

Recording and Displaying Biospecimen Quality

Biomaterial Quality Issues in Registers

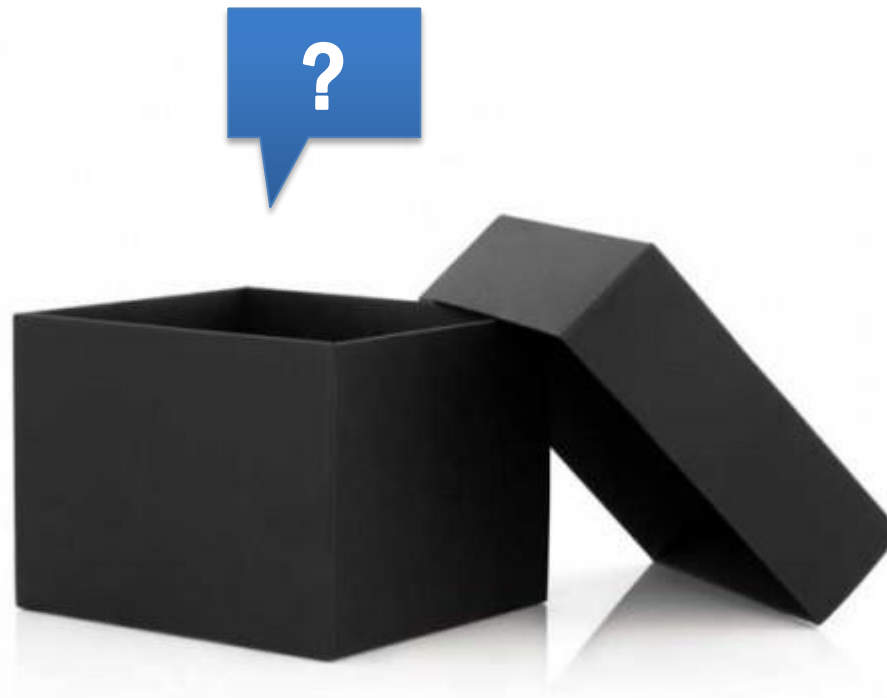


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Quality of biomaterial



Quality for special purposes



Goals of biobanks

- Provide researchers with samples of best quality
- Provide easy access to researchers



Challenges

- What is “best quality”?
- Comparability of samples of different biobanks



Approach

- Provide researchers with information about quality in a standardized way at one place

Popular standards for quality and biobank transparency

BRISQ

SPREC

(MIABIS)

Processed samples?

BRISQ

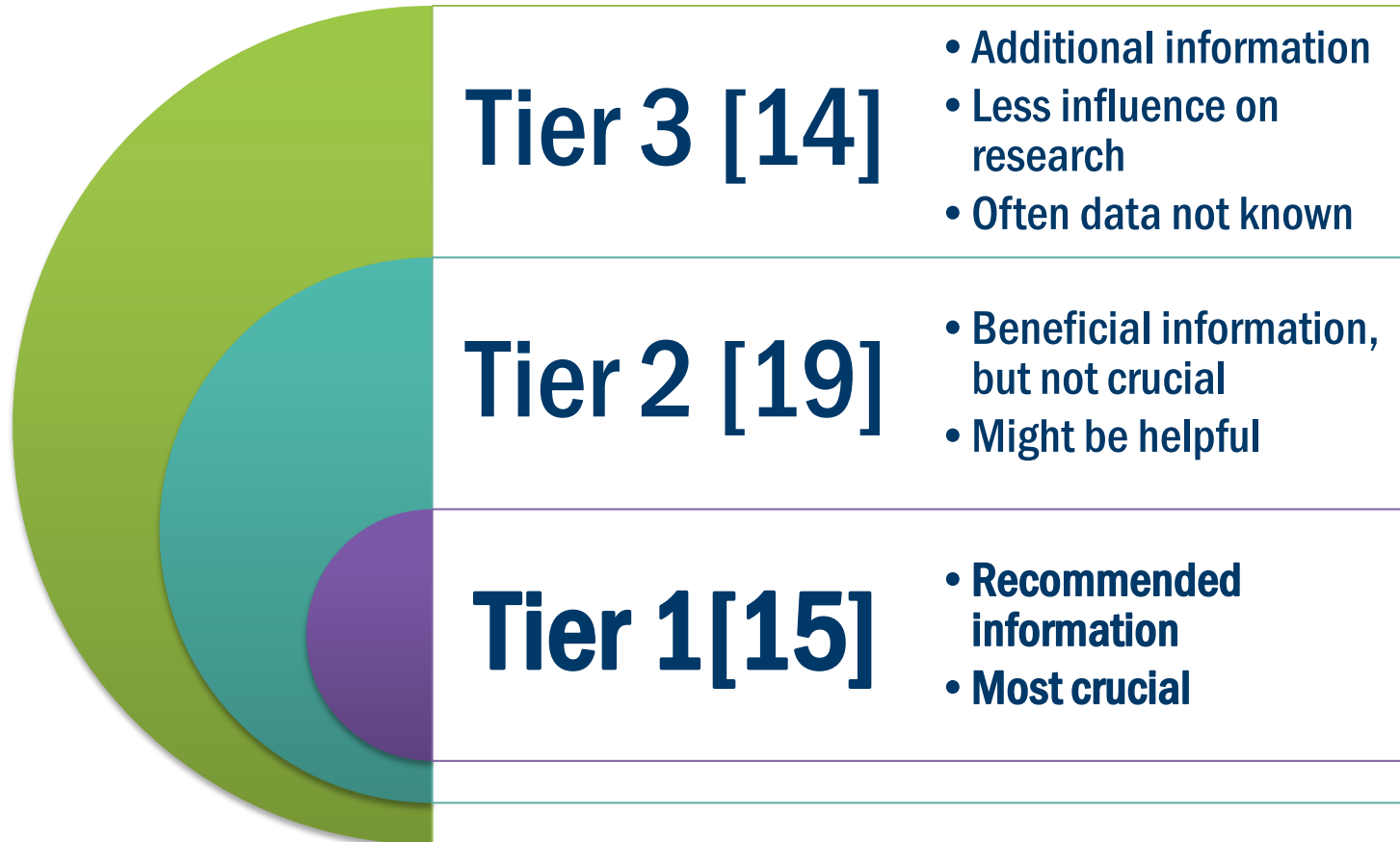
BIOSPECIMEN REPORTING FOR IMPROVED STUDY QUALITY

DOI: [10.1002/CNCY.20147](https://doi.org/10.1002/CNCY.20147)

BRISQ

- **Purpose: transparency of research and publications**
- **Information on**
 - **Samples (solid and liquid)**
 - **Sample donors**
 - **Collection site and mechanism**

BRISQ



BRISQ - Examples

Tier 1

- Biospecimen type
- Anatomical site
- Storage temp.
- Disease status of patients
- ...

Tier 2

- Cause of death
- Aliquot volume
- Specimen size
- Shipping duration
- ...

Tier 3

- Type of storage container
- Reproductive status
- Duration of thaw events
- ...

BRISQ

For describing human biospecimens, **Nature** recommends referring to the **BRISQ** reporting guidelines and to ensure that **at least Tier 1** characteristics are provided

<http://www.nature.com/authors/policies/availability.html>

BRISQ - limitations

- **No standards for entering data**
- **Often not computable – data has to be entered manually**
- **Many items if using all three tiers**
- **Data could be found in different systems (BIMS, clinical record,...)**

Improvement of BRISQ

- **ESBBperanto working group**
 - Lead Dr. Sara Y. Nussbeck
 - Standards for data acquisition (based on BRISQ)

Poster: http://www.esbb.org/download/ESBBperanto_poster.pdf

No.	Data Element
1	Biospecimen type
2	Anatomical site
3	Disease status of patients
4	Clinical characteristics of patients
5	Vital State of patients
6	Clinical diagnosis of patients
7	Pathology diagnosis
8	Collection mechanism
9	Type of stabilization
10	Type of long-term preservation
11	Constitution of preservative
12	Storage temperature
13	Storage duration
14	Shipping temperature
15	Composition assessment & selection

Answers of 14 biobanks in Europe and Canada

	BRISQ Tier 1 items														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Not documented at all			28%		100% only living patients	28%	14%	57%	43%	28%	57%	28%	43%*	28%	43%
Documented but not standardised	100%	57%	57%	100% own minimal data sets*		28%		28%	28%	43%	14%	57%	57%	71%	57%
Documented and standardised		43% ICD-O	14% ICD-10 ICD-O			43% ICD-O	85% ICD-O	14% SPREC	28% SPREC	28% SPREC	28% SPREC	14% SPREC			

*partially national

*unclear so far

In which system should the BRISQ be stored

- **Minimising additional documentation effort during biospecimen collection**
- **All BRISQ information (samples and clinical data) needs to be available at biobank**
- **Automatic generation of BRISQ report upon sample hand-over from the biobank**
- **Provision of reliable and complete BRISQ dataset for researchers for the publication process as part of the MTA**

SPREC

SAMPLE PRE-ANALYTICAL CODE

DOI: 10.1089/BIO.2012.0012

DOI: 10.1158/1055-9965.EPI-09-1268

DOI: 10.1089/BIO.2011.0035

SPREC

- **Purpose: document quality of samples**
- **Information about a specific sample**
- **Pre-analytical factors are coded in 7 fields**
- **Currently version 2.0 for fluid and solid samples**
 - **SPREC for environmental biobanking exists as well**
- **Update is planned for about end of the year (by ISBER Biospecimen Science WG)**

SPREC

Fluid Samples

1. Type of sample
2. Type of primary container
3. Pre-centrifugation delay
4. Centrifugation
5. Second centrifugation
6. Post-centrifugation delay
7. Long-term storage

Solid Samples

1. Type of sample
2. Type of collection
3. Warm ischemia time
4. Cold ischemia time
5. Fixation/stabilization type
6. Fixation time
7. Long-term storage

SPREC - example

Fluid Samples

SER-TEM-A-X-N-A-C

Solid Samples

TIS-A12-A-B-SNP-Z-C

SPREC limitations

- Leaves out processed samples
- Way of coding could be improved
 - Centrifugation: A = RT | 10-15 min | <3000 g | no braking
- Not enough information?

In which system should the SPREC be stored

- Biomaterial information management system
- examples: doi: 10.1089/bio.2013.1152
- For each individual sample

The screenshot shows a software interface with two tabs: 'Metadata' and 'SPREC'. The 'SPREC' tab is active, showing a 'Select SPREC' section with several dropdown menus. Below these is a 'Comments:' text area. A table of SPREC codes is displayed, with the row for code 'A' highlighted in yellow.

Code	Version	Description
J	2	RT for >24h
H	2	RT for 8-24h
F	2	RT for 2-8h
D	2	RT for 1-2h
B	2	RT for <1h
X	2	Unknown
Z	2	Other
A	2	3-7°C <1h
C	2	3-7°C for 1-2h
E	2	3-7°C for 2-8h
G	2	3-7°C for 8-24h
I	2	3-7°C for >24h

And now...



“Standards”

- BRISQ
- SPREC



Deutsches
Biobanken-Register



Registers (EU/World)



German Biobank
Node WP2



German Biobank
Node WP2

BIOMATERIAL QUALITY ISSUES IN REGISTERS

Which information regarding sample quality should be in a register

- Minimal Data Set based on standards
- Strongly depends on purpose
- Finding samples on sample/project/biobank level
 - Linkage with clinical data?
- ! At least
 - Information that quality data is available on request
 - Typ of quality data

Which information regarding sample quality should be in a register

BRISQ

SPREC

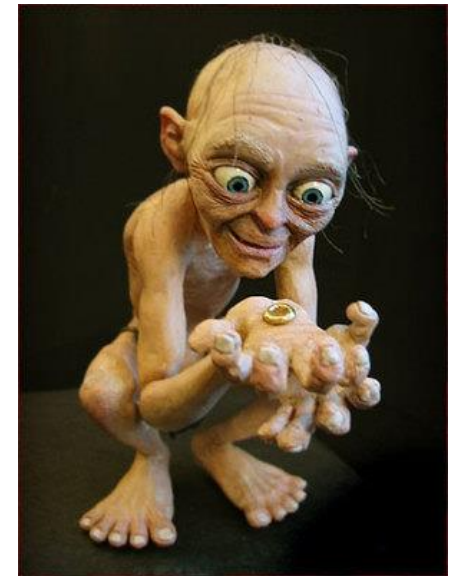
MIABIS

Processed
material

- **Basic information of samples**
- **Notation in the BRISQ clinical,**
- **Quality information (reference)**
- **Not standard (e.g. Naylor)**

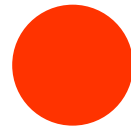
Challenges

- **Data has to be existent and easy accessible in biobanks**
- **Trust of other researchers in biobank samples**
- **“Up-to-date” information**
- **Benefits for biobanks needed**
- **Benefits for requesting researcher needed**
- **Benefits for collecting researcher needed**
 - **“my precious”**

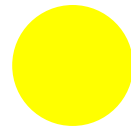


Recommendations

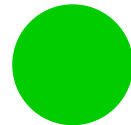
- Interfaces to reduce workload and get latest data easier
- Support of request workflow
- Using a minimal data set, based on existing standards



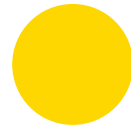
No additional information



Incomplete minimal data set



Complete minimal data set



Complete data set / advanced data set

Benefits for biobanks and researchers

- **Biobanks: samples will be used ... but only if usability of register is good**
- **Researchers: Use existing sample collections**
- **Research collaborations**
- **No “unused” biobanks**

To sum up..



Selection of data to display in registers



Technical implementation that requires minor effort to add and update data



Easy search and request procedure



Coordination with other registers including interfaces

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