

Biobanking in the German Centers for Health Research



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DKTK, DZIF, DZG-Working Group Biobanking/IT









DZD
Deutsches Zentrum
für Diabetesforschung



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



The German Centres for Health Research

- Fighting major disease challenges
- Coordination of competences → Translational Research, Core infrastructures
- Six centres:
 - Deutsches Zentrum für Neurodegenerative Erkrankungen (**DZNE**, 2009) 
 - Deutsches Zentrum für Diabetesforschung (**DZD**, 2009) 
 - Deutsches Zentrum für Herz-Kreislauf-Forschung (**DZHK**, 2012) 
 - Deutsches Zentrum für Lungenforschung (**DZL**, 2012) 
 - Deutsches Zentrum für Infektionsforschung (**DZIF**, 2012) 
 - Deutsches Konsortiums für Translationale Krebsforschung (**DKTK**, 2012) 



Different organisational and decision-making structures!

Aims of the DZGs

- Sustainable partnerships between Universities, University Hospitals and external Research Institutions (coordination by Helmholtz Center)
- Bundling of competences → Translational Research
- Development of infrastructures (IT, Biobanks, Data management etc.)

Cooperation of the DZGs:



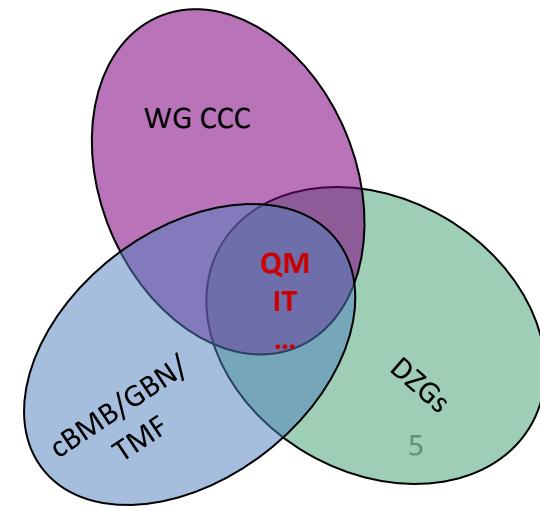
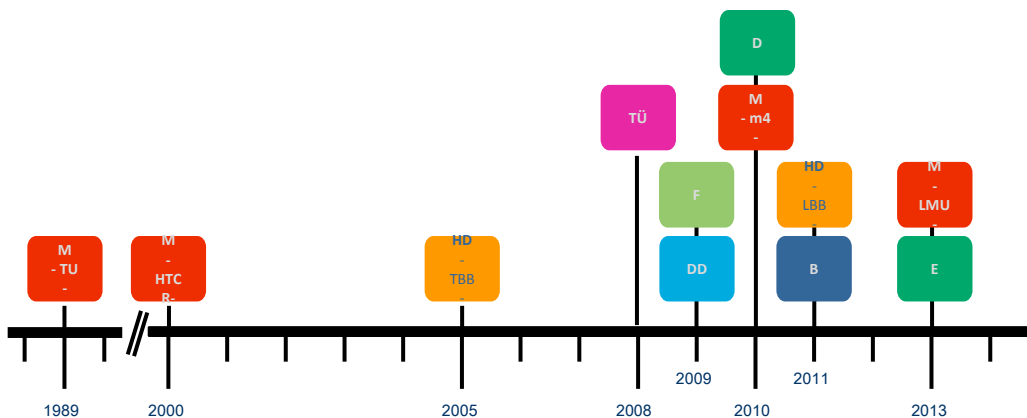
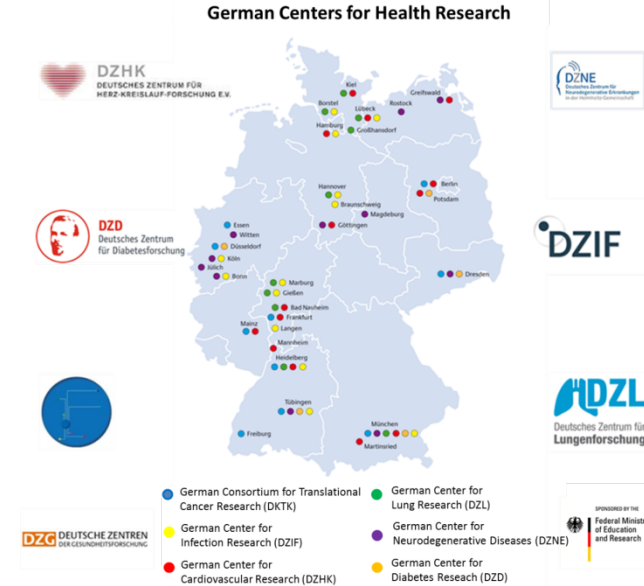
- Public Relation
- Drug design
- **Biobanking, IT & Data management**

Reviewed by Joint Steering Board

Positioning of DZG-Biobanking

- **DZGs**
- cBMBs/GBN, TMF (WG Biobanking)
- WG CCCs (WG Tissue banking),
- Other Research Networks (SFBs, Epidemiology (NatKo))

Most powerful supportive structure for biobanking (focus, user network/outreach, sustainability)



German Center for Lung Research (DZL)

Achievements (2012-2015)

- **Implementation of a DZL-biobanking portal:** searchable data base for existing (retrospective) biomaterials
- **Harmonization of documents and procedures related to biobanking:** broad IC form, SOPs, by-laws regulating use & access to biomaterials/data
- **Development of a data management structure:** data protection concept, centralized DZL-data warehouse, software solutions for DZL centralized Pat- and Lab-ID generation, Data harmonization pilot projects

Some information about the data collection.

Number of Biobanks/Registers	6
Number of DiseaseAreas	11
Number of Diseases	105
Number of Specimens	50
Total count of Samples	151603

PATIENTENINFORMATION

ERNEUERUNGSPERMITTLUNG

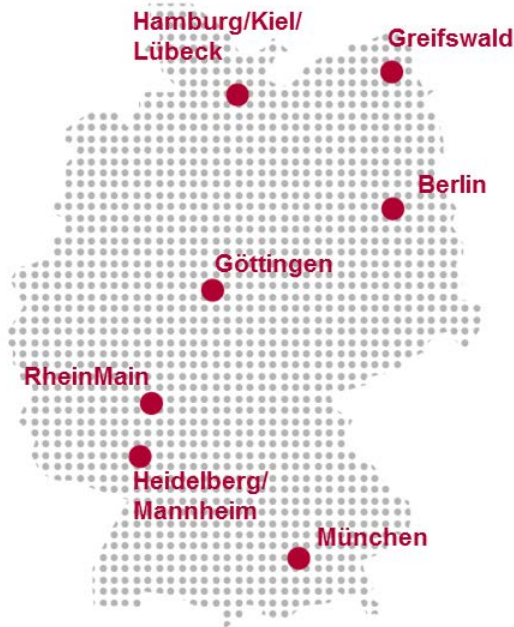
Standardarbeitsanweisung (SOP) DZL-SOP-016/Version 1.0

DZL-Data Warehouse i2b2

Query Builder interface showing a tree view of data categories (e.g., Diagnosis, Follow-up, Examinations) and a query execution panel with options for 'Run Query', 'Clear', and 'Print Query'.



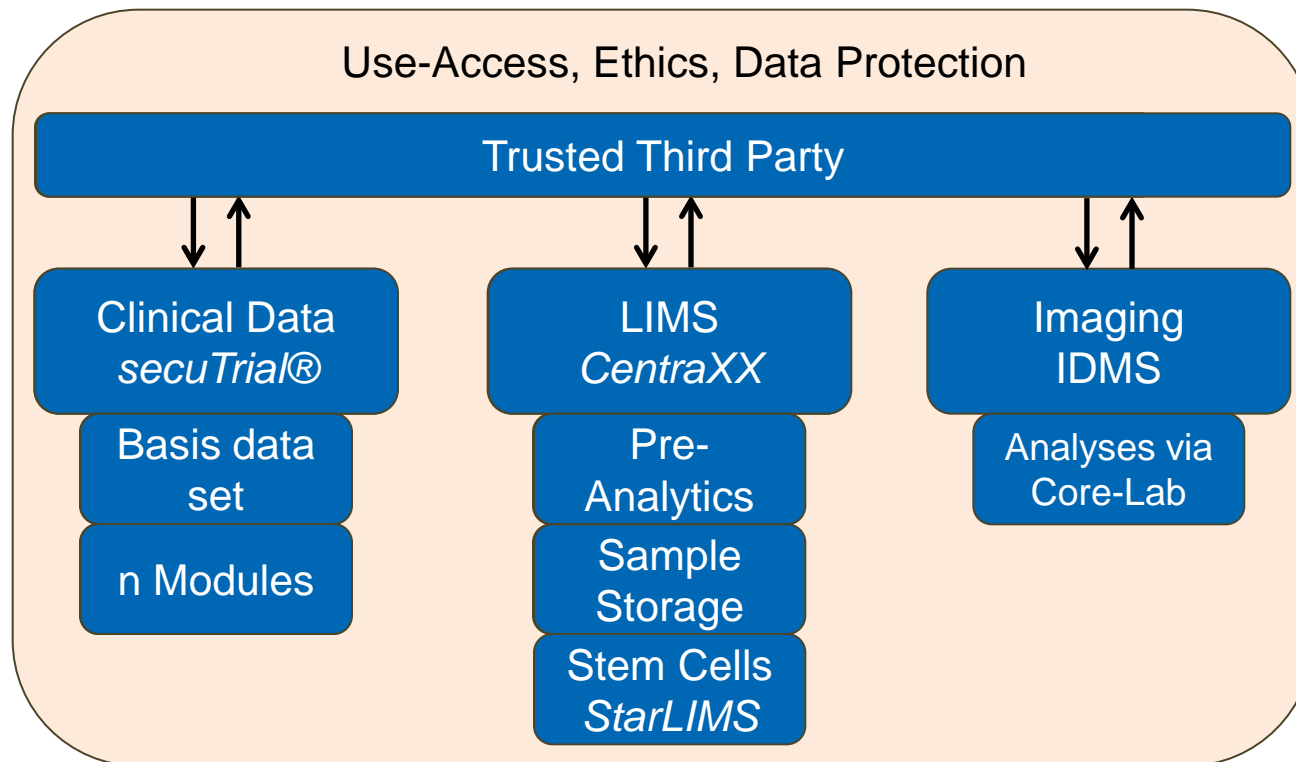
Biobanking Challenges



- ▶ Decentral (inhomogeneous) structures at the partner sites
- ▶ -> Standardization and Harmonization:
DZHK Infrastructure
 - ▶ Use & Access Rules
 - ▶ Data Protection
 - ▶ Ethical approval
 - ▶ SOPs
 - ▶ IT-Infrastructure



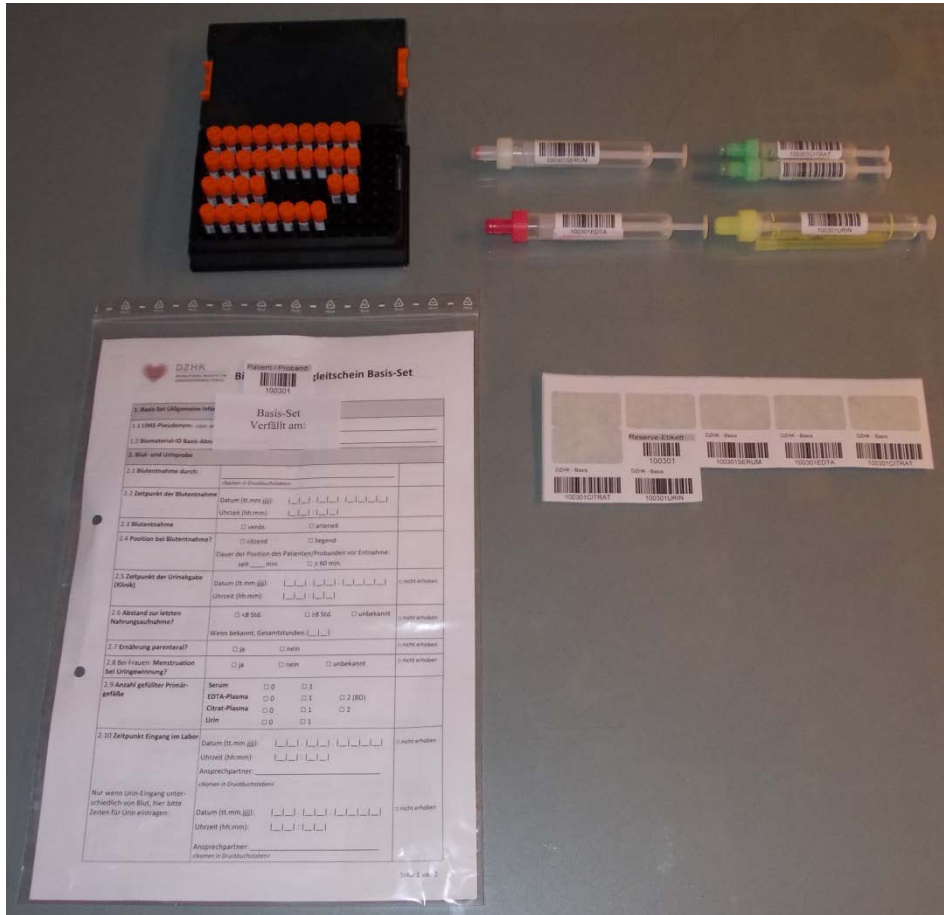
Scientific Infrastructure for Clinical Research



- Post hoc concept (developed in first period)
- Strong central coordination; decentral storage
- Prospective/trial-based concept

DZHK: Basis Set

Study Set (Transition CHF)





The German Center for Diabetes Research (DZD)



Research for a Future without Diabetes

- Founded 2009
- > 250 Scientists
- Excellently evaluated in 2014

Biobanking Activities

- Preexisting Biosamples > Biobanks in the BBMRI catalogue
- Novel study-derived Biosamples

IT Activities

- Data and Knowledge Management





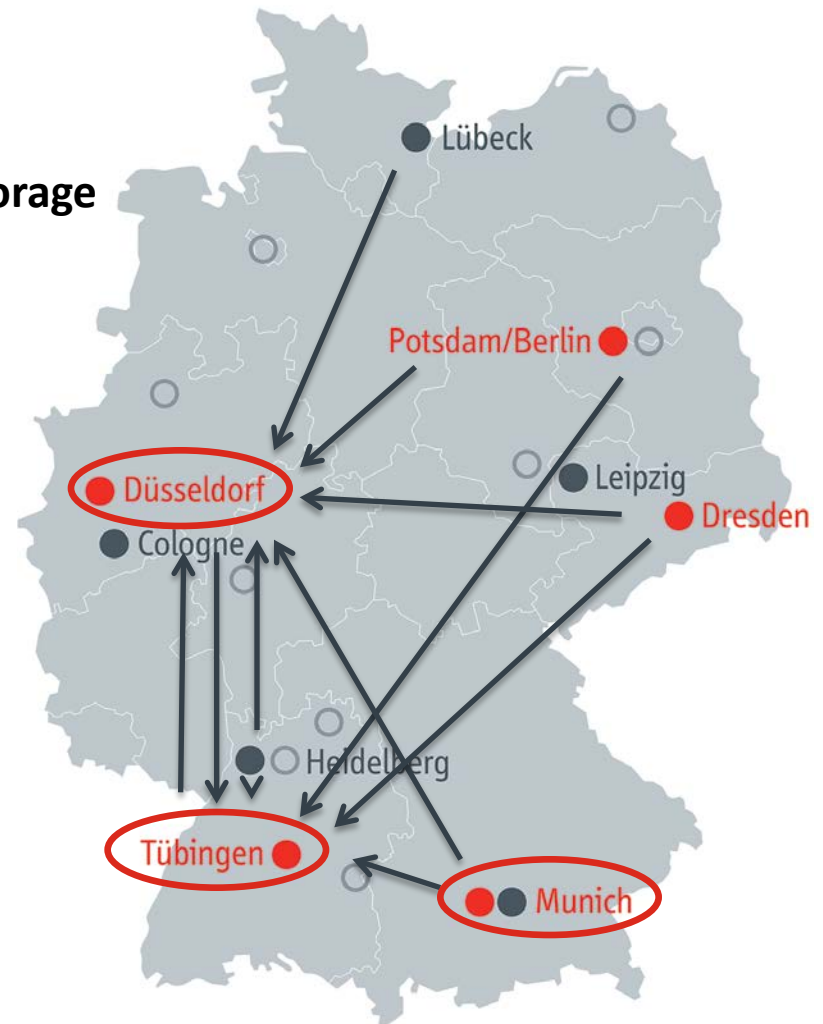
The German Center for Diabetes Research (DZD)



Novel Study-derived Biosamples

1st Phase: Centralized Management – Local Storage
(Ongoing clinical studies)

1. **Samples** taken locally at DZD clinical study sites
2. **Storage** and sample management (LIMS) at the leading study centers (Tübingen, Düsseldorf)
3. **Project management of applications** at the Head Office





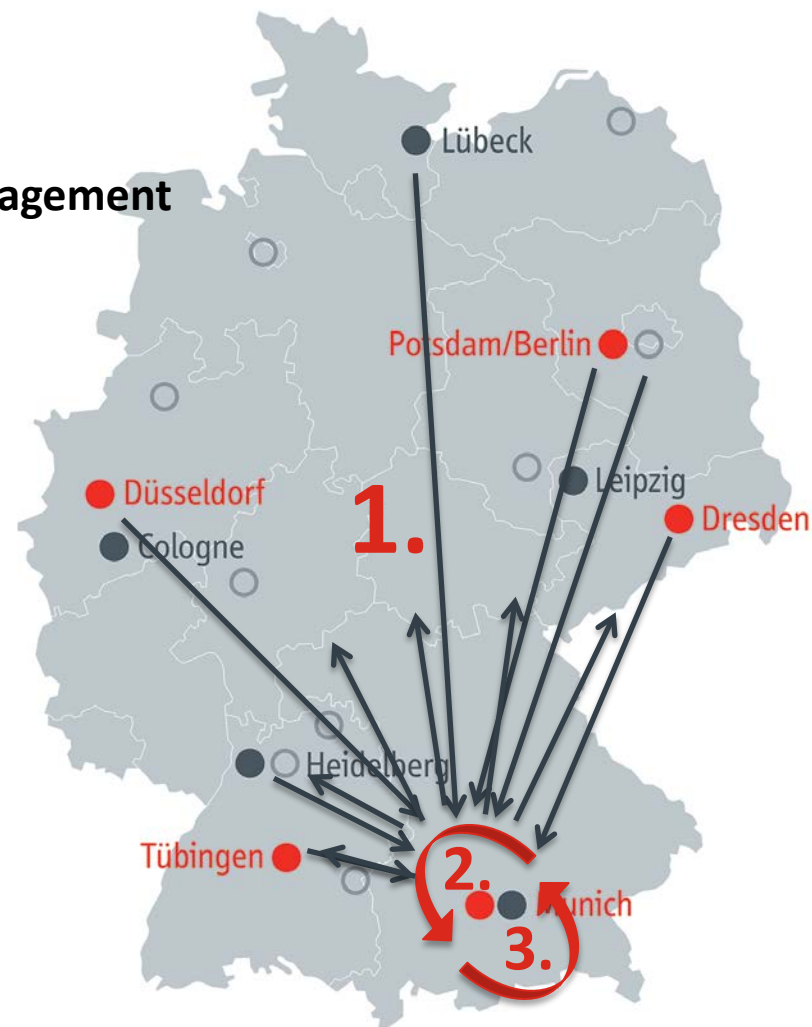
The German Center for Diabetes Research (DZD)



Novel Study-derived Biosamples

2nd Phase: Centralized Biobank and Data Management (Future clinical studies)

1. **Samples** taken locally at DZD clinical studies
2. **Storage** and sample management (LIMS) centralized at the Helmholtz Zentrum München (service provider)
3. **Project management of applications** at the Head Office in Munich



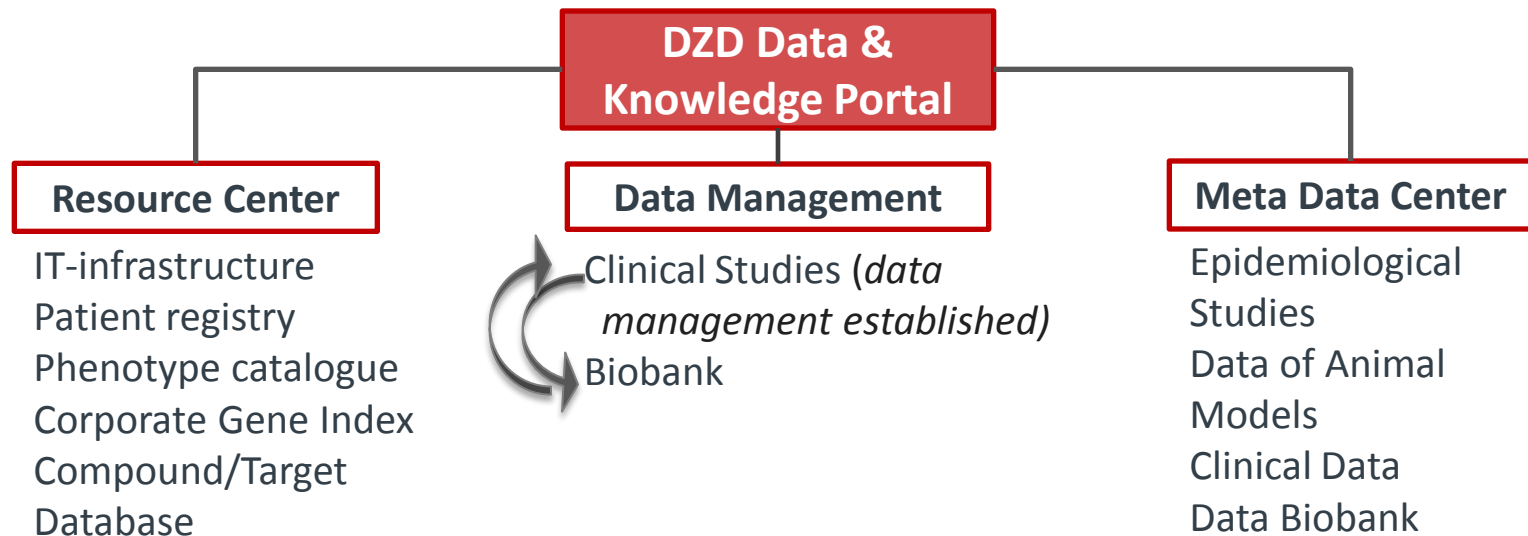


The German Center for Diabetes Research (DZD)



Data and Knowledge Management - *Added value by sharing knowledge* (under development)

Aim: building up knowledge management environment that offers the big picture of locally available data at DZD partner sites. Established e-infrastructures and communication structures will be linked with novel IT solutions.





German Center for Neurodegenerative Diseases (DZNE)



- 2009** 3 April: Foundation of DZNE
- Single Helmholtz center, 9 sites

Mission:

understand causes and risk factors leading to predisposition for neurodegeneration and develop new therapeutic and health care strategies.

Fields of research:

- major neurodegenerative diseases (Alzheimer and other dementias, Parkinson disease)
- rare conditions (prion or Huntington disease).





German Center for Neurodegenerative Diseases (DZNE)



Translational by design:

- Basic research
- Clinical research
- **Population research: epidemiology**
- Health care research

Biobanking activities: next steps

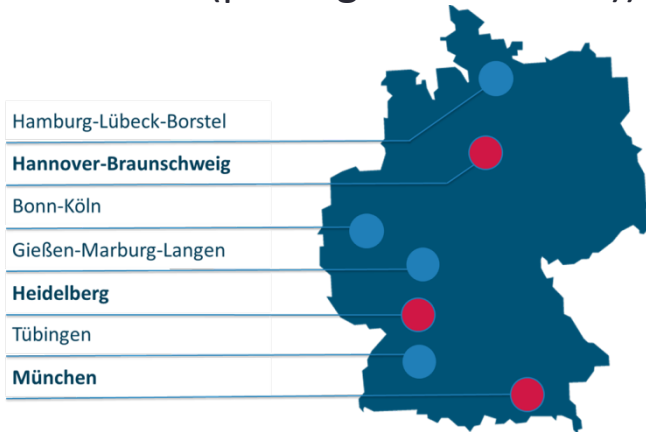
- Central storage (biorepository) for all research areas in DZNE
- Storage: liquid N₂

IT:

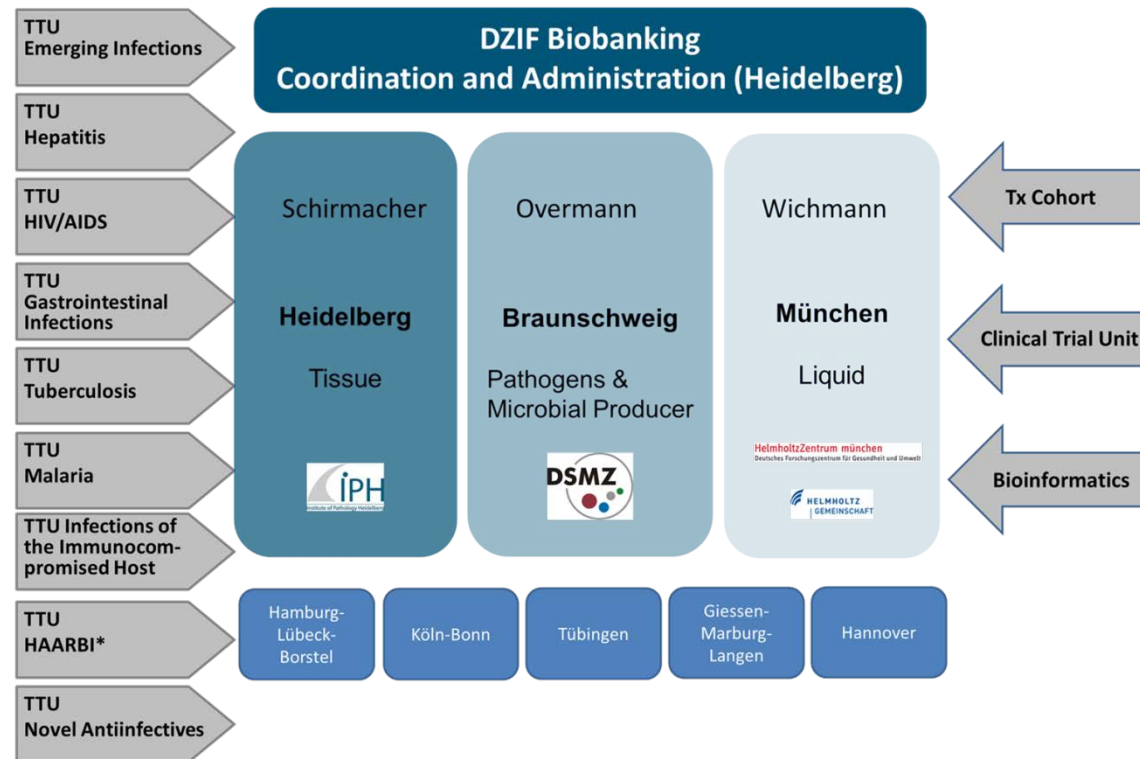
- DZNE-wide LIMS (Nautilus) for clinical and epidemiological biobanking

DZIF Biobanking platform (2013-2015)

- Translational Infrastructure (TI)
- Decentral storage
- 3 main locations
- 3 columns: tissue, liquid, pathogens & microbial producer (until 2015; separated in 2016 (pathogens in TTU EI))



● Focus site ● Contributing site





Key Achievements TI Biobanking:

- Establishment of **functional and active biobanking infrastructure** within DZIF; fully integrated within the **national** (GBN, TMF, other DZGs) and **international** (BBMRI) biobanking community.
- Support of **>100 projects**
- Compilation of **key disease collectives**; integration of focussed preexisting collectives (e.g. hepatitis)
- Implementation of **information platform** (Biobanking website (www.dzif-biobanking.de), Biobanking catalogue with more than 31 biobanks , specific DZIF sub-catalogue on pathogens linked to the novel metadata in BacDive (<http://bacdive.dsmz.de>) .
- Development of a **cost-calculation model**, and an **ethical and data protection concept**
- active support of DZIF **Tx-cohort development**.
- Selection of **central DZIF LIMS system** for DZIF-wide administration of common data sets for all prospective biomaterial collections (pilot project: Tx-cohort)
- Initiation and organization of the regular meetings within the **DZG Biobanking & IT working group**.



German Center for Infection Research (DZIF)

Ethical, Legal, and Social Issues (ELSI)

- Comprehensive votes (Heidelberg and Munich sites)
- Standardized Patient consent
(informed, broad, retraction possible at any time)
- Standardized ethical vote(s)
(Altruistic: no promise for further diagnostic use, feedback information, reimbursement)
- Data protection issues (see IT)

Generic template for DZIF purposes available

Cooperation with TX-Registry, TTU HIV,
TTU Hepatitis

Support & information

→ High effort to respect patient will

→ Basic **frame for interchange of biomaterial**
(nationwide/international)

DZIF-Biobanken-Infrastruktur

**Interner Bereich:
Qualitätsmanagement/
Ethische und rechtliche
Themen:**

Startseite

Qualitätsmanagement

Ethische und rechtliche Themen

Zurück zum öffentlichen Bereich

Interner Bereich Qualitätsmanagement/ Ethische und rechtliche Themen:

Ethik und Datenschutz

Die DZIF-Biobanken-Infrastruktur unterstützt DZIF-Partner, die die Sammlung von Daten und/oder Biomaterialien planen, bei der **Erstellung des Ethikvotums und der Patienteninformation**. Eine generisches Ethik- und Datenschutzkonzept und ein Mustertext für die Patienteninformation und Hilfestellung bei der Anpassung können angefordert werden bei:

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oder

Dr. Gabriele Anton
DZIF-liquid biobanking
Molecular Epidemiology - Complex Diseases
Department for Molecular Epidemiology (AME)
Tel: +49 (0)89 3187-3871
Fax: +49 (0)89 3187-4567
E-Mail: gabriele.anton@helmholtz-muenchen.de

DZIF-Biobanken-Infrastruktur
c/o Helmholtz Zentrum München • Institut für Epidemiologie I und LMU IBE • Ingolstädter Landstraße 1 • D-85764 Neuherberg
Telefon: +49 (0)89-3187-4066 • Fax: -4499 • wichmann@helmholtz-muenchen.de
Letzte Änderung dieser Seite: 09.10.2013

DZIF Biobanking Website:

- Representatives of partner sites
- Participating biobanks/partners
- Detailed information on available samples in biobanking catalogue
- Internal module of biobanking platform (exchange of information, protocols, quality management, ethical/legal issues)



DZIF-Biobanken-Infrastruktur

- Home
- Aktuelles
- DZIF-Biobanken-Plattform
- Beteiligte Biobanken
- DZIF-Biobanken-Katalog
- Interner Bereich für die Standortvertreter
- Links
- Impressum/ Haftungsausschluss

Beteiligte Biobanken:

Hier erhalten Sie Informationen zu den derzeit innerhalb DZIF vorhandenen Biobanken bzw. Sammlungen humaner Bioproben, den Sammlungen pathogener Mikroorganismen und von mikrobiellen Produzenten, sowie zu Biobanken von DZIF Partnern. Eine Kurzdarstellung zu den einzelnen Biobanken finden Sie unter den entsprechenden Akronymen. Genauere Angaben zu den Biobanken finden sich im [Katalog der DZIF-Biobanken](#), zu dem Sie einen persönlichen Zugang benötigen. Sie können aber auch den Gastzugang nutzen. Unter [aktuelle Projekte](#) werden außerdem Projekte in DZIF vorgestellt, bei denen derzeit Bioproben gesammelt werden.

Biobanken an DZIF-Standorten:

Standort	Klinische Biobanken	Populationsbezogene Biobanken	Nicht-humane Biobanken
Heidelberg	• BMBH >		
München	• InfektLMU > • TxChirTUM > • LTX > • MikroTUM > • VirTUM >	• KORA > • GINI/GINI-plus > • LISA/LISA-plus >	• IMBBw >
Hannover-Braunschweig	• HUB > • BIT >		• DSMZ > • DSMZ-CNET >
Tübingen			
Köln-Bonn	• MedBonn > • MikroBonn > • Bonn_ViroHumanDiag >		• MikroBonnP > • MikroKölnP > • Bonn_ViroStrains > • Bonn_ViroAnimal >
Gießen-Marburg-Langen	GI-GWB		GI-ERB
Hamburg-Lübeck-Borstel	• EHEC > • BNI-ViroDiag >		• BNI-ViroStrains >

Quality management Liquids

- **Aim: harmonized SOPs for biomaterials in DZIF**
- **For liquids:**
SOPs of German National Cohort:
→ worked out by expert group
→ used by other DZGs:
DZL, DZHK, DZD



DZIF-Biobanken-Infrastruktur

Interner Bereich: Qualitätsmanagement/ Ethische und rechtliche Themen:
Startseite
Qualitäts- management
Ethische und rechtliche Themen
Zurück zum öffentlichen Bereich

Interner Bereich Qualitätsmanagement/ Ethische und rechtliche Themen:

Aktuelle SOPs der DZIF-Biobank: Liquids

Blutentnahme:	DZIF LIQ 2.2 01 Blutentnahme.pdf
Blutverarbeitung:	DZIF LIQ 2.2 02 Blutverarbeitung.pdf
Bioprobenprotokoll Blut:	DZIF LIQ 3 01 Bioprobenprotokoll Blut.pdf
Uringewinnung:	DZIF LIQ 2.2 03 Uringewinnung.pdf
Bioprobenprotokoll Urin:	DZIF LIQ 3 03 Bioprobenprotokoll Urin.pdf
Stuhlgewinnung:	DZIF LIQ 2.2 05 Stuhlgewinnung.pdf
Bioprobenprotokoll Stuhl:	DZIF LIQ 3 05 Bioprobenprotokoll Stuhl.pdf
Speichelgewinnung:	DZIF LIQ 2.2 04 Speichelgewinnung.pdf
Bioprobenprotokoll Speichel:	DZIF LIQ 3 04 Bioprobenprotokoll Speichel.pdf
Nasenabstriche:	DZIF LIQ 2.2 06 Nasenabstriche.pdf
Bioprobenprotokoll Nasenabstriche:	DZIF LIQ 3 06 Bioprobenprotokoll Nasenabstriche.pdf

DZIF Biobanking Catalogue

- Website
- >30 registered biobanks
- Accessible collectives, representatives, features
- Promotion
- Project management (application)
- Conformity with German Biobank Catalogue and BBMRI

DZIF DZIF-Biobanken-Infrastruktur

Beteiligte Biobanken:
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Heidelberg	• BMHI >		
München	• InfektMHI > • TUCHTUM > • LTC > • MucTUM > • VIRUM >	• KORA > • GIN/GINplus > • LEA/LEAplus >	• MIBiB >
Hannover-Braunschweig	• HIS > • BIT >		• DSMZ > • DSMZ-CNET >
Tübingen			
Köln-Bonn	• MucBonn > • MucBonn2 > • Bonn_ViroHumanData >		• MucBonn2 > • MucBonn > • Bonn_VirusData > • Bonn_VirusData2 >
Gießen-Marburg-Langen			
Hamburg-Lübeck-Borstel	• EMIC > • BM-VirusData >		• BM-VirusData >

Biobanken deutscher Kompetenznetzwerke:

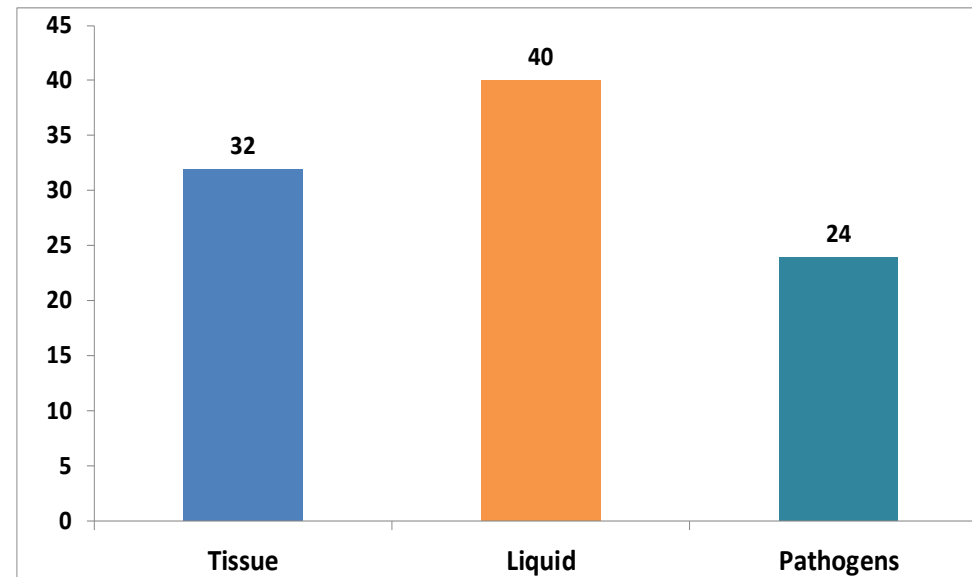
- [SepNet](#) >
- [HepNet](#) >
- [HIV/COINNET](#) >
- [CAPNETZ](#) >

Project Work

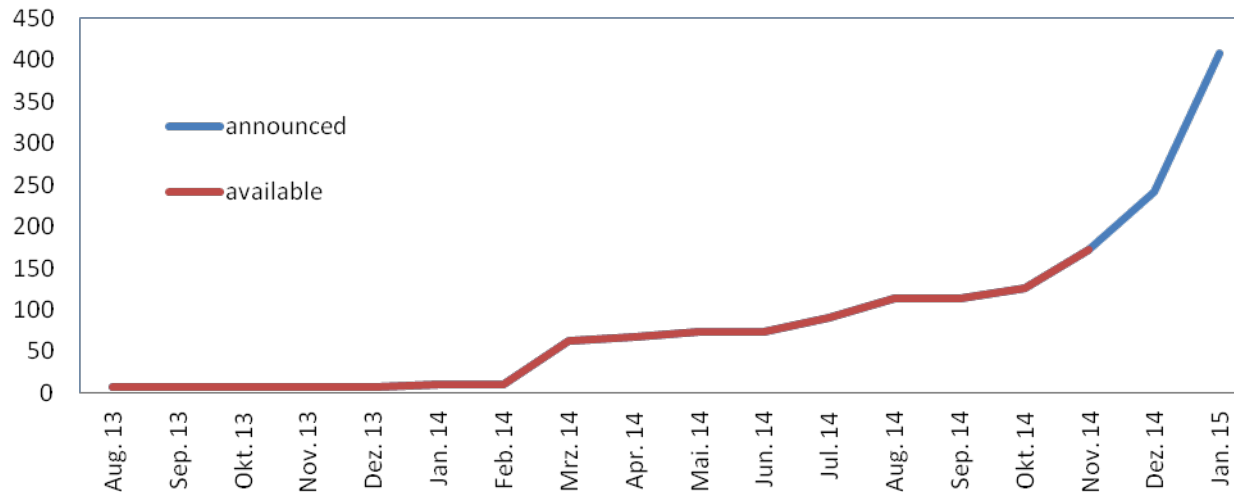
96 projects (8/2015):

- Tissue: 32
- Liquid: 40
- Pathogens: 24

Key support of TX-cohort (ongoing)



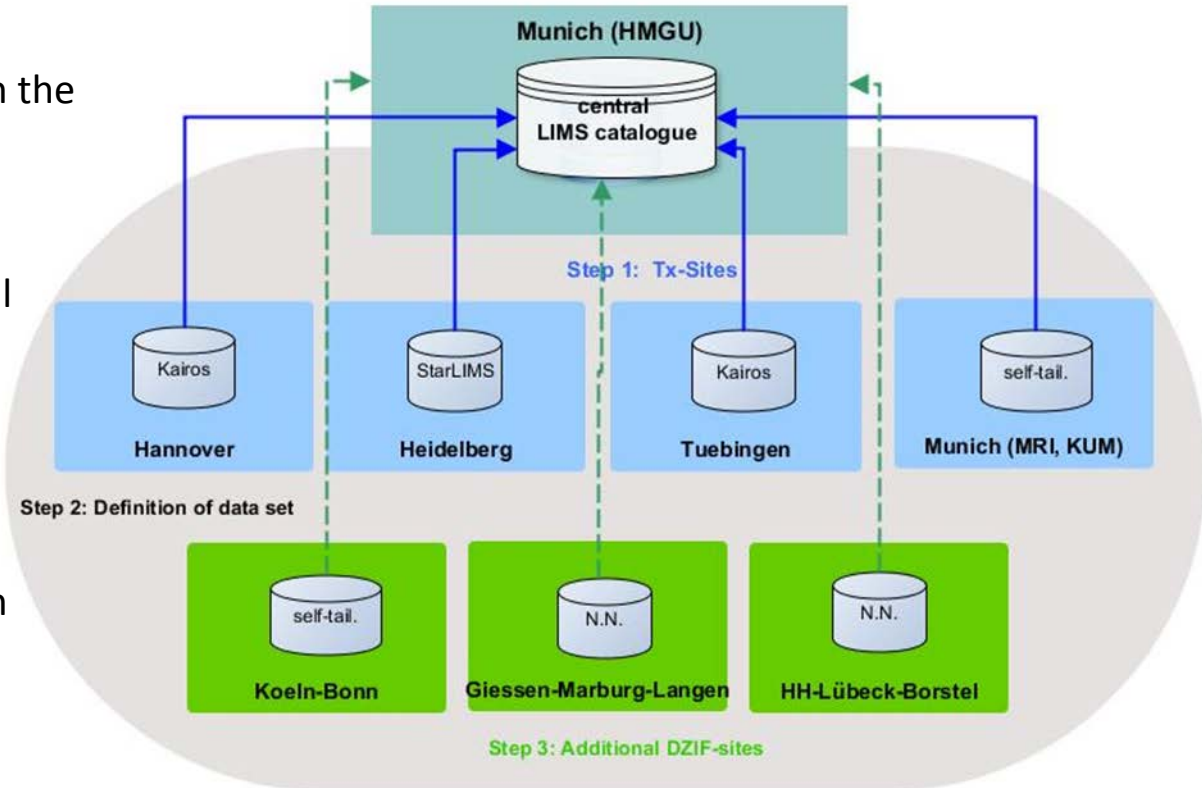
Pathogen Repository – Deposits



- 80 strains Mouse-Microbiome (Thomas Clavel, TUM) description of new taxa
- 50 *Clostridium difficile* strains (clinical isolates)
- Testpanel for compound screening (TI Natural Compound Library)
- key strains: MRSA, MRSE, *Arthrobacter mysorens*, *Streptococcus suis* (Gießen) genome sequencing
- key strains: *Serratia marcescens*, *Enterobacter* sp., *E. coli* (Gießen)
- pulmonary Microbiome: *Pseudomonas aeruginosa* strains (Hannover)

DZIF LIMS-next steps

- Fine-concept preparation with the provider and first test system ready by mid of 2016
- Definition of common minimal data set
- Interface to Tx-partner sites (blue) available in Q3 / 2016
- Catalogue and search function ready in Q4 2016
- Interface to residual DZIF partner sites with biosample collections (green) in Q1/ 2017



Provider: Kairos CentraxX

DZIF Biobanking -future

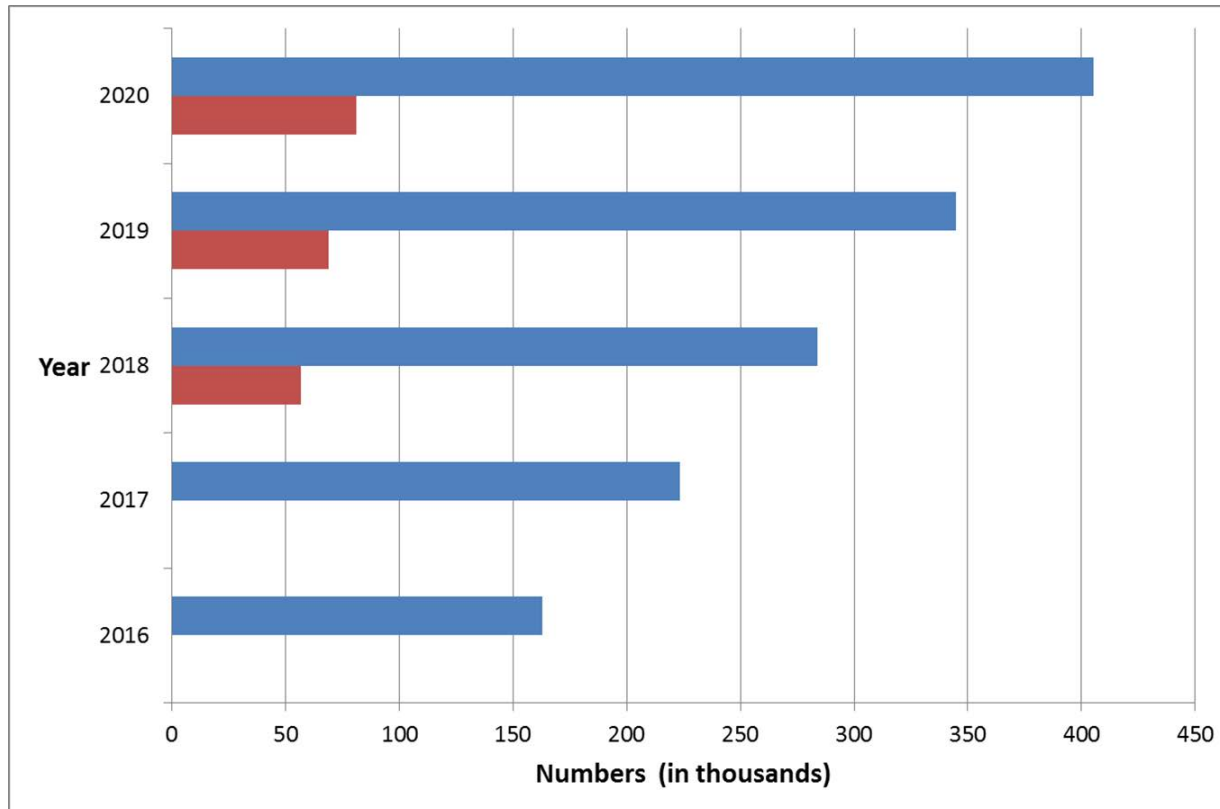
Priority project:

Support of **the Tx-cohort** with the focus on

- Data management: implementation of a central LIMS catalogue at the Munich site; Munich is in charge of the development of the infrastructure and implementation as well as the roll-out to the Tx-cohort sites; in a second step all other DZIF sites collecting biomaterials and the TTUs with cohort activities will be integrated
- Quality management: development of common and harmonized standard operating procedures (SOPs) and/or common minimal standards for sample retrieval especially avoiding pre-analytical artefacts, sample processing, transport and storage of biosamples
- Tissue banking: support of all biobanking activities and further set up special tissue specimen collections (annotation and ELSI support)



DZIF Biobanking -future



Estimated sample collection and utilization of the DZIF Tx-cohort
2016-2020

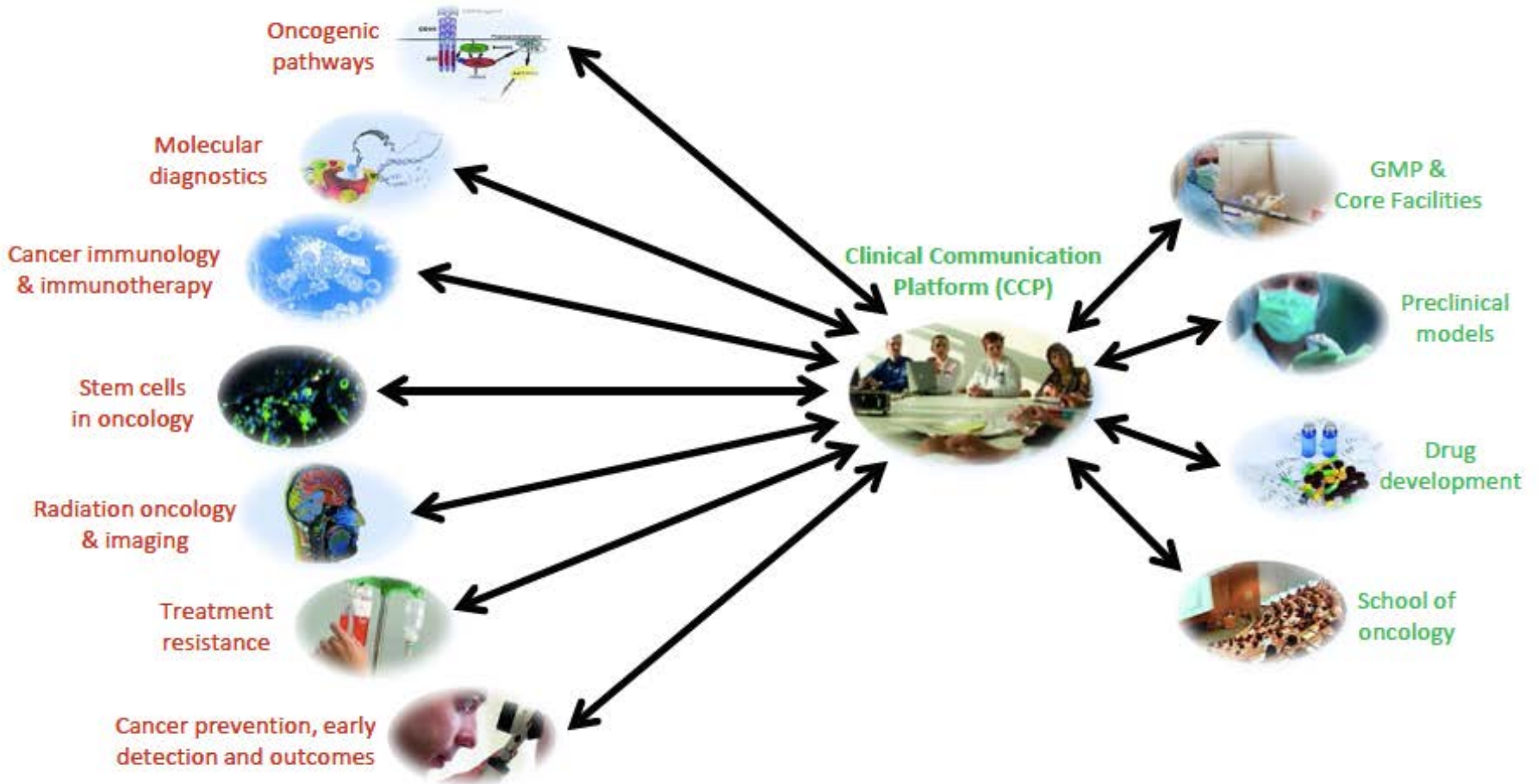


The German Consortium for Translational Cancer Research (DKTK):



Translational research program

Structural platforms



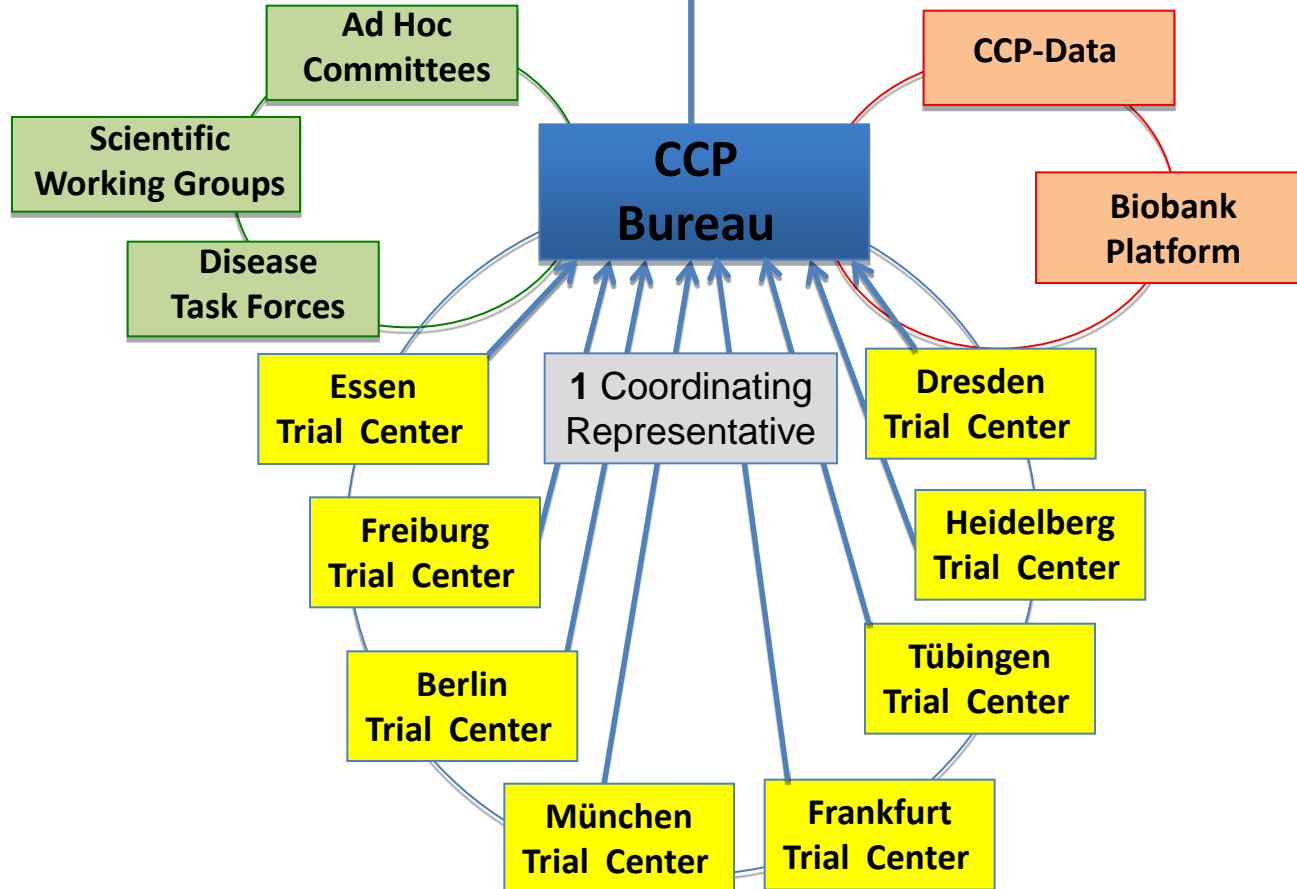
The German Consortium for Translational Cancer Research (DKTK):



Steering Board

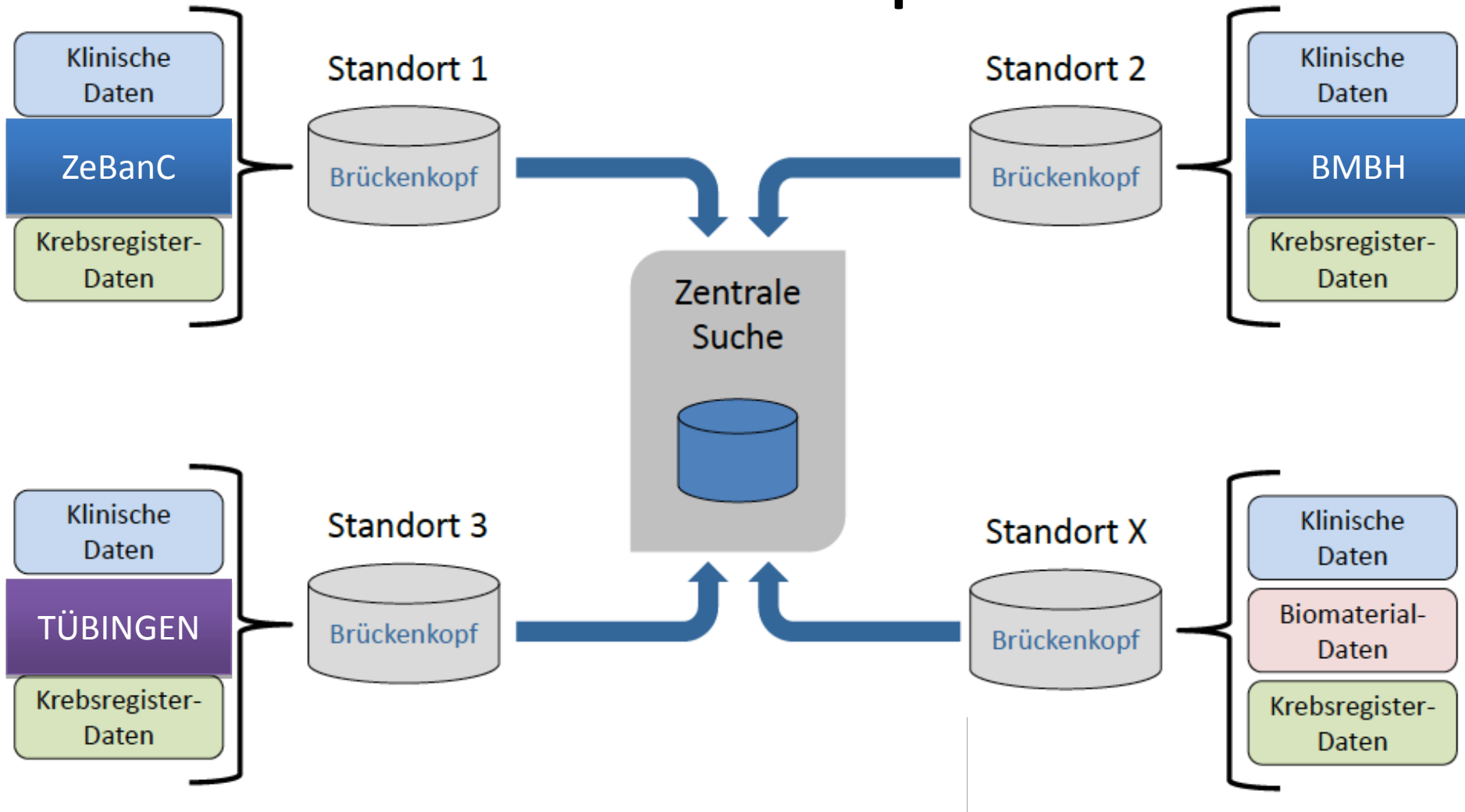
DKTK CCP

Trial Board



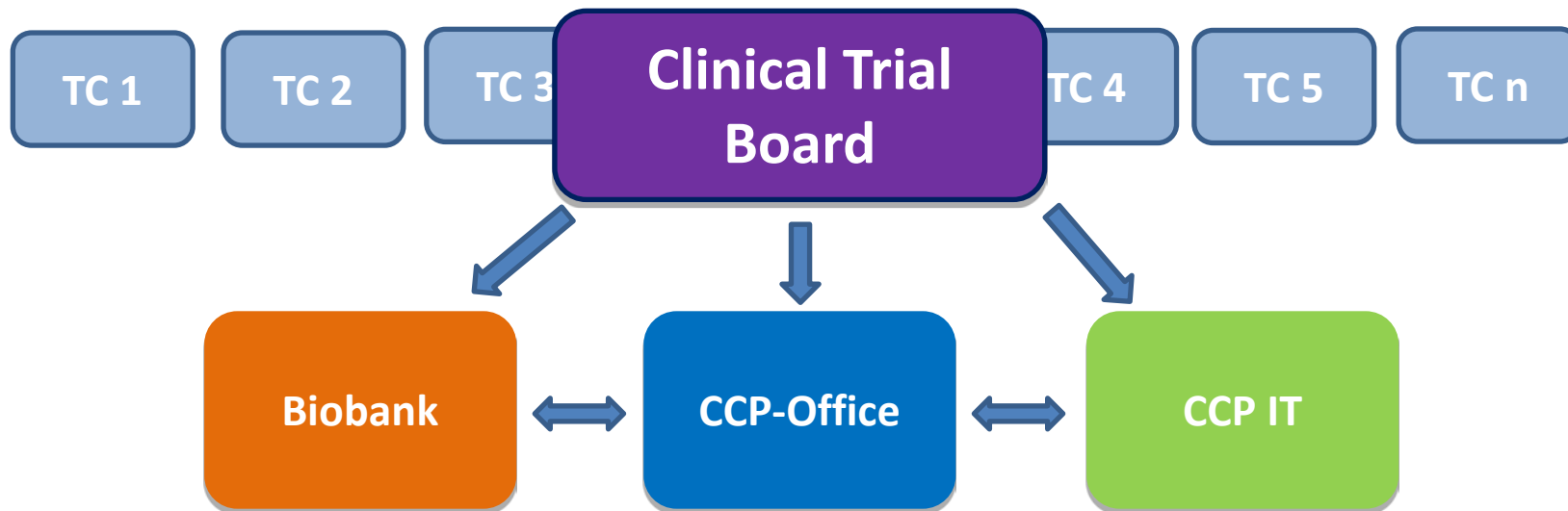


The DKTK IT Concept





The German Consortium for Translational Cancer Research (DKTK):



Mission of the biobanking platform:

- High quality biomaterials
- Enable research projects within DKTK
- Project quality and good scientific practice
- Trustee of users and partner biobanks



Biobanking Platform

Coordinative Activities

- Detailed site evaluations
- Biobanking-IT/Coordination with CCP-IT/
Integration in CCP concept
- Harmonization of DZGs Biobanking
- Biobank Catalogue (BBMRI & German Biobank
Catalogue conformity)
- Interaction with other national and international
activities

The German Consortium for Translational Cancer Research (DKTK):



Detailed Site Evaluations

- **Biomaterials:** storage, degree of utilization, performance indicators, special collections...
- **Datamanagement:** Which data are available? How are they administered?
- **Qualitymanagement:** Is there an existing QMS? Which standards?
- **Projectmanagement:** Available? Standardized? Performance indicators?
- **ELSI:** ethical vote, informed consent & data protection rules

Berlin	<input type="checkbox"/>
Dresden	<input type="checkbox"/>
Essen/ Düsseldorf	<input type="checkbox"/>
Frankfurt/ Mainz	<input type="checkbox"/>
Freiburg	<input type="checkbox"/>
Heidelberg	<input type="checkbox"/>
München	<input type="checkbox"/>
Tübingen	<input type="checkbox"/>

= finished
 = date fixed



The German Consortium for Translational Cancer Research (DKTK):



Biomaterial Availability

	Tissue	Liquids	DNA/RNA
ZeBanC Berlin	✓	✓	✓
TNTB UCC Dresden	✓	✗	✗
Biobank des Westdeutschen Tumorzentrums Essen	✓	✓	✓
UCT-Biobank Frankfurt (Allgemeine Tumorbank)	✓	✗	✓
UCT-Biobank Frankfurt (Hämatologische Tumorbank)	✗	✓	✓
UCT-Biobank Frankfurt (Hirntumorbank)	✓	✗	✓
Tumorgewebebank Freiburg	✓	✗	✗
NCT-Gewebebank Heidelberg/(NCT Liquid Biobank)	✓	(✓)	(✓)
Gewebebank TU München	✓	✗	✗
LMU Biobank München	✓	✓	✓
Tumorbank CCC Tübingen	✓	✗	✗

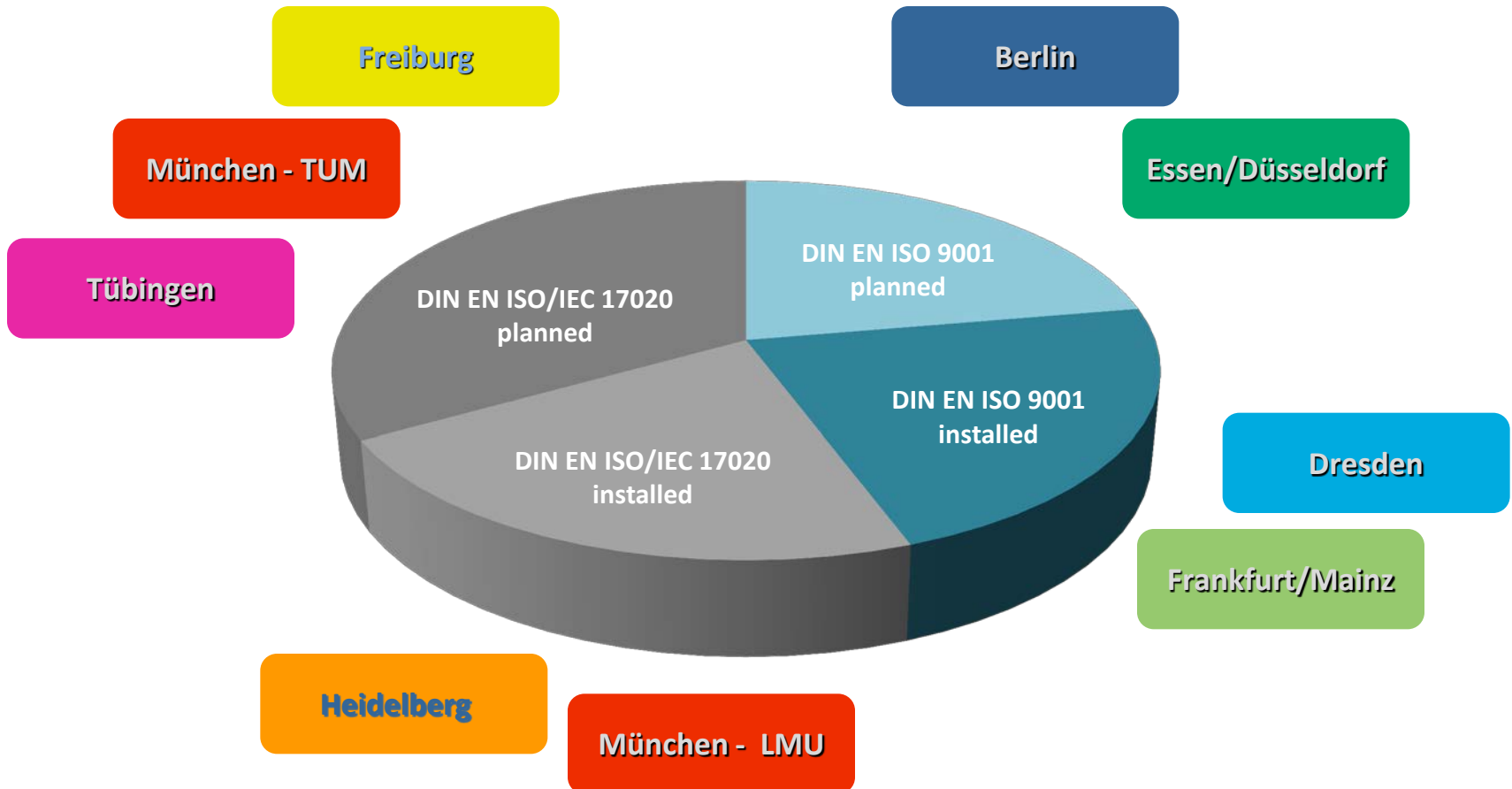
Collection: = yes; = no



The German Consortium for Translational Cancer Research (DKTK):



Quality Management





Biobanking Platform - Future

- Reach sustainability (2nd funding period)
- Complete harmonisation of all sites
- Complete integration in CCP-IT concept (bridgeheads)
- Harmonisation with other activities (DKH-CCCs; joint board)
- Increase project work

The German Centres for Health Research – Coordinative Biobanking (and IT) Issues

- Common ground on biobanking and IT in DZGs
 - Need for local and Meta-IT-Systems
 - Need for coordinated DZG-adapted biobanking
 - Lack of respective preexisting structures – need for implementation
 - Need for information and best practice exchange
 - Need for perception and sustainability
- Avoid conflicts and use synergies at multi-DZG sites
- Avoid unnecessary implementation work/mistakes – learn from the others
- Coordinate similar activities (lobbying, PR, training)



Need for coordination between DZG biobanking and IT structures

DZG WG Biobanking & IT

- 1st coordination meeting in (Munich; Nov 13)
- DZG management board (Frankfurt; Dec 2013)
- Consent on biobanking structures and interaction
- Defined Activities:
 - QM/SOP collections
 - Biobanking Catalogue
 - PR
 - Regular communication
 - DZG Boards statements (Controlling and reviewing parameters)

DZG Biobanking Catalogue

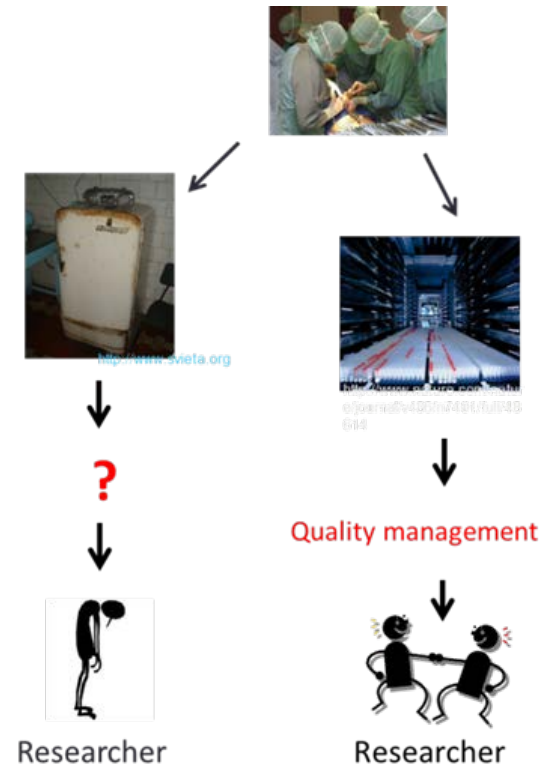
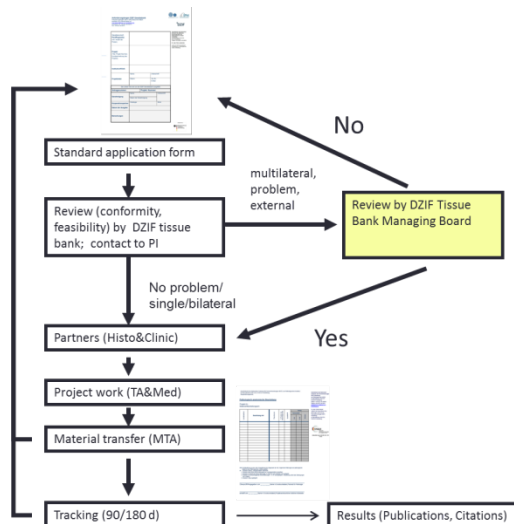
- Good DZG-wide documentation /overview
- Individual but harmonized BBMRI-compatible format

Laboratory Information Management System (LIMS)

- Different systems → interoperability challenges
- Using/expanding local synergies

Quality management for Biobanking

- Indispensable: comprehensive and structured quality management considering future certifications/ accreditations
- SOP-collection
- Project management harmonisation



Statements of DZG WG Biobanking

Example Controlling and Reviewing of Biobanks

- 2014/15 First draft statement by WG
- 4-11/15 Adaptation, evolution, and interdisciplinary consent by German Cancer Aid (DKH) working group biobanking
- 11/15-2/16 Acceptance by
 - CCC Board of DKH
 - All 13 CCCs
 - DKTK Board

The German Centres for Health Research – Differences in Biobanking

- Preexisting biobanking structures?
- Sufficient prospective probes and data acquisition?
- Need/acceptance of centralisation
- Extent of interaction/interference with clinical structures
- Need for human bioprobes
- Different DZG organisational structure
- Different core structures concepts



Different organisational and decision-making structures!

The German Centres for Health Research – Biobanking

- Most powerful and sustainable biobanking support network
- Efficient implementation of biobanking in all DZG
- Different structures and aims due to inherent DZG differences
- Efficient internal harmonisation and information activity (DZG WG Biobanking and IT)
- Efficient work share with other national activities (GBN, TMF, WG CCCs)
- Clear future perspectives

The German Centres for Health Research – Biobanking Perspectives

- Assure sustainability of biobanking in DZGs (organisational & financial)
- Harmonisation of assessment and controlling rules
- Harmonisation of IT solutions (limited)
- Maintain coordinative platform (biobanking & IT WG)
- Joint activities
 - Catalogues
 - Outreach
 - International networking

Thank you !

German Centers for Health Research



- German Consortium for Translational Cancer Research (DKTK)
- German Center for Infection Research (DZIF)
- German Center for Cardiovascular Research (DZHK)
- German Center for Lung Research (DZL)
- German Center for Neurodegenerative Diseases (DZNE)
- German Center for Diabetes Research (DZD)



DZGs

**Coordination
Biobanking**

DZG WG Biobanking&IT

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Heidelberg (BMBH)**

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