Biobank: What's in a Name?

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Editor's Introduction

THE PHRASE, “What’s in a name? That which we call a rose by any other name would smell as sweet” is a well-known phrase from Shakespeare’s *Romeo and Juliet*.¹ The phrase has been used to imply that the names we use to describe things do not always reflect what they actually are. However, names are very important and do have important connotations and implications that must be considered.

Although the term “biobank” did not appear in the literature until later, the term “biobanque” may have been first used in 1992 by a pharmacist in the Picardie Regional laboratory² to describe a collection of valuable biospecimens from an sexually transmitted disease (STD) clinic accompanied by full clinical and laboratory annotations. In this context, the word was chosen to convey safe storage for future use, as for money in a financial bank (Allen D, personal communication, January 25, 2019). Since that time, a variety of different definitions have been used. For example, the International Society for Biological and Environmental Repositories Best Practices for Biorepositories defines a biobank as, “An entity that receives, stores, processes, and/or distributes specimens, as needed. It encompasses the physical location as well as the full range of activities associated with its operation.”³ Although the term biobank has been widely used, a variety of other terms have been employed to describe biobanks, such as biorepositories and biological resources or biorepositories. Other more recent terms that have been used to describe some biobanks include the terms “biovaults” and “biodistributors.” These terms have different connotations and implications with regard to the availability of biospecimens within the collections and how widely they are distributed and utilized. In this article, we asked experts to share their views on the various terms used to describe biobanks and how the terms reflect biospecimen distribution and utilization.

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Expert's Response: Peter H. Watson

WE OFTEN KEEP USING the same term for familiar and useful things, even when they change. Phones, computers, and research laboratories are familiar and fairly similar on the outside, but have changed dramatically on the inside as new capabilities and functions evolve. So have biobanks.

Biobanks are defined by ISBER as “An entity that receives, stores, processes, and/or distributes specimens, as needed. It encompasses the physical location as well as the full range of activities associated with its operation”¹ and also among biobankers as “a facility conducting biobanking according to standards.”² But in the context of cancer research, it may be useful to concentrate on the word “entity” and broaden the definition to any form of biospecimen collection arising in the context of a research project, study, or clinical trial. First, the purpose is all the same, to generate research data. Second, the processes are common, whether they involve large or small collections of biospecimens or whether they lead to immediate consumption or to storage and then selection and consumption. Third, researchers are agnostic to the type of collection they access to pursue their studies. So, although some collections are intended for a single research

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user and purpose, others for several semidefined users and purposes, and still others for multiple users and semidefined purposes, all are essentially forms of biobanks.³

So, why persist with the term biobank when there is all this diversity? Several alternative terms are used (e.g., biorepository) and have been proposed (e.g., biolibrary) without gaining more popularity, but new terms are still emerging (e.g., biotrust). Perhaps we persist with the term biobank because its merits outweigh its drawbacks; it is simple, short, widely recognized, and captures the essence of an activity that involves collecting biological samples. The inclusion of the word “bank” within “biobank” can be misconstrued by some as an entity that aims to hoard samples, but to many others it conveys high value.

Why then are new terms proposed? Perhaps because the activity of biobanking and the way biospecimens are utilized is evolving. There are many reasons for this evolution, but for cancer biobanks, the main drivers come from the changing research landscape and new researcher requirements and, in particular, from technical advances that have expanded the utility of the formalin-fixed paraffin-embedded (FFPE) block for research.⁴ There is increasing recognition of the importance of biospecimens that are linked to other biospecimens from different locations or different events in the same patient (and, therefore, support analysis of tumor heterogeneity and evolution) and biospecimens associated with population-based cohorts (and, therefore, minimizing the enrollment bias that is often inherent in traditional biobank collections). We have previously called these features “complex” biospecimen qualities.⁵ But there are also significant changes occurring in forms of formats of tissue biospecimens. The emergence of immunotherapies is driving research in this area and a need for fresh prospectively collected biospecimens. But the increased research appetite for FFPE blocks banked in pathology archives is growing the most rapidly. This is not just because it is now easier to interrogate FFPE blocks, or that it is easier to find biospecimens with “complex” qualities already described. It is also because these offer a range of pathologies that just do not exist in frozen tissue collections of traditional cancer research biobanks, but these pathologies are representative of perhaps the most important features of cancer that research should study. Preinvasive lesions, lymphovascular invasion, isolated tumor cell deposits, and macrometastases, in lymph node, are just a few of the important pathologies that are at best scarce in traditional research biobanks and really only found in pathology FFPE blocks.

So, the future of cancer research biobanks, and the expertise they hold that has been developed around the process of biobanking, lies in an ability to change and adapt. Cancer biobanks must change their operational emphasis, from a priority on preassembled collections and storage to a priority on prospective collection services, combined with re-deploying their expertise in the discipline of biobanking to broker efficient access to existing collections of FFPE blocks in pathology archives. This is not to suggest that all the retrospective frozen tissue collections in research biobanks have an immediate diminished value, these are just no longer the priority biospecimens. Nevertheless, biobanks should rationalize the duplications and reduce the scale of these collections to pivot their focus.⁶ Enabling appropriate access to pathology archives and determining which material is available for research while preserving material for future care and addressing ethical requirements remain challenging.

The ability to select from pathology archives using multiple research specific criteria also remains a challenge in many locations because the pathology departments’ IT databases are principally designed to support individual clinical care and linkage to treatment and outcomes data can be difficult. These are the problems that biobanks should solve for researchers. This new focus is not necessarily a new idea. There is much for biobanks to consider in the example of the well-established and successful Cooperative Human Tissue Network that operates on a model that integrates prospective collection capabilities with retrospective biobank collections and access to pathology archives.⁷

Should we drop the familiar term biobank? In my opinion and despite some negative connotations associated with the word “bank,” we should not waste our time changing a term that also has many merits as already noted. But what is needed is for many biobanks to refocus their capabilities and reprioritize their functions. Biobanks should place new emphasis on the knowledge and expertise they hold in the activity of biobanking and the services they can offer in supporting prospective custom collections and facilitating access to clinical archives.

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Expert's Response: Robert E. Hewitt

OVER THE PAST 20 YEARS, the term “biobank” has been adopted increasingly widely, but at the same time many have criticized the word and multiple alternatives have been proposed. So, why all the names?

The first publication to use the word “biobank” was by Loft and Poulsen in 1996.¹ Although originally restricted to human population-based biobanks, the term was subsequently used for human disease-based and hospital-based collections, and also for samples from animals, plants, bacteria, and other life forms. The word “biorepository” predates the word “biobank” by several years and is most popular in the United States. The two words are used interchangeably by many.²

“Biobank” is a neat and convenient word that can be modified to give the word “biobanking,” which denotes the (1) activity of managing sample collections and (2) the associated discipline. Perhaps because of these advantages, the word has been widely adopted. However, over the past 10 years, a number of speakers and authors have argued that “biobank” is in fact *NOT* the most appropriate term for the biological collections they describe. The terms “biovault,” “biohoard,” and “biotrust” have been proposed as alternatives.

At the inaugural conference of ESBB in Marseille in 2011, Simone Sommer gave a presentation entitled “Biobanking for the Biggest Stakeholder—The Patients.”³ In her talk she described her own experience of setting up a biobank to support research on chordoma. She said that unfortunately most biorepositories are more aptly described as a “biovault” where there is hoarding and limited access to biospecimens, rather than a “biobank” where there is dynamic active deposit and withdrawal of specimens and data sharing. She went on to say that the greatest public impact and benefit of biorepositories is when there is a patient-centered approach where the ultimate goal is curing the patient.

In a publication by Daniel Catchpole in 2015, entitled “Biohoarding: treasures not seen, stories not told,”⁴ he argued that too many biobanks are in fact “biohoards” where samples are stockpiled and guarded, contrary to the expectation of individual donors, the broader health community and society in general. He said that biobank policies should ensure that samples can “tell their story.” He argued convincingly that in cases wherein “biohoards” exist, they are the result of poor policy decisions.

Of course, the words “biovault” and “biohoard” are proposed to draw attention to the fact that we have a problem; there is a tendency for biobanks to store too much and share too little.

At the Global Biobank Week conference in Stockholm in 2017, Greg Simon of the Biden Cancer Initiative gave a keynote speech in which he stressed the need for biobanks to share actively, since this is the expectation of the donors who entrust their samples and data to the biobank.⁵ Entrusting personal data is not something to be taken lightly, and to make this point he asked each member of the audience to pass their unlocked mobile phone to the person sitting directly behind them. Not surprisingly, people were unwilling! He went on to say that the word “biotrust” would be more appropriate than “biobank,” because it emphasizes responsibility: the word reminds biobankers that we have a moral obligation to the donor to make good use of the samples they entrust to us.

The problem of insufficient sharing by biobanks is even more marked and serious when it comes to providing bios-

specimens to researchers in industry. Too many biobanks have policies that prevent industry from accessing their samples.⁶ In some cases biobank access policies explicitly exclude investigators associated with for-profit research entities (e.g., pharma, biotech, and diagnostic companies). This seems hard to justify, because although everyone agrees that fundamental and basic research in academia has tremendous value, ultimately it is the applied research by for-profit entities that brings new drugs and diagnostics to the patient.

To overcome the difficulty in obtaining samples from academic biobanks, researchers in industry need to obtain a high proportion of their samples from intermediary organizations such as commercial biobanks, brokers, and Contract Research Organizations (CROs). From the traceability perspective, this is not always ideal.⁷

Perhaps academic biobanks should ask what the donors of biobanked samples would expect, assuming that the importance of industry research has been explained to them. Would they expect their samples to be restricted to researchers in academia?

In conclusion, there have been a lot of discussions about whether or not “biobank” is a good name that conveys the correct meaning. Whatever your opinion on this, one thing is certain: the word “biobank” has served an important purpose. It has been a lightning rod for concerns about whether biobanks are meeting the expectations of all their stakeholders and has served as an excellent talking point.

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Expert's Response: Daniel R. Catchpole

I HATE THE WORD “BIOBANK.” It is an overused title for a biospecimen storage unit that is wheeled out by research

institutions, hospitals, universities, and companies to make their tissue collections sound special and virtuous. Researchers and managers alike claim that biobanks are “valuable resources,” “ethical requirements,” “vital for research,” “central infrastructure,” “high risk,” “expensive entities,” and the chorus of claims get louder when research funding is in the offering. However, based on experience, misconstrued promotion or uninformed perceptions the term “biobank” conjures up different understanding in the minds of the hearer. For example, a politician tasked with officially opening a brand-new biobank requested to see the new facility. Upon leaving the center she was heard to exclaim, “all it is, is a big fridge” (P. Marlton, personal communication).

Here is why I hate the name “biobank.” Names reflect purpose. Someone named “John Smith” came from a family engaged in a trade; for example, a blacksmith. A “Catchpoole,” for instance, was a person tasked with the job of catching chickens (“poulet”) from people who had not paid their taxes. Likewise naming something a “biobank” should reflect its purpose.¹ Trouble is, despite having the same name, many biobanks have different purposes. This reflects the different motivations of those who set them up. Sure, all biobanks store stuff, but why do they store stuff? All financial banks are involved in the purpose of “investment” but not all investments are good investments. So putting your money in a “bank” does not mean you have done the best thing.

As a community of experts, surprisingly, biomedical researchers have yet to determine exactly what the primary objective of the “biobank” should be. Is its purpose custodial in nature, part of the regulatory system guiding ethical research, or is it about the distribution of tissue from donor to scientist? Is a biobank’s purpose to ensure scientific robustness, reproducibility, and quality assurance, or is it about the efficiency of research activity and the expedient dispersal of tissue? What about beneficence, goodwill, probity, and equity issues or is a biobank’s purpose all about possession, capacity, and how you control the direction of research? Should biobanks be measured by their “profitability,” and if so, how is this defined? Should they be cost neutral or receive long-term investment? Is a biobank part of research infrastructure, a service provider’s or a project-driven facility?

And is it just about storage? Discussion around biobanks tend to center on capacity—“my biobank is bigger than your biobank” type arguments. Some biobanks are paid based on how many samples are stored. But is a resource with 1 million biospecimens that nobody wants or can get access to any better than one with a thousand samples that is actively fed into research investigations? Any biobank that starts its narrative with the lines, “we have capacity to store x number of samples,” needs to be treated with caution.

Purpose guides function. Why a biobank operates determines its objective. However, despite each facility being called a biobank, their different purposes confuse the title and lead to different ways that they interact with the world. In recent years, questions have been raised whether biobanks actually serve the function their name suggests. Many have been bold to suggest that alternative names should be applied to some facilities so as to better reflect their function: biohoard,² biovault,³ archive,⁴ cohort study,⁵ biotrust,⁶ and repository.⁷ In truth, all these names, as nouns, represent the same thing: biospecimens stored in a freezer. But what these names reflect is the varied motivations behind the people making the effort of collecting them. This is where

the distinctions lie. Meanwhile, pathology staff referred to biobanks as “glorified specimen collection” (anonymous comment, Royal College of Pathologist Australasia Pathology Update Conference, Melbourne, Australia, 2010).

One of the consequences of such definitional issues is that it makes it difficult to establish ethical boundaries with which biobanks must operate.⁸ Biobanks are under heightened scrutiny compared with everyday diagnostic services seemingly because they have different motivations. Yet, practically, the tissue handling steps within pathology and genetic laboratories are exactly the same, which are investigated and studied in essentially the same way. So, who the biobank represents and serves may determine its purpose. If biobanks represent and serve the donors of the biospecimens, a biobank’s purpose may be custodial and protective. If a biobank seeks to support research, then integrity, the scientific robustness, reproducibility, and quality assurance may be our stated goals, although researcher access to biospecimens may be a higher driving motivation. If a biobank is set up by a governing institution, then the storage capacity and technology of the biobank may be a key motivator, so its leaders can sprout tag lines that generate external public profile. Commercial biobanks will be motivated by profit margins and market share figures as they try to serve their shareholders. Often a biobank’s function is simply to survive and to be seen as relevant with the result that they get tossed around by the whimsy of its leaders.

Function leads to expectations. Despite having the same name, because they have varying functions, biobanks are judged by different standards. If the primary purpose is to store biospecimens, then the biobank will be judged on how full the liquid nitrogen tanks are. If the purpose is purely custodial, then the regulatory rigor and the depth of the paper trail will determine the value of your operations. If you are a commercial operator, then profit levels and market share will need to be reported at annual meetings. However, for the next conversation, the biobank may have the goal of collecting for a particular study population, to which a reasonable question may be, “have you then managed to get a collection of material that is representative of the populations you intend to study.” In this case, numbers have nothing to do with it, selection bias does.

In 2004, the major government medical research funding agency in Australia awarded \$12M to six consortia to set up “biobanks” to support biomedical research.⁹ After 5 years, the government asked the six consortia to report on the research output and health benefits of their efforts. Each consortium reported on the capacity of their collection efforts. This was rejected by the government as they expected actual measures of research output and health benefits, not the number of samples collected.⁹ The function of the biobanking consortia and the expectation of the funder did not match because it was never defined. As a result, the government withdrew the funding, the consortia no longer exist, and the biobanks are slowly folding. This example highlights that biobanks are not necessarily judged on what they do. Rather, they are judged on what they are expected to achieve. What a biobank is expected to do is determined by the motivation of those who set them up, or indeed those who have funded them. Calling each a “biobank” masks this finer nuance and fails to allow observers to consider the differences in tissue handling needs required within our research landscape by different facilities. It dumbs this down and lumps every facility into the same camp, yet the observers judge biobanks by different criteria.

So, I hate the word biobank because it means too many things to the point that it means nothing. Here is my evidence: the commentary I hear from the research community is that biobanks are vital to research. Every one nods as this is said. Yet increasingly, established biobanks are losing funding, closing down, and are unable to sustain themselves. No one wants to pay for “biobanks” because they are not doing what they expect. My contention is that this is because no one really knows what biobanks are nor what they could be because, at the moment, they can be anything.

In conclusion, biobanks are not special, but biobanking is.¹⁰ It is not about the noun, but the verb.¹¹ The passage of biospecimens from donor to researcher scientist is fundamental, and always has been, to meaningful translational research. Without it, research does not happen. Facilities that collect tissue should be named in such a way as to reflect their purpose so that (1) we know what to expect and how to gauge their productivity (2) we know how to set limits of what they can and cannot do with the information generated from the biospecimens, and (3) we can place realistic expectation on them as to what society expects of how these facilities are managed, funded, and sustained into the future. Biobanking is more than the name “biobank” implies. It is about building connections and relationships, trust and goodwill, productivity, and knowledge generation. Biobanking leads to new knowledge, creative enquiry, new opportunities, and advanced understanding of who we are.

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Expert's Response: William E. Grizzle

BIOBANK, BIOVAULT, AND BIOREPOSITORY are some of the names used to describe an entity that collects, processes, stores, and distributes biospecimens to support biomedical research. My concern is that each of these names emphasizes storage, and hence, these names suggest that a major function of these entities is storage of biospecimens. Much of my concern about the emphasis on biospecimen storage is that the growing inventories of biobanks suggest that these entities are not placing adequate emphasis on biospecimen distribution and hence, utilization.^{1,2} Therefore, I want to change the name of these entities to reduce the emphasis on storage/banking and place the emphasis on actually providing biospecimens to investigators to support research with human tissues. Specifically, a biobank is useless unless its biospecimens are utilized and I want to push for biobanks developing defined and stable inventories. The main problems leading to constantly increasing biospecimen inventories have been discussed elsewhere^{1,2}; these include inadequate design of biorepositories, overcollection of specific biospecimens, and inadequate attention to distribution of biospecimens.

Names are important. To reduce the emphasis on storage, I recommend names that do not emphasize banking or storage. The current names are not specific, so I recommend we replace them with a name emphasizing what should be the primary goal of any biobank/biorepository—to distribute biospecimens for research. I prefer the name “biodistributor,” which emphasizes the importance of biospecimen utilization with respect to these entities. Alternatively, we could use a name such as “bioresource,” which at least seems more dynamic than either biobank or biorepository; however, my view is that any name that does not suggest that specimens are being stored is preferable to the current names.

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