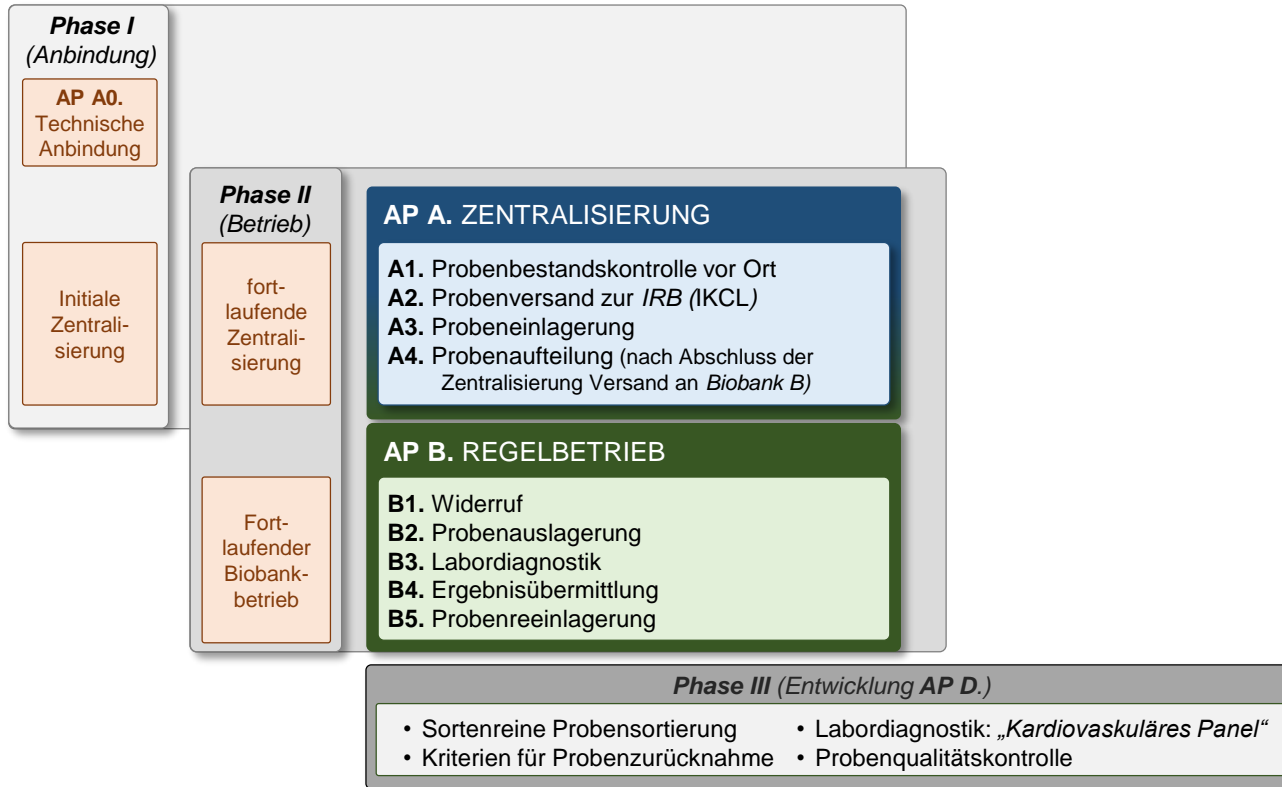


- Optimierung der Lagerkapazität
- Statt 96 passen 138 Cryogefäße auf dieselbe Fläche



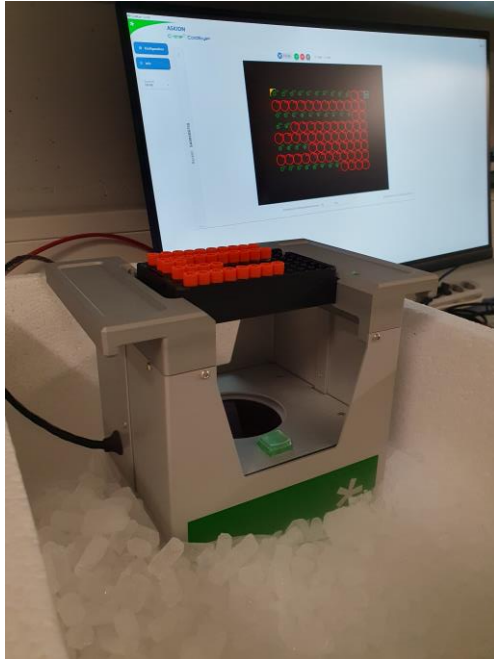
**Erhöhung der
Lagerkapazität
um mehr als 40%!**





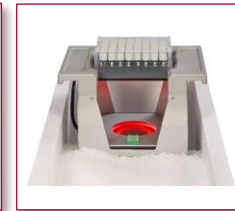


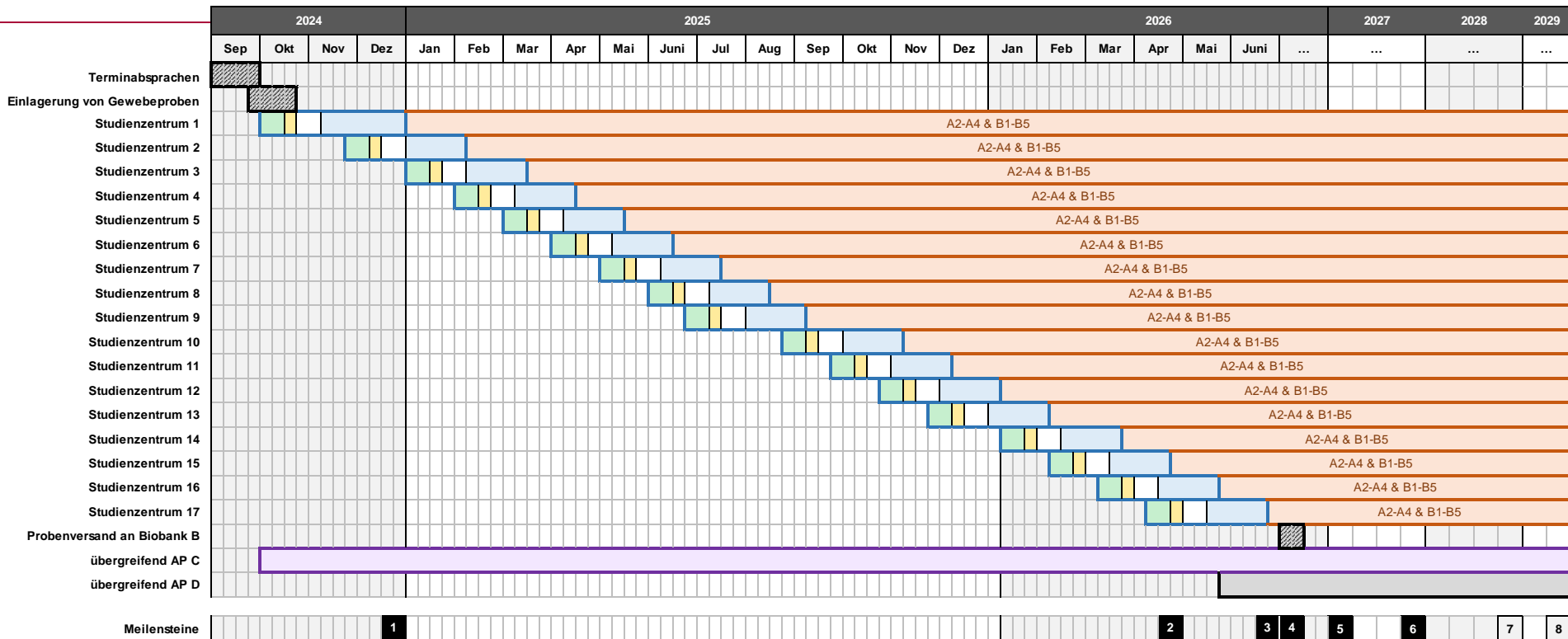
Scannen aller Cryogefäße vor Ort bei -80°C



- Abgleich mit Datensatz aus DZHK-LIMS
- Wurden alle Proben lokal erfasst?
- Wurden keine falschen Proben herausgesucht?
- einfache manuelle Verdichtung, um Volumen des Probenversands zu reduzieren
- hohe Verbindlichkeit bezüglich Zeit und Qualität

ASKION C-line® ColdEye





A1/A2 Probenkontrolle und Versand **A3** Probeneinlagerung **A4** Probenaufteilung **B1-B5** Probenverwaltung **C** Qualitätssichernde Maßnahmen **D** Entwicklung



- **Probeneingangskontrolle:** Abgleich der Proben mit dem DZHK-LIMS (AP A1)
- Temperaturüberwachung der Proben Transporte (**Logger**)
- der Probenfluss wird mit allen erforderlichen **Zeitstempeln** erfasst
- die Temperatur von einzelnen „**Prozessierungsschritten**“ wird überwacht
- die Auslagerung und das damit verbundene **Probenpicken erfolgt bei -80°C**
- Minimierung von **Tau-Frier-Zyklen** für angeschlossene Labordiagnostik
- interne und externe Qualitätssicherung (Teilnahme an **Ringversuchen**)
- projektspezifische Messungen zur **Probenqualität** nach DZHK-Vorgaben (siehe AP B3, D)
- Optimierung der **Datenübergaben** an die DZHK-GSt.
- mit Transferoffice **Workflows** erarbeiten zum strukturierten Feedback zur Proben- und Datenqualität von Antragstellenden



Phase III (Entwicklung)

AP D.

- sortenreine Probensortierung
- Labordiagnostik: „Kardiovaskuläres Panel“
- Probenqualitätskontrolle
- Kriterien für Probenzurücknahme

- Gewinnung und Prozessierung **weiterer Materialien** wie PBMC, Stuhl, Speichel, Abstriche, ...
- direkte Informationen an „**Spender**“ bei Nutzung ihrer Proben
- **flexibel** einsetzbare Ausstattungen (PC, Scanner, etc.) zur Probengewinnung vor Ort
- Qualitätskontrolle der Proben sowie **virtuelles Biobanking** mittels der NMR-Spektrenbiobank



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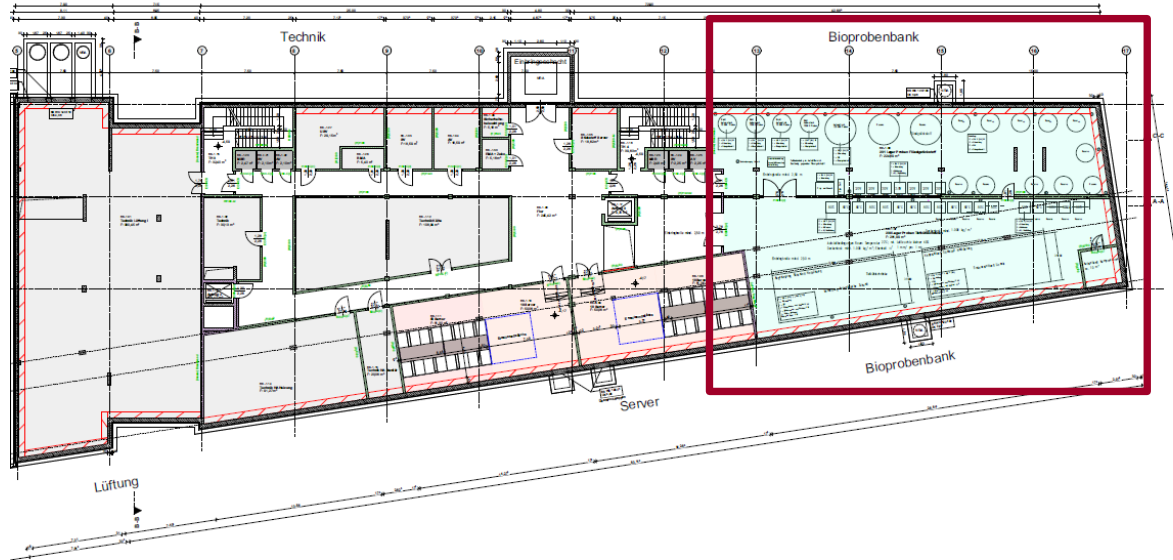
William B. Kannel Center



- Forschungsbau von nationaler Bedeutung
- Institut für Community Medicine
- Fertigstellung bis Ende 2026
- Kosten: ca. 65 Mio. €



Zusätzliche große Bioprobenbank 2026



Exzellente Zukunftsperspektive

- ca. 400 m² Grundfläche
- Investitionen: ca. 3 Mio. €
- langfristige Lagerkapazitäten verfügbar





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Kooperationen



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HERZ-KREISLAUF-FORSCHUNG E.V.



GCKD



ideficsstudy
Learning healthy living



20-ÅRS OPFØLGNING



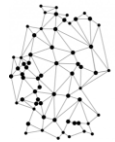
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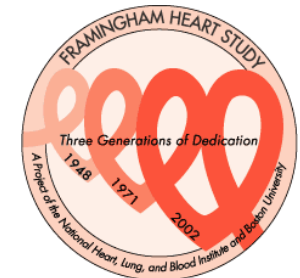
NAPKON
NATIONALES
PANDEMIE
KOHORTEN
NETZ



GESUNDHEITS-
STUDIE ■■■



KOOPERATIVE GESUNDHEITSFORSCHUNG
IN DER REGION AUGSBURG
KORA



FRAMINGHAM HEART STUDY

Three Generations of Dedication

1948 1971 2002

A project of the National Heart, Lung, and Blood Institute and Boston University