

REVIEW

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A message to biobanks: get the word out or be out

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Abstract

Biobanks are the hidden bottom of the iceberg of healthcare progress. Although important medico-scientific nexus, they are underutilised, under-publicised and undercapitalised. From their improvisational functioning at their emergence to the meticulous professionalisation of today, biobanks have experienced a full internal (r)evolution. However, an equivalent external echo is still missing among the main stakeholders (researchers, clinicians, patients and funders). This is all the more regrettable in that each community is both contributor and recipient in the biobanking web. In this review, we put forward communication as a critically influential but under-tapped resource to maximise the outreach and involvement of each community and subsequently optimise the overall sustainability of biobanks. In a particular setting of disease-oriented biobanks, we present the specific messages to convey to each partner category as well as multi-pronged approaches to do so, locally as well as globally.

Keywords Biobank, Communication, Sustainability, Stakeholders

1 Introduction

It is widely accepted that the actual main challenge of biobanks is their sustainability [1–4]. There is currently no standard business model for the sustainability of biobanks, a shortcoming aggravated by the under-appreciated variety of biobank types [5]. Nonetheless, a consensus seems to arise in the literature for a proposed plan to foster long-term biobank survival: an internal-to-external refocus. Indeed, while the first developmental waves of biobanks were inevitably product-focused (first in terms of quantity and then in terms of quality), biobanks are now entering a transformative phase, calling for a more people-oriented approach [6]. The overarching strategy consists in proving the value of the biobank to the main stakeholders, such as patients (to favour enrolment) and researchers (to favour use) [6]. As just one example of concrete implementation of this approach, biobanks are advised to exhaustively capture all performance output metrics (utilisation rate, publications, etc.) [7]. Although more challenging to tease out compared to internal metrics (e.g. number of accrued samples), these indicative data not only enable informed internal strategy (a business plan) but also prompt external participation and (financial) support [7]. While the present authors stand by and



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implement this overall vision, we would like to emphasise a crucial yet under-mentioned tool with a comprehensive and rapid impact on biobank sustainability: communication. Indeed, although the recent literature is burgeoning with reasoning and recommendations concerning biobank sustainability, we feel that the broad communication aspect is only brushed upon and scattered in the literature, even though it positively influences each typical sustainability aspect (financial, operational and social [5]). Everyone would agree that communication is the bedrock of any organisation. But in practice, is it? In this review, we draw upon the biobanking expertise and experience we have accumulated over the past 15 years to underline the importance of transparent, bidirectional communication with the communities directly but also indirectly impacting biobanking activities.

While biobanks have been created at the initiative of scientists, the evolution and refinement of their structures in terms of concept and strategy have compelled biobankers to ramify their skills beyond science (into business, law, politics, advertisement, social skills, etc.), often to the frustrating extent that this requirement of being all-rounders leaves little time for the originally leading scientific spirit. It goes easily omitted and unnoticed, but the capacity of biobanks to perdure relies on the biobanker's ability to endure. By contrast, the biobank structure constitutes only one link of the biobanking chain, and coordinated communication between the different links is paramount for all organisation and management aspects. By capitalising on both discernment of the literature and personal insights gained from firsthand experience, we wish to provide an exhaustive view of the approachable and actionable means represented by the communication dimension. In doing so, we hope to inspire useful considerations in fellow biobankers in a bid to improve, at any scale, both daily management and long-term sustainability in the current challenging times. To this end, we focus on four main communities (researchers, healthcare providers, patients and funders) whose significance in biobanking has previously been stressed [8], and we note critical points to foreground with each partner as well as relevant means to do so.

For the purpose of this review, the term *biobank* embraces and refers to disease-oriented hospital-associated biobanks. While this subtype is not necessarily the sole beneficiary of the content of this review, it represents a significant part of the Biobanking and BioMolecular Resources Research Infrastructure (BBMRI)-united biobanks and describes the facility managed by the authors. The biobank of the CHU UCL Namur (site of Godinne), integrated into a university hospital, is a not-for-profit structure set up in 2009 under the impetus of the Belgian Cancer Plan launched by the Belgian government. Hence, since its creation, the biobank has received annual funds from the Belgian government, exclusively destined to help subsidize the general retrospective biobanking of tumour samples, which makes it *de facto* primarily a tumour bank. This financing is the only reason why the biobank could be initiated and remains the only fixed fund received to this day. The biobank is ISO9001 certified and notified by the Federal Agency for Medicines and Health Products in conformity with the royal decree relative to Belgian biobanks (<https://www.ejustice.just.fgov.be>). It currently provides three main services: general retrospective biobanking (i.e. inventory), assembling of collections on demand and pre-analytical processing of clinical trial samples. The biobank collects samples from diverse pathologies (tumour, infection, inflammation, etc.), entailing an interaction with clinicians from different clinical specialties. Although not yet included in the

programme of the BELgium ACcreditation body BELAC, the biobank is currently taking the necessary steps towards ISO20837 accreditation.

We would like to bring to the reader's attention the plethora of biobank internal management systems, ranging from one-headed management of the diverse scientific, IT, marketing and business aspects to a decentralised, multi-headed system. Similarly, the professional personnel involved in the biobank ecosystem (pathologists, nurses, accountants, etc.) may be shared within the host institution or specifically dedicated to the structure. As no exception to the rule, there are as many Belgian biobank models (financing, organisation, culture, etc.) as there are biobanks, even among hospital-located biobanks. In our biobank, the functioning rests majorly on the shoulders of the biobank coordinator, and highly depends on adjacent hospital departments including the pathology laboratory, the clinical biology laboratory, the finance department, the communication department, the nursing staff, etc. While the multifariousness of biobank models is always noticeable at the biobanking congresses we attend, the communication aspect remains a shared issue. For the sake of exhaustivity, this review approaches the global communication aspect according to the most challenging operational scenario. Therefore, the relevance of each section will vary depending on each biobank's circumstances.

2 Communication with the scientific community

The scientific community constitutes the target customer of biobanks. It is as important for biobanks to get biosamples out as it is to get them in. Indeed, patients granted their faith and trust in the biobank they donated to. Therefore, the structure has the (moral, human, legal, scientific) duty to honour their donation by ensuring their active and proper use for the greater good. If researchers' partiality for biobanks may be considered a truism, it is quite a different story in practice. In our experience and as previously noted in the literature [2, 9], the scientific community is either seldom familiar with the existence and full potential of biobanks, is daunted by the prospect of the request-associated cost and/or is discouraged by the perceived procedural weariness. To address these popular prejudicial beliefs that impair biobanks' sustainability due to sample underuse, biobanks should implement a far-reaching, comprehensive communication plan regarding the exhaustive capabilities of biobanks. As detailed below, the lack of biobank visibility can be alleviated via both small-scale and broad-scale communication. Main ideas of this section are recapitulated in Table 1.

2.1 Communication means

Recurrent and spontaneous presentations of the biobank's services to research teams constitute a germane way not only to (re)familiarise scientists with a more relevant bio-material perspective but also to eliminate the erroneously perceived hurdles between them and access to biospecimens. To exploit researchers' availability and attention, this interaction can take place during routine seminars/staff meetings periodically organised in house by the research team [2]. Attendance (e.g. as a trade exhibitor) at niche-matching conferences is also a sound marketing approach to attract customers [10]. In addition, an updated website is an easily attainable way to advertise biobank services while centralising and facilitating access to the necessary procedural documentation [2, 10].

However, we believe that outreach to researchers should be tackled well before their careers are established. Hence, the welcoming of students to the biobank and their

Table 1 Summary of published and empiric considerations relevant to the scientific community in biobanking. We recapitulate the personal observations made during our 15-year long experience in biobanking regarding the scientific community (attitude, perceptions, etc.) and subsequent impact on our biobank (limitations, adaptations, etc.). We paralleled with (backing up) information published in the literature

What the literature says	What our experience says
Presentations of biobanks during staff meetings [2]	· Researchers generally neither have time nor wish to free a specific slot for a presentation they are not interested in at the moment. · Presentations during already planned team meetings maximize attendance, despite potential lack of original interest.
Creation and update of a website [2] [10]	· Essential for researchers to glean more information but not the most relevant path to increase awareness about the role of biobanks and related services as it implies an active and already enlightened search.
Biobanking education to undergraduate students of life sciences [11]	· Teaching courses to students about biobanks leads to an interest in doing an internship in the structure (we attract around 2 students yearly from one course). · Students doing an internship in the biobank spread awareness during their future career and are loyal users, leading to widened connections with industry and academia.
Inclusion of biobanking fees in budget [12] [13]	· This practice is not yet an automatic reflex. · We managed to go from 100–40% omission rate in 5 years thanks to constant communication, which allows us to envisage more easily some cost sacrifice for the researchers who still make the oversight.
Perception of specimen overpricing [2] [14] despite service quality [2]	· Researchers usually react with consternation when informed about the cost of the samples. · They consider prices overexaggerated (e.g. “for just a centrifugation”) without having in sight the importance of the applied standardisation, protocol rigor and equipment maintenance to prevent preanalytical variations. · While more understanding when enlightened, researchers face their own budget limitations in a difficult economic situation and still hope for some discount in the context of a biobank collaboration.
Awareness of what biobanks can offer to researchers [2] Network tools (e.g. https://www.bbmri.be)	· Detailing the exhaustive service range of the biobank (e.g. sample types) prompts use, as researchers are sometimes pleasantly surprised about what the biobank can provide. · Researchers should be aware that biobanks are adaptable, to avoid losing profitable requests. · Usually, the word of mouth serves us right to attract more and more requests that stray from our usual routine (synovial fluid, microbiological samples, plasma from patients who received a specific treatment, etc.). · Informing about the biobank’s extra services (technical input, collaboration set-up, ethics support) is essential to ease additional stress and improve the project. Notably, we often must bring researchers back to reality concerning some of their unreasonable requests (e.g. 50 mL of bone marrow from healthy patients). · Explaining the role of networks (BBMRI, BVT) is essential for their proper exploitation. · Redirecting researchers to the networks for requests the biobank cannot answer positively to is good practice.
Lack of protective time for clinicians to engage in research Lack of knowledge of the clinical context from researchers [17]	· Researchers and clinicians are enthusiastic about collaboratively engaging with each other but both sides are daunted by a world they know little about. They also fear it would take up too much time (clinicians) or energy (researchers). · Including a success story in the biobank presentations participate to allay fears and encourage such productive alliances. · Clinical collaboration/input in research projects using biobank samples proved indispensable, as clinicians often redirect the project towards relevant clinical gaps or more promising approaches.
Referencing biobanks in scientific communications [8]	· Not yet an automatic reflex. · We went from 50–70% biobank referencing rate through regular preventive reminders (notably via the satisfaction survey) and regular solicitations of users regarding their project advances.

Table 1 (continued)

What the literature says	What our experience says
Trend for more complex biospecimens [19]	· Being anticipatory regarding the future needs of researchers is crucial to stay in the game. · We felt the growing need for isolated cancer cells from lymph nodes for lymphoma subtypes that tend to remain localized. Hence, we purchased the GentleMACS Dissociator (Miltenyi Biotec) and optimized the cell isolation procedure, as continuous improvement research. Incidentally, more requests of that sort were coming our way during this process, and we were able to meet them. · Along those lines, our biobank keeps up with accreditations and certifications, as they are more and more valued and demanded by users, in particular industries.

familiarisation with the biobanking world is an actionable and relevant upstream strategy to acquaint future scientists with the functioning, value and mission of biobanks. In parallel, the inclusion of biobankers in university lectures complements this intention [11]. Imparting a pro-biobank mentality early in scientists’ careers through active immersion paves the way to a shift in habits in the future generation.

2.2 Service fees

In their communication, biobankers should expound to scientists the absolute necessity of pre-emptively including the fees relative to biobank services in grant applications [12, 13]. Indeed, researchers’ absence of foresight (or underestimation of the true cost [7]) is usually the main culprit in either the complete withdrawal of the researcher from biospecimen use, the deleterious reduction of the originally requested samples or the subsequent price discount proposed by the biobank in a sacrificial effort to encourage the pursuit of the project (as frequently experienced by us).

In addition, it is essential for biobanks to justify themselves regarding the applied fees, which are usually appraised as overly expensive by researchers [2, 14], in proportion to the perceived amount/complexity of work performed by biobanks. The price is justified by the guarantee to provide samples of high, controlled and defined quality (standardised procedures, rigorous maintenance of equipment, certification/accreditation, etc.). Far from being a mere frill, such strict monitoring strives to thwart the dramatic influence of pre-analytical variations on experimental outputs [15]. This top-tier service is costly [2], and an awareness of the potential peril to research outcomes would naturally sway opinions towards a better acceptance of biobank-related costs, as researchers already easily fathom the financial repercussions when exploiting advanced technologies for downstream project applications (such as DNA sequencing). In a nutshell, it is crucial to convey to researchers the undeniable truth that while reliable, high-quality biosamples are the researchers’ reward, the associated cost is the biobank’s reward.

2.3 Service range

Biobankers should underline the possibility of prospectively assembling a customised sample collection in the event of material unavailability or inadequacy between the accessible stored biospecimens and a research project’s biological prerequisites. This biobanking service is often unknown or overlooked, although it provides a close and valuable collaboration with clinicians to generate fit-for-purpose biomaterials benefitting from clinical, biological and technical relevance. Collaboration with clinicians enables a rewarding transfer of medical knowledge and needs to researchers and vice versa,

thereby promoting accelerated, pivotal and better targeted science for the development of new treatments and diagnostic methods. Until biobanks facilitated and democratised this clinical/scientific competence association, the establishment of a customised collection was restricted mainly to researchers already benefiting from privileged connections with clinicians.

More than simply stating their services (access to inventory, personalised collection, etc.), biobankers should be as exhaustive as possible in spelling out the multiformity they can provide in terms of sample format (paraffin-embedded tissue, flash-frozen tissue, single cells from dissociated tissue, etc.) as well as in terms of sampling dynamic (i.e. time points). Indeed, researchers do not necessarily have an all-inclusive appreciation of what a specific biobank is able to supply or even of what they could/should themselves potentially be interested in. Therefore, this early specification from the biobank sparks ideas in researchers, orientates their reflections and altogether enhances the project to be developed (e.g. by proposing alternative time points than the ones originally determined by the researcher so that data can be directly associated with clinical check-ups/follow-ups, such as a scan or endoscopy). In particular, the anticipation of the prospective establishment of a customised collection acts in favour of the extended time it requires to be relevantly gathered.

Another important message to spread is the flexibility of biobanks in being both open and able to break out of their customary practice in terms of routine procedure and sample types to accommodate specific requests. Hence, researchers should not hesitate to open the discussion, as biobanking is in essence an activity characterised by a *cando* and accommodating attitude. Along those lines, we recommend a verbal exchange following every preliminary contact/request made to the biobank, as an early and panoramic review of the project allows the biobank to better guide researchers in their sample choices and to reframe (for example) naive, clinically aberrant inquiries in terms of requested sample volume.

2.4 Extra services

Biobanks should emphasise their added value regarding the manifold guidance they can provide to researchers wishing to use human biomaterial. It is a common belief that biobanks are mere suppliers of primary samples, but it certainly does not necessarily stop there. They can provide pre-analytical technical input (thereby assisting in the optimal set-up of the project in a manner anchored in clinical reality), offer access to their privileged network (thereby facilitating the development of multicentric projects) and provide ethical and legal support (thereby greatly dedramatizing and reducing effort and stress in the procedure of gaining access to samples). In regard to the last-mentioned aid, we frequently receive complaints from researchers regarding the biobank's perceived lengthy procedure for sample access. Everyone will concede that the administrative burden is generally off putting. However, biobankers should remind researchers that they have a moral duty to respect patients' donations [16]. Ensuring the intended and optimal use via both ethical and scientific review of the research project is an integral part of this duty. Additionally, journals are ever-increasingly rigorous in guaranteeing the adherence to ethical standards. Hence, for both the researchers' sake and to honour patients' trust, it appears relevant to encourage researchers to reconsider their threshold of perceived

nuisance. In this regard, the tremendous alleviation of these processes enabled by biobanks surely helps them to do so.

Collaboration between researchers and clinicians is imperative for improving bench-to-bedside translation but is not devoid of hurdles [17]. Although they may both be enthusiastic, we observe that researchers and clinicians do not always dare to engage each other in collaborative projects, ironically due to similar fears. Notably, they are usually mutually intimidated by a world in which they lack expertise. Since biobankers are at the intersection of the medical and research worlds, they are best positioned to act as Rosetta stones in the birthing stage of such projects. In our experience, these self-imposed barriers are common but most often unexpressed/unadmitted. Hence, biobankers should pre-emptively dismantle them by advertising the facilitating role they can fill.

2.5 Service visibility

The affiliation of biobanks with dedicated (inter)national networks is a broad means of promoting the structure's visibility. For instance, the Belgian Virtual Tumourbank (BVT) network (<https://www.virtualltumourbank.be>) [18], created in 2008 and financed by the Belgian National Cancer Plan, centralises in one database the tumour samples available at 11 Belgian university hospitals. This unification allows researchers to perform specific queries in the catalogue (or even ask for queries to be performed for them) and therefore easily locate samples of interest. The BVT website also details the main procedural steps to expect when requesting patient samples from a biobank as well as important tips and considerations to entertain before engaging in the process (e.g. to expect and plan for biobanking fees). At a larger scale, the BBMRI–European Research Infrastructure Consortium (ERIC) (<https://www.bbmri-eric.eu>) extends the BVT service beyond tumour-only samples and Belgian borders by taking advantage of national nodes in member countries. However, for biobanks to truly benefit from such helpful tools, the trick is to let researchers know about their role, an elementary requirement often forgotten. Indeed, while biobankers almost always mention their network affiliations in communications, they often neglect to explicate the actual goal and service offered by such networks, thereby only giving researchers soon buried information.

BBMRI-ERIC recently provided biobanks with a satisfaction survey template to customise to assess customers' experiences in a standardised way. It is indeed fundamental (and required for certification) that biobankers promote bidirectional dialogue and seek researchers' feedback to adapt/improve the biobank's overall service and strategy. Like any template shared by the BBMRI, this document has been designed in consultation with all member biobanks, guaranteeing maximum impact and efficiency.

The proper mention of biobanks in publications is also of prime importance for the structure's visibility to the scientific community and should therefore be emphasised in biobank communications [8]. While the details regarding the recognition of contribution are usually decided beforehand, they are not always honoured by the researcher, especially if a significant amount of time has passed between biomaterial provision and publication of the work [7]. An accessible approach to reminding researchers is to incorporate a publication-related module in the satisfaction survey. However, since the response rate is usually disappointing, another good practice, although admittedly time consuming and organisation sensitive, would be to regularly (e.g. annually) contact

researchers to inquire about the progress of the research project and the impending publication prospects.

Finally, we would like to point out that the best communication remains that driven by one's reputation, i.e. word of mouth. Hence, the smartest communication strategy for a biobank is actually first and foremost to focus on providing the best service so that advocates will spread the word [10] and customers remain loyal. To achieve this ambition, biobanks ought to remain competitive and up to date with research progress and needs. Perpetual advances at both the medical and scientific levels necessitate the increasingly tailored pre-analytical processing of patient samples [19]. While each era comes with its own demanding adaptation (transcriptomics, proteomics, etc.), one of biobanks' latest challenges lies in the ability to provide biomaterial suitable for the generation of trendy preclinical culture models. Hence, the growing impetus for the complex generation of tumoroids has prompted biobanks to establish living organoid collections [20]. While the recent literature is a good indication of researchers' focus, the time between the start of a project and the publication of the associated results implies that clandestine newer trends have likely already emerged by the time of biobankers' literature perusal. Thus, attentive and investigative communication with academic and industrial researchers early in the project development process (especially when requests cannot yet be met) can allow biobanks to pinpoint the most recent enthusiasm and subsequently curate bespoke samples in an anticipatory manner. Adapting to researchers' desiderata is proving to be increasingly complex, however, as it necessitates a more and more advanced/expensive pre-analytical processing of patient samples. For example, the establishment of a living tumoroid collection is a tedious affair that requires access to adapted culture facilities, associated technical skills, substantial experimental (organ-dependent optimisation) work, sizable financial means and a high regard for a plethora of ethical concerns that are as yet unanswered.

3 Communication with the healthcare community

Since a biobank's activities are contingent on the involvement of a gamut of orbital disciplines (nurses, surgeons, pathologists, etc.), and because procedure deviation risks (timeframe, collection conditions, preservation, data exhaustiveness etc.) tend to be proportional to the number of contributors, effective communication between all involved parties is paramount to ensure the optimal flow and quality of operations. The interdisciplinary nature of a biospecimen's journey from the patient to the researcher calls for anticipation, analysis and correction of naive, deleterious behaviours at all steps. Never ill-intentioned, these behaviours are simply inherent in a lack of expertise and mindful foresight regarding others' disciplinary specialties and related priorities. Consequently, the very strength that makes a team complementary can also be a prejudicial weakness if inter-communication is neglected or suboptimal.

More than a frequently useful tool, communication should, for maximum benefit, be a work lifestyle. Hence, regular booster shots to already informed colleagues are indispensable to avoid behavioural drifts. We have observed that the frequency of the necessary reminders decreases once biobank-related activities have been completely absorbed into the routine of the service, although the time leading to this absolute incorporation is service dependent. We have also noticed that a decline or complete stop in communication recurrence leads to insidious slides (as observed during the COVID-19 period

because of limited authorised human contacts). Additionally, staff turnover demands recurrent informative sessions to keep newly hired members up to speed. It is also important to share positive feedback with the various healthcare actors, for example, regarding the number of research projects their effort allowed to support. Indeed, the nourishing of their sense of community belonging and usefulness encourages and maintains correct ways. All in all, the communication aspect relative to biobanking activities represents a substantial but invisible workload that can therefore easily be neglected or sacrificed. Main ideas of this section are recapitulated in Table 2.

3.1 Clinicians

Clinicians are vital enablers of biobanking activities [21]. Two categories can be distinguished among clinicians: clinician scientists and those who are medical practitioners only [22]. While the latter focus solely on clinical activities, the former simultaneously conduct scientific research.

From our point of view, one of the best added values of clinicians lies in their spontaneously taking the initiative to identify and direct biospecimens of interest for biobanking in retrospective collections. However, as we ourselves observe, there tends to be a

Table 2 Summary of published and empiric considerations relevant to the healthcare community in biobanking. We recapitulate the personal observations made during our 15-year long experience in biobanking regarding the healthcare community (attitude, perceptions, etc.) and subsequent impact on our biobank (limitations, adaptations, etc.). We paralleled with (backing up) information published in the literature

What the literature says	What our experience says
Deeper biobanking engagement from clinician scientists [23]	· Clinician scientists are more prone to grasp the importance of biobanking and spontaneously feed the structure with samples. · We experience 80% spontaneous involvement rate from clinician scientists, compared to barely 10% from clinicians that are not keen on research. · Necessity to not be afraid to state the obvious in communications with clinicians. For example, some of them wrongly assume that informed consent has not been asked and therefore do not send the patient sample to the biobank.
Ambiguity regarding sample ownership [26]	· Clinicians feel entitled to the samples they provide, despite them being destined for general biobanking. Hence, it is common for us to be condemned by clinicians for releasing samples they helped collect. Therefore, we must frequently re-instruct the principle of general biobanking.
Danger of ‘biohoarding’ [27] ‘Stockpiling mentality’ [28]	· Clinicians tend to leave their prospective collections unexploited. Not to mention the cost linked to the associated long-term storage, the samples might also be impacted in terms of quality and not meet the initial analytical requirements anymore.
Assistance of biobanks with clinical trials [29]	· Clinical trial sponsors appreciate and trust the professionalism of biobanks. · This activity generates a substantial cash infusion, that can finance one FTE for our biobank.
Key role of pathologists [31] Encouragement of their involvement in research projects, associated with recognition in scientific papers [20].	· Pathologists feel excluded from scientific publications and reduced to sample/digital data providers rather than beneficial collaborators.
Low awareness of nurses regarding good practice relevant to the pre-analytical phase [33]	· Nurses are not familiarized with biobanking and the impact of pre-analytical errors on the reliability of results, which easily generate deviations. · We are commonly faced with delayed sampling times or incompletely filled blood tubes because of the nursing shortage and subsequent harsh schedule.
Paucity of education programmes for biobank technical employees [34]	· Some unfulfilled technicians changed careers to only routine activities when realizing that biobanking is 60% routine and 40% evolution-driven originality. · Technicians need to see the meaning of what they are doing to feel motivated and useful and must therefore be kept updated about project advances and especially successes.

deeper engagement from clinician scientists [23]. That is why it is crucial to impart to this community that biobanking is a requirement for the universal progress of biomedical research and directly benefits the subsequent refinement and widening of the care options they can provide to patients. Hence, whether they have a research penchant or not, it is vital for all clinicians to contribute selflessly to biobanking, as they best comprehend and sympathise with their patients' unmet needs, which can be addressed only via translational research. Similarly to what has been suggested above for the research community, the prospective training of medical students during their formal education is worth envisaging, in an extra-curricular fashion if necessary to better achieve this [24, 25]. Along these lines, it is incumbent on clinicians who teach university courses to raise awareness and spontaneously advocate for biobanking, notably at the institution where they practice.

A sensitive matter associated with the biobanking of retrospective collections is the actual implications in terms of the stored biomaterial's ownership; this is understandable considering the lack of a standard ownership model between biobanks [26]. There tends to be a default assumption among clinicians that the act of collecting biospecimens destined for general biobanking bestows full ownership for possible retrospective use for research purposes. Therefore, the principle of 'sharing' needs to be expounded so that clinicians can properly understand that the stored biomaterial is destined to benefit the overall scientific community and that carrying out a procedure already required for the patient's welfare/diagnosis does not justify totally exercising the upper hand on the residual samples' potential subsequent use. Nevertheless, as clinicians' medical expertise represents an invaluable benefit for the relevant orientation of preclinical research projects, it is crucial to encourage and motivate their collaborative involvement every time a sample request is made to the biobank. While multiple additional research activities are undeniably excessively complicated to fit into a clinician's overbooked schedule, it is also true that the collaborative clinical input does not necessarily need to be substantial to yield massive gains as we ourselves have observed.

Clinician scientists can choose to assemble a private collection. When done in the context of a yet undefined research project, it is important to urge them to reflect on the level of difficulty to gather the collection over time. Indeed, while some collections can be established only over a substantial period (rare samples), others can be gathered quickly and therefore do not justify premature occupation of storage space. Moreover, collections that end up not being used constitute a loss in terms of human and financial resources. Also, although it is usually discounted, a financial compensation from clinician scientists seems necessary for biobanks to survive. While this claim tends to be initially met with resistance with the argument of belonging to the same institution than the biobank, clinician scientists are often heard to comment retrospectively that this pecuniary requirement urges them to judiciously filter the patient samples destined for their personal collections, thus avoiding deleterious storage space saturation. Annual storage fees also remind them of the existence of the waiting collection and prompt the initiation of research projects (otherwise readily postponed), thereby avoiding 'bio-hoarding' [27]. A 'stockpiling mentality' is indeed a prevalent trend in biobanking [28]. Clinician scientists also tend to be reluctant to open their personal collection to outsiders [28]. As we have observed, the reason is at least threefold: they consider (and understandably so) that initiating (and financing) the collection makes them by default its sole

proprietor; they feel responsible for the samples' proper use from their patients' perspective and/or they are wary of research competition. Some compromises could then be imagined and discussed with them to balance interests and therefore best honour both the clinician scientist's feelings and general service to biomedical research. In a first scenario, the collection would be made visible, but the clinician scientist would have a right to veto requests. In this ideal win-win situation, clinician scientists lose neither control over their collection nor profitable collaboration opportunities. In a second scenario, an (excess) part of the collection would be under the custodianship of the biobank [26]. In any case, promoting the visibility of the collection is beneficial to establish synergetic (sometimes unexpectedly so) collaborations and promote biobank capacities.

Finally, it is essential to share the information that biobanks can assist in clinical trials [29], notably in the pre-analytical processing of patient samples. As mentioned above, pre-analytical variabilities may jeopardise research outcomes [30]. Biobanks are the organisations most cognisant of this extra-analytical vulnerability, and their daily activities are governed by meticulous documentation-based standardisation and traceability. Hence, this is an ideal scenario in which sponsors benefit from a recognised professionalism in the service for which they provide financial compensation, allowing biobanks to perpetuate their activities.

As has been proposed for researchers, communication with clinicians can be done during periodically organised staff meetings to avoid further burdening clinicians' already overstretched agendas. In the specific case of clinician scientists, regular communication enables reigniting the research spark, which is all too easily smothered by the intensity of clinical practice. The communication ought to be well thought out, as the practical implications of activities are crystal clear only to the performer of said activities. Hence, a seemingly obvious detail that goes unmentioned can sometimes be a main impediment to a profitable understanding. For instance, as we have observed, it is important to clarify to clinicians that biobanking activities related to the residual tissue do not undermine the diagnostic process, as only pathologists determine whether there are leftover samples that may be safely dedicated to biobanking.

3.2 Pathologists

Pathologists are fundamental collaborators in biobanking as they have the appropriate expertise and decision-making power regarding the delivery of remnant tissue destined for biobanking [31]. However, this extra destination of the biospecimens demands an adaptation of the technical routine of the pathology department. Indeed, researchers' need for additional unfixed or viable samples implies that the biomaterial cannot be formalin-fixed right away, since it first requires a macroscopic observation from the pathologist and subsequent proper selective sectioning. The execution of this additional responsibility is entirely dependent on the (frequently inconvenient) time of arrival of the biospecimen and is therefore more demanding of staff time. Indeed, the necessity of rapid sample freezing/release requires immediate action from the pathologist. Thus, it is up to biobankers to convey to pathologists that this exercise should not be seen as a disadvantageous extra load but as a useful, rewarding complement to their function that directly aligns with their medical and scientific expertise/devotion. The biobank should encourage the active involvement of pathologists in research projects, associated with recognition in scientific papers [23]. Perceived burdensome extra activities can also

eventually prove beneficial for a service activity. Indeed, as observed in our institution, the fact that the samples are not directly fixed in the operating room when they require prior selective sectioning by the pathologist ultimately enhances fixation quality (especially for the bigger tissue pieces).

3.3 Nurses

Nurses are also pivotal partners in biobanking activities and can shape the quality of the samples early in the process [32]. However, an education that does not familiarise them with biobanking makes nurses oblivious to the impact of pre-analytical variabilities on the reliability of results [33]. Also, as they are naturally focused mostly on patient care, they can unknowingly yet easily cause deviations in the biobanking process. For instance, as a personal anecdote, it was not uncommon for nurses to transport blood samples in their uniform pockets, thereby unwittingly introducing clotting and temperature bias. This can be aggravated by a prevalent, regrettable context of understaffing, in which supplementary tasks that are not essential to patient care management (at least in the short term) are consistently sacrificed. Hence, as experienced by us, whenever nurses are challenged with a hectic schedule, the subsequent delayed delivery of biospecimens to the biobank negatively impacts the respect of the allotted and required timeframe for their processing.

Within the scope of ISO9001:2015 certification, our biobank set up a system for continuous improvement, comprising records of identified nonconformities, associated decisions in terms of corrective measures, improvement actions and effectiveness analysis. Most of the improvement actions targeted at nurses involved reinforcing verbal and written communication. Organised meetings were dedicated to providing information on the biobank's value and mission but also raising awareness of the influence of pre-analytical variations on biospecimen quality and the results' dependability. Efforts were also made to nurture a sense of partnership, involvement and responsibility. The communication-centred improvement actions proved fruitful, with interventions leading to a halving of the percentage of identified nonconformities between 2021 and 2022 of biospecimens coming from the oncology service.

When asking collaborators to work smarter in terms of biobanking quality requirements, the key for compliance is not to make them work harder for it. For example, the design and strategic posting (e.g. in operating rooms) of user-friendly plasticised procedural sheets eased and encouraged appreciation for and application of the standardised conditions for sample collection, intermediate storage and transport to the biobank. As another in-house example, the biobank recently implemented the direct provision of dedicated tube holders in the pre-identified sampling kits. This constitutes a very simple but efficient way to ensure the proper provisional storage of samples (i.e. vertically). Hence, as a rule, biobanks should urge – and even more, facilitate – the implementation of proper behaviours.

3.4 Biobank staff

Finally, we wish to bring attention to another communication target that can be dangerously overlooked, that is, the biobank team itself. A biobank's quality of work, like that of any other organisation, stems first and foremost from its core team and notably the technical team that is accountable for the proper handling (from collect to storage)

of biospecimens. There are two imperatives that should be honoured by the biobank technical staff to ensure the finest activity and superior service: the precise execution of developed procedures and the cultivation of a biobanking mindset. While the skill and thoroughness of a technician are expected to be innate to the position, the integration of the ins and outs of biobanking most generally occurs on the job. This is readily explained by the paucity of education programmes for future biobank technical employees [34]. Hence, from the very day of the job interview, biobank managers ought to compensate for this lack of reach in terms of biobanking ethos. It is paramount to stress to the candidate that although biobanking is characterised by standardised procedures, it cannot be described as a routine activity, as biobanks are shaped by continually evolving demands and are therefore in perpetual (self)-questioning/reassessment. This implies regular literature searches and optimisation work that technicians are often not familiar with. These work specifications are not a good fit for a subset of technicians who seek less variable and demanding responsibilities in their professional lives. This aspect must therefore be cleared up straight away to prevent any future prejudice (technician departure, unsatisfying completion of tasks, etc.).

As with education programmes, there remains a dire need to develop formal trainings for the technical personnel in biobanks, both in content (i.e. focused on relevant topics, such as operational procedures) and in form (provided in a language that is not a deterrent to the trainee, as the English language often is for non-native speakers) [34]. Hence, the onboarding training of newly hired technicians is basically provided on premises, informally, by the biobank. For lack of better standardised and validated alternatives, biobanks should therefore polish their on-site orientation training course [35], because exhaustive and meticulous communication on fundamental biobanking considerations will shape the proper operation of the organisation.

On a day-to-day basis, the regular scheduling of team meetings is crucial to avoid procedural biases by continually reviewing procedures and processes. It also allows to favour improvement by encouraging challenges to existing methods and the general development of critical thinking. Moreover, it gives the opportunity to disseminate recent updates in terms of broad biobanking aspects, such as ethics, legislation, quality and communication and teach about research projects' results and related publications. Relative to the last point, it is highly gratifying for biobank technicians to see concretely the fruit of what they do, i.e. to realize that their effort contributes to medico-scientific progress. It enables them to grasp the full importance of their upstream work, which could otherwise be perceived as 'just retrieving and storing material' as we have heard before. Similarly, showing technicians the whole reasoning that justifies the quality and improvement mindset of a biobank motivates the time-consuming filling out of miscellaneous quality-related documents, such as the following up of nonconformities.

4 Communication with the patient/public community

Patients are the cornerstone of biobanking. Concurrently with the impetus for personalised medicine, the position of patients in biobanking has been evolving from passive suppliers to active collaborators [36]. An evident obstacle to patients' involvement in biobanking is their insufficient knowledge of the research (biobank) world [37]. As faced by us, the altruistic benefit of consenting to biobanking is sometimes not immediately grasped by patients, and the sentiment of being guinea pigs exploited for irrelevant or

dodgy purposes is predominant. Other times, preconceived, erroneous ideas mislead patients and make them wary. This is all the more regrettable as, for most patients, the prospect of contributing to better care for others is a solace in their own journey. Beyond maximising patients' involvement in biobank research, pre-emptively educating them also aims to alleviate the unnecessary additional distress generated by the consent request process at an already emotionally daunting time. Hence, improved communication is beneficial for both parties. A potent patient education transcends the hospital walls and radiates towards the public. The harnessing of diverse communication channels broadens the possibility of imparting to patients that they do have the power, even the 'moral duty' [16], to contribute to medical discoveries. As nicely stated by Forsberg et al., supporting biobank research is a 'collective responsibility and solidarity' [16]. It should be transparently communicated to patients that no direct individual benefit will ensue from the donation, which is meant only for the public good. However, the process represents a continuity of asynchronized generosity, with the current donors reaping the benefits of previous donations while supporting future donors' health in turn. Ultimately, patients are both the initial providers and the final users [38]. Main ideas of this section are recapitulated in Table 3.

4.1 Communication means

As a basis, biobanks need to polish their websites. Since this channel targets diverse stakeholders (e.g. the above-mentioned researchers), biobanks should ensure that the displayed information is comprehensible to each community. While a friendly website is a convenient route for biobanks to convey their messages, it implies an active, intuitive and pre-emptive information search by patients. Because this behaviour is not automatic, the website does not constitute a leading communication tool but rather a source of complementary information that patients will more naturally browse through once the animating knowledge has already been introduced. Patients should therefore be exposed to the biobanking notion as a background advertisement, in a ubiquitous but non-intrusive manner. For example, the existence and purpose of biobanks should be mentioned in the hospitalisation diary delivered upon admission. We also recommend designing and disseminating biobank-centred informative leaflets and wall posters in the hospital. Relevant display locations obviously include waiting rooms as well as areas that patients tend to routinely look for (e.g. public conveniences) and where patients tend to be unoccupied (e.g. changing rooms). Overall, the communication material should display the bare minimum in terms of (popularised) text and should use catchy subtitles, as the title will most probably contain opaque terms, such as 'biobank', that are not yet familiar to the public. In the case of leaflets, relevant text should be positioned to remain visible when the leaflet is in the holder. To complement these, we advise broadcasting an eye-catching slide about biobanks on waiting room TV screens. It is widely appreciated that waiting rooms do not inspire a receptive attitude and that newly admitted patients are too otherwise preoccupied to do more than flip through the available documentation. Nonetheless, an initial, passive (partial) introduction to the biobanking field can facilitate later discussions.

Some biobanks impress and inspire by elaborating escape games (HCB-IDIBAPS Biobank) or developing virtual reality applications (vNIB, NIBiobank) to promote population awareness and engagement (Dr. Teresa Botta-Orfila; Dr. Claire Lewis, ESBB

Table 3 Summary of published and empiric considerations relevant to the patient/public community in biobanking. We recapitulate the personal observations made during our 15-year long experience in biobanking regarding the patient/public community (attitude, perceptions, etc.) and subsequent impact on our biobank (limitations, adaptations, etc.). We paralleled with (backing up) information published in the literature

What the literature says	What our experience says
Active and willing collaboration from patients in research [36] [38] Involvement symbolized by patient partnership, a promising yet unshaped alliance between medical and laypeople [38]	· The CHU UCL Namur promotes patient partnership. · We called on patient partners to contribute to the design of the biobank informative leaflet and of the survey about biobank knowledge among the public. They proved very useful, notably regarding how to express ideas and what not to write.
Lack of knowledge in the research (biobank) world [37]	· We recently designed a survey to find out more about patient knowledge regarding biobanks and the best approach to improve related awareness. Results showed that unless patients have already donated to a biobank or know someone that works in a biobank, they are completely unaware of their existence. · While indispensable, information about biobanks via the hospitalisation diary, leaflet and other material remains insufficient because too passive. More dynamic and interactive approaches are called for.
Trust in biobanks dependent on wider trust [37] [39]	· We recently received a donation for the biobank from a patient highly satisfied with the care their relative received in the hospital, despite a dismal outcome. The known commitment of the praised clinician for biobanking and research prompted the patient to make the donation to our biobank, while trusting in its proper use.
Intelligibility, honesty and reassurance in informed consent [36] [40] Donation driven by altruism [37]	· There is genuine added value in having a nurse specifically dedicated to obtaining informed consent. As they best know the care pathway, they can pinpoint the ideal moment to address the subject. Also, they already are familiar faces with often emotional and social connections with the patients. They can therefore anticipate their expectations and reinforce trust. · While patients often need to be reassured that nothing more than what they consented on will be collected, they are always driven by the selflessness nature of the donation and the feeling of usefulness.
Mistrust towards industries [43]	· Most patients feel industries are greedy and selfish. Hence, patients are reluctant to donate knowing industries may be users. · We always try to reassure in the informed consent by stressing the double safety barrier represented by the assessment of the project by both the scientific and ethics committees (with patient partners as members). · We always favor collaborations with industries, rather than mere transactions.

Webinar-New ways of engaging the public with biobanks, 2024), but other alternatives with lesser financial and time burdens can be envisaged. For example, occasional information corners at the entrance of the hospital, spontaneously organised or under the harmonised direction of biobank networks (such as the one launched by BBMRL.be in 2023), represent an excellent means to promulgate biobank research to the patients/public in a set-up promoting fruitful dialogue.

Patients' engagement in biobanking is contingent on their overall level of trust, not only in biobanks per se but also in host institutions, healthcare systems and government [37, 39]. This reality further justifies the need to educate the public about biobank research to build independent, specific trust based on transparency [37]. This inculcation should take place as early as secondary school to ingrain the culture of biobanking in society. For instance, biobankers could take advantage of and intervene in one-day events organised to familiarise students with science.

4.2 Consent process

During the consent process, timely, high-quality face-to-face communication is of the utmost importance, as it largely dictates patients' willingness to participate. The information given to the patient should be clear cut and honest and tackle the typical delicate matters related to biobanking practices (e.g. confidentiality [40]) [36]. Importantly, patients should be given the opportunity to voice their unique perspectives and concerns and have them heeded and addressed. Our biobank appointed a dedicated study nurse to part-time biobanking-related activities and, more specifically, to patient information and consent, thus capitalising on the trust and reassurance inspired by the nurse uniform in combination with the nurse's soft skills and detailed knowledge of the biobanking world. This mission could also be entrusted to oncology care coordinators, who are already frontliners. Separating biobanking consent from the care context (e.g. consultation with a clinician) offers a twofold advantage. First, it allows the medical professional to spend the time saved on pressing clinical activities and prevents a flawed consent process due to insufficient time [41]. Second, it enables patients to process biobank-related and clinical information at separate moments, which increases the patients' decision-making capacity [39], by promoting greater emotional and intellectual engagement and by excluding the influential presence of the clinician, which may lead patients to unwillingly make a choice based more on the perceived preference of their care giver than on their own.

Although Belgian law does not require explicit patient consent to conserve leftover material (following a surgical excision, for example), we nevertheless attempt to request it to respectfully ensure the patient's knowledge and understanding. Because it is not mandatory, this interaction can take place at a more comfortable time for the patient, i.e. after the biomaterial is obtained and following the stressful period of waiting for a diagnosis. This practice simultaneously promotes the popularisation of biobanks. Moreover, we believe that biobanking that equates patients' inaction with consent is not in adequation with the growing trend of patients' active engagement in the research effort [38] as it only assumes and does not confirm their awareness.

4.3 Patient partners

Echoing this last idea, biobankers should not hesitate to open communication with patient partners [8], who are perfectly positioned to provide relevant input on the information material used, such as the consent form [38]. Indeed, they are the mirror of the patient community that is, in general, less scientifically knowledgeable yet distinctly experienced. This specific feature allows them to pinpoint the information that matters most, that which is lacking and (probably most importantly) information that may be prone to misinterpretation. Scientists' vision is differently focused by their unique objectives. Patient partners can also integrate biobanks into their networks, expand information broadcasting and support the advertisement and organisation of educational events, such as open-door days. By targeting the general population, biobank open-door days can have a far-reaching impact in both space and time. Indeed, the information provided will ripple through the personal spheres of the informed visitors, and some visitors may later unfortunately become part of the patient community, directly or indirectly. Particularly, open door days are ideal opportunities for the public to get a concrete picture of biobanks' operation, a knowledge that can also be imparted by patient partners. A

deeper acquaintance with the biobanking world is necessary for patients to decide whether to grant their trust. This authentic association with patient partners, whose contribution is genuine and palpable, both serves the biobank's research interests and alleviates the pervasive tokenism commonly perceived by the research-engaged patient community [42]. In our experience, exchanges with patient partners have been tremendously helpful and highly appreciated on both sides.

4.4 Biobank users

It is also important to candidly communicate about the possible users of biobanks. While academic research is usually inferred, solicitations from industries are also a necessary reality. However, the latter scenario triggers the public/patient community's widespread mistrust regarding industries' true incentives [43]. We believe that a biobank's communication plan should include countering the demonising of industry, enabling the public to understand that industries are equal, complementary and indispensable links in the chain of therapeutic innovation [44, 45]. Just as academic researchers cannot be reduced to careerists in single-minded pursuit of recognition according to their publication activity, industries cannot be dismissed as greedy profiteers because of their patents and financial gain. No involved player can be painted black or white, and it seems reasonable to say that undertaking (and dedication to) an activity involving great effort (researchers) and/or great risk (industries) should be motivated primarily by a common altruistic concern for enhancing the public good. We believe it is a biobanks' duty to favour bona fide, (multi)-collaborative relationships with industries by contributing their own competence and/or that of the researchers and clinicians in their network to maximise the profitable synergy between the diverse actors, meanwhile reassuring the public by means of the major existing checkpoints (ethics and scientific committees) in the research project [13]. Compared to academics, industries generally better appreciate the real cost and value of biobanking activities [14]. Therefore, they also enable better securing the financial sustainability of the biobank. Recent years have seen efforts to foster interactions between industries and biobanks as reflected in the creation of the Biosample Hub (<https://biosamplehub.org>), a worldwide not-for-profit online platform that connects industrial researchers and hospital biobanks.

5 Communication with the funding community

A commonality amongst biobankers, who painfully experience it daily, is that biobanks are bleeding [28]. In the following section, we neither aim nor pretend to propose a sustainable financial model for biobanks, as judicious strategies towards this objective have already been extensively proposed in the literature [45–47]. Rather, we merely suggest how to better secure and boost funding through articulated communication. Main ideas of this section are recapitulated in Table 4.

5.1 Parent institution as a first focus

Because full operational cost recovery from sample distribution fees is plainly unattainable, sources of external subsidy are indispensable [4]. The two predominant core funders are the host institution and public bodies (together hereafter referred to as funders) [4]. The government provides the main public funding and offers the most constancy when it is provided through national health programmes [48]. However, this

Table 4 Summary of published and empiric considerations relevant to the funding community in biobanking. We recapitulate the personal observations made during our 15-year long experience in biobanking regarding the funding community (attitude, perceptions, etc.) and subsequent impact on our biobank (limitations, adaptations, etc.). We paralleled with (backing up) information published in the literature

What the literature says	What our experience says
Biobank financial struggle [28]	· Biobanks reached their peak in terms of development but work at a critical level in terms of personnel and budget. · Our biobank is not spared and functions mostly on survival mode – from the walls to the people.
Not-for-profit biobank status [49]	· Since biobanks are non-commercial structures, financial support (from the host institution and/or the government) is crucial for their survival.
Indispensable external subsidy [4]	· Managing heads have their minds scattered on a plethora of miscellaneous matters at once. Being heard and seen therefore requires a significant amount of preparative work when given the chance to speak. In a nutshell, it is more about defending a case than waiting to be offered one. · Although time-consuming, we ourselves imagined and presented a financial strategy to the managing heads allowing us to hire an additional FTE, which was granted partly because of the audience-adapted and thought-out approach we implemented. · We opt daily for what we could call a “gentle rambling” strategy to continuously remind the managing heads of the necessity to obtain working capital. · Managing heads often think highly of the passion of biobankers for their work. Biobankers should be comfortable to show it through.
Hidden potential of biobanks [50]	· Biobanks must capitalize on their latent value to convince funders, as brought out during the COVID-19 pandemic. · Any university hospital should rationally preserve their biobanks. Besides, they constitute a valorizing tool to further improve the hospital image and attractivity. · Biobanks have a greater influence on precious actors than they seem, such as research-oriented clinicians but also research-sensitive patients, who often deem research-focused hospitals better care providers. Also, one must keep in mind that the care (or lack thereof) given to a particular institutional structure can resonate in other departments and impacts general feelings of trust and safety towards the institution.
Expansion of professionalism [2]	· Biobanks are both “being” and “yet to become”. They can still be partly moulded into a model that benefits both the parent institution and the biobank, on a case-by-case basis · Cf Table 2 “Assistance with clinical trials”.

advantage in stability usually comes with a lack of dynamic adaptation to the structure’s demanding evolution. Indeed, generally speaking, the older the biobank, the greater the deficit [48]. While biobanks have little to no impact on some aspects that influence funding (e.g. the global economic and political context), biobankers are not completely powerless when it comes to persuading funders to grant, sustain or increase financial support. The key step is simple but not easy and consists in (pro)-actively engaging in robust communication, starting with the most reachable funder, i.e. the host institution. Broad awareness-raising among the management of the parent institution has a two-fold impact, as it reaches not only the immediate sphere of directors but also the distant government. Indeed, managing heads are prone to cross paths with federal representatives at miscellaneous events, making them ideal intermediaries to convey the lack of correspondence between biobanks’ resources and needs. Hence, biobanks should take charge to ensure close, regular and transparent discussions with the managing heads of their parent institutions, because they are likely quite disconnected from the reality of biobanking – from its value to its predicaments. This often leads to the disheartening situation of biobankers being left to fend for themselves to promote their structures and find external funding. Biobankers should especially seek assurance that the parent institution will not divert any biobank-specific funds (external or not) to unrelated institutional

activities [28]. In newly established biobanks, this is especially true of funds remaining at the end of each year. Those initial excess funds constitute the private savings of the biobank and will later compensate for the ever-increasing operating cost as the biobank evolves. If access to directors proves difficult, biobanks should use to good advantage events that incidentally bring biobankers and managing heads together. For instance, our institution regularly organises semi-recreational, semi-informative ‘Executives Days’. At the participants’ request, these events are notably focused on learning about one another’s roles and activities within the institution, through oral presentations. Thus, these meetings constitute direct communication opportunities in a more relaxed and therefore more receptive atmosphere. We wish to stress that while biobankers are right to firmly reposition biobanks and ask for acknowledgment in the institutional budget planning and allowance, they should consider the institution’s own financial limits and realistically recognise their priority in the bigger picture of a care institution.

5.2 Financial potential of biobanks

Biobanks can also influence their fate by refining their terminology, i.e. introducing business language on top of research language. Even if the former is usually more daunting and less familiar than the latter, it is equally compelling to funders in the present economically challenging time, when concrete short-term profit tends to prevail over long-term impalpable benefits. However, while demonstrating the fundamental role of biobanks in the progress of contemporary medical research is relatively uncomplicated, justifying their financial potential is a different affair altogether. Indeed, by definition, research biobanks are not convincing money-making entities, as they have a not-for-profit status [49]. This stark reality is restricting but does not mean that biobanks cannot make an appeal, as they do have an authentic worth that they can emphasise and capitalise on to underpin their business value. For instance, the recent Covid pandemic revealed the neglected but profitable potential of biobanks [50]. Hence, when properly sustained in their development (infrastructures, equipment, accreditations, personnel, etc.), biobanks perform admirably in the quick scale-up of sample collections while being acutely attuned to safety and quality measures. This shadow work contributes to the (financial) performance of institutions/countries in the heat of a (health) crisis. Hence, just as countries support armies in peacetime to enable their uttermost performance in wartime, institutions should support their biobanks to exploit their talent when the need arises. This is especially true because the next health crisis is not a matter of ‘if’ but of ‘when’.

If this is not convincing enough, biobankers can also stress that while biobanks are not direct profit-making structures themselves, they can substantially influence activities that do bring money. For instance, university hospitals mostly attract clinicians willing to juggle clinical practice and research activities (i.e. clinician scientists). As aptly expressed by Somekh and collaborators [22], ‘each career is a challenge by itself’. Therefore, clinician scientists tend to react negatively when confronted with the hindering consequence of biobanks’ financial hardship, that is, the need to offset it by finding more funds to support the biobank services that their research requires. We have heard clinicians wonder ‘where the U from CHU (Centre Hospitalier Universitaire) has gone. In the long term, if biobanks are not adequately supported, those hospitals are at risk of discouraging the undertaking of research activity and/or an exodus of research-inclined clinicians, adversely affecting the institutions’ financial turnover. Specifically, patient attraction

per se could suffer as well, as patients are increasingly attentive to hospitals' research endeavours. Hence, as some patients are already attentive to the number of clinical trials carried out by their care institution, one might expect that the presence of a biobank is next on the decision criteria list.

Another message to convey to funders is that biobanks are ever-morphing entities that have yet to reach their full power and are therefore capable of being moulded to their best potential. The manifestation of this ideal state is remarkably dependent on the host institution's specific strong suit and resources. Also, to promote financial sustainability, a recent debate has considered biobanks' need to expand their professionalism by proposing additional services [2]. Uniting these two ideas, biobankers and parent institutions should together consider how best to exploit and synergise their individual strengths to enhance biobanks' profitability. In our hospital, for instance, a research laboratory was established in 2020 as a logical continuation of the biobank's services to encourage patient material-based research by both on-site and external researchers. In light of the expertise in cell culture of the laboratory personnel, the hospital's clinical expertise and an upsurge in requests from researchers for cell culture-suited patient material, we collectively decided to build an identity related to preclinical cell culture models. This extensive service ranges from the provision of model-fitting patient material to its on-site investigation for specific research purposes. Among other things, this ambition is illustrated by the biobank's purchase of a vibrating microtome, an instrument dedicated to the generation of viable organotypic culture slices from fresh tissue, with the advantage of preserving much more completely the chemical, biological and physical microanatomy of the original (tumoral) tissue [51]. While currently less popular than organoids, this model is drawing an intensified focus. As in the present case, a biobank must determine the degree of service it can and wants to offer, from the provision of rudimentary biosample through processing into its finite subform to the full generation of the culture model. This decision rests on optimally balancing the burden of the costly, time-consuming optimisation work and the benefit of a technical monopoly that gives the biobank a unique service feature and the potential to be better represented in publications thanks to being an actual participant rather than a mere supplier.

The stakes related to biobanks are greater than meets the eye, and biobankers have the arduous task of lifting the veil from funders' eyes through edifying communication. Biobanks should be presented to funders as they are, i.e. safe investments. With the development of personalised medicine, the distinction between research and medical practice is becoming meaningless as embodied by clinician scientists [22]. Hence, recent years have been characterised by an impetus for investigating drug screening on primary 3D culture models [52], and it seems clear that biobanks embedded in hospitals represent ideal platforms to execute this practice either as an extension of core services or in a close collaborative context. Similarly, the hopeful enthusiasm for liquid biopsies for longitudinal disease monitoring [53] logically positions biobanks as central actors in implementing the practice in routine clinical care. Indeed, promptness and standardisation are at the core of these promising modern tools. Hence, while biobanks may now be considered only as dispensable extras, they may before long become required hospital appendices. One could even expect, in a not-too-distant future, that the presence of a biobank will constitute a necessary criterion for hospitals to be recognised as reference centres.

6 Looking ahead

Modern biobanking requires stronger external outreach to better feed research work, acquire societal support and attract multi-source financing. This review proposed daily communication strategies and avenues to use with main stakeholders to support reaching these goals (Fig. 1; Table 5). These suggestions are mainly cost-effective or financeable through sponsors or grants (e.g. open-door days, leaflets). While each category of partners requires a tailored approach, a relevant universal strategy of appeal consists in simply demonstrating that biobanking works. Thus, every biobank communication should be punctuated by an illustrative success story.

Although biobanks are in full (r)evolution, all groups of stakeholders, by contrast, exhibit ignorance regarding their principle. Thus, it is evident that more profound, impactful actions are needed in the long run to turn the tide on biobanking. Only continual exposure from a young age will overcome society's current knowledge deficit and dispel the myths surrounding biobanking. We believe that these educational actions should not be delayed by time or space restrictions. Therefore, as imagined for organ donation, public awareness could be inculcated as early as primary school [54].

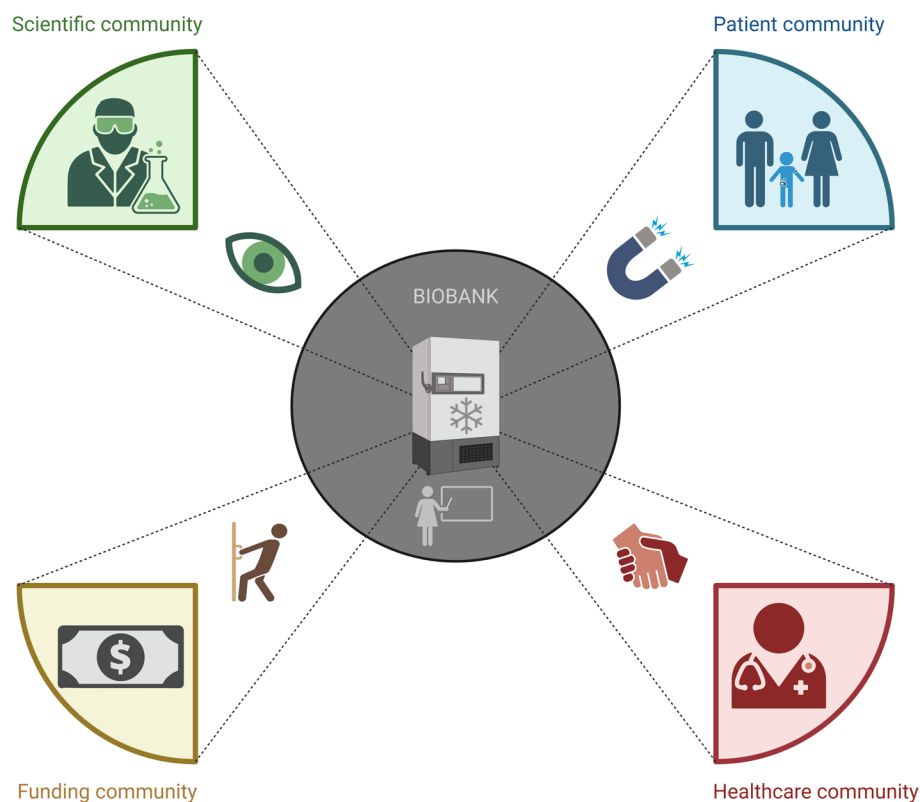


Fig. 1 Main communication targets of biobanks (Created with Biorender.com). There are four major community pillars that enable biobanks to exist and with whom continuous two-way communication should therefore be well tended. For the scientific community, comprising universities and industries, the communication focuses on increasing the visibility of the biobank's services while correcting and/or expanding the preconceived vision of its putative clients. For the community population, composed of patients and the healthy public, the communication aims to attract their trust-based participation by establishing a pro-biobank culture. For the healthcare community, consisting of biobanking partners, such as nurses and clinicians, the communication promotes a collaborative spirit that maximises the quality of biobank services. For the funding community, ranging from the host institution to the government, communication about (hidden) biobank value inspires financing entities to better consider (increased) support. Last, but not least, biobanks ought to ensure the reliability and competence of their technical professionals by compensating for the current lack of formal training for this subset of personnel

Table 5 Main messages to convey by biobanks to orbital communities. Based on the literature and our own professional experience, we propose a guide for impactful communication with each stakeholder in biobanking, in an accessible and cost-effective manner (yet inevitably time-consuming)

TARGETS	MESSAGES	MEANS
Researchers (academia, hospital, industry, etc.)	· Service range · Flexibility and adaptability to requests (prospective collection, samples' format and type, etc.) · Integral view and subsequent valuable input of biobankers (methods, clinical reality checks, etc.) · Legal and ethics support (alleviation of administrative burden) · Facilitating intermediary between clinicians and researchers (crumbling of imaginary walls impeding productive collaboration) · Networks - Existence and goal (request acceleration and assistance) · Visibility - Necessity to acknowledge/cite biobanks in communications (e.g. publications) · Service fees · Necessity to include in project budgeting and grant applications · Prices legitimated by samples' reliability and quality (vigilance for perilous preanalytical variations) · Efficiency · Necessity to be clear and precise about sample needs · Need to get samples out, not just in (beware of biohoarding) · Awareness regarding the time necessary to obtain agreements (e.g. ethics)	- Website - Staff meeting - interventions - University lectures - Conferences - Student internships
Clinicians	· Care impact - Remind that biobanking is required to improve care options/efficiency · Sample ownership - Advocate sharing mentality · Collaboration - Stimulate implication to relevantly guide research projects · Clinical trial-related service - Enlighten about the professional processing of clinical trial samples by the biobank staff	- Website - Staff meeting - interventions - Conferences
Pathologists	· Collaboration - Encourage active involvement and recognition	Staff meetings
Nurses	· Deviations - Make aware of the detrimental consequences of preanalytical variations · Value - Make aware of their importance in the biobanking chain · Ethics - Make aware of the ethical stakes during consent process	- Staff meetings - Procedure reminder sheets - Feedback on developed projects - Staff meetings
Biobank staff	· Biobanking ethos - Impart biobanking values for optimal dedication and service quality	- Hiring interview - Training - Everyday communication

Table 5 (continued)

TARGETS	MESSAGES	MEANS
Patients/Public	· Partnership - Educate that biobanking occurs through and for patients · Users - Inform about industry participation and re-embellish image · Eco-responsibility - Express self-awareness regarding energy-intensive activity and share related eco-friendly approach · Trust - Demonstrate that biobanks are worthy of the people's trust (purpose of biobanks, informed consent, scientific and ethics review boards, transparency, confidentiality, anonymity, use scope of samples, respect of samples from donation to release/use, withdrawal right and associated sample destruction and data removal, etc.)	- Website - Hospitalisation diary - Leaflets/Wall posters/Screens - Information corners - Patient partners - Consent process (separated from care consultation, transparent, accessible and bidirectional communication) - Open door days - One-day event - intervention - Social media
Funders	· Support - Biobanks cannot survive without financial help from parent institutions (full inclusion in institutional budget planning) · Potential - Biobanks are shapable gems waiting for excavation.	Meetings with managing heads (chance, occasional or requested; use of business language)

The opportunities offered by wide-reaching modern technologies, such as social media, could also be harnessed as envisaged for blood donation awareness [55].

Biobanks should adopt a marketing strategy modelled on their scientific strategy, both anticipating and responding to trends. Hence, it is worth exploiting influencer culture to champion biobanking, as influencers' outreach is quite radical and phenomenal. Regardless of their initial niche, many influencers share their health struggles and document the related journey to their vast communities of followers. The marketing approach through social media needs to remain current, however, as there is a dizzyingly fast evolution of social fads as exemplified by the recent emergence of 'influencer fatigue'. Also, the success of each platform is short lived. Interestingly, current indicators hint at LinkedIn as the next trusted platform of choice for the latest generation, as it contrasts with the perceived toxicity of previously popular social platforms.

Finally, demonstrating that one is a trustworthy and valuable collaborator goes beyond the narrow medico-scientific context and should be approached holistically. Hence, biobanks should also offer reassurance regarding the global human concerns they affect, such as environmental sustainability. Biobanking is a digitalised and energy-intensive activity, and while its environmental impact remains an unclear and unprioritized issue [28, 56], global eco-anxiety is acutely real, and overlooking this aspect may be biobanking's next strategic miscalculation. Because they are intertwined, an optimal balance between the financial and environmental sustainability of biobanks still needs to be identified and adopted [28]. For now, biobanks should not succumb to another sustainability panic but communicate their mindfulness on the matter and their eco-aware initiatives. The latter may be even the smallest, such as purchasing eco-friendly freezers and ensuring minimal power consumption through proper maintenance (e.g. regular defrosting) and behaviour (e.g. minimal door opening frequency) [28].

Abbreviations

BBMRI-ERIC	Biobanking and BioMolecular Resources Research Infrastructure-European Research Infrastructure Consortium
BVT	Belgian Virtual Tumourbank

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Author contributions

MC and FG conceptualized and wrote the manuscript. CG reviewed and edited the final version of the manuscript. All authors read and approved the final manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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