

COMMENTARY

# Common criteria among States for storage and use of dried blood spot specimens after newborn screening

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**Abstract.** Biological samples collected in biobanks are a resource with significant research potential. The Italian Joint Group CNB - CNBBSV (National Committee of Bioethics - National Committee for Biosecurity, Biotechnologies and Life Sciences) published a document reporting recommendations on storage and use of dried blood spot (DBS) and on the development of a National Network of Regional Newborn Screening Repositories for collection of residual DBS. Several ethical questions (about consent, possible use of genetic information, unanticipated possible usages for research purposes) rise from residual newborn screening specimens collections. Moreover, legal and ethical controversies are accentuated by the conflicts between the interests of sample donors, biobank holders, researchers and the public. To overcome these difficulties the identification of a few criteria for storage and research usage of DBS is crucial.

*Key words:* dried blood spot (DBS) storage, neonatal screening, ethics.

The biological samples collected in biobanks are a resource with significant research potential, but may also be subject to various ethical and deontological conflicts.

Policies and practices about storage and use of residual newborn screening specimens vary considerably. Several studies show, and denounce, not only significant differences in national policies, but also fragmentations within federal States (e.g. Australia, United States) [1, 2] and different regional practices within countries (e.g. Italy) [3]. In the European Union, although binding regulations give a common framework to Member States, national regulations, policies and practices vary as regards length of storage, possibility of research use of deidentified samples, parents information sheets, and so on. Moreover, many samples now stored in biobanks were collected years ago, in situations lacking standardization and in contexts where an awareness of the need

to meticulously handle information and obtain consent was not yet widespread. The problem of such conditions for the potential use of the samples is noted everywhere and confronted in different ways.

In US, a report on storage and use of residual newborn screening specimens has been recently published by the Secretary of Health and Human Services' Advisory Committee on Heritable Disorders in Newborns and Children (SACHDNC) [4]. The principles have international applicability and should be considered by all programs which store samples [5]. Therefore, we thought useful to propose a comparison with current Italian policies in this field. In fact, in 2010 the Italian Joint Group CNB - CNBBSV (National Committee of Bioethics - National Committee for Biosecurity Biotechnologies and Life Sciences) published a document reporting recommendations on

storage and use of dried blood spot (DBS) and on the development of a National Network of Regional Newborn Screening Repositories for collection of residual DBS [6].

At least three common principles represent the core of the SACHDNC report and of the Italian Joint Group CNB - CNBBSV document: i) to work in connection with – not to weaken – long-standing and highly effective nationwide newborn screening programs; ii) to work together with families to protect these valuable resources and allow for important public health research uses; iii) to establish a voluntary national repository.

The first point is very critical. In Minnesota campaigns against the use of DBS for research, started in the mid-1990s and based on a hypothetical violation of privacy by the state, posed a threat to neonatal screening program. In fact, under the pressure of these campaigns, in the mid-2000s, Minnesota added a note to its newborn-screening brochure saying that parents could opt-out of screening or storage. Moreover, a bill amendment is under discussion: the amendment would turn the state's entire screening program – not just the research portion – from an opt-out model to an opt-in one. All these events led to an increasing number of parents who have declined screening in the last years in Minnesota [7]. In Italy the nationwide screening program is mandatory for congenital hypothyroidism, cystic fibrosis, and phenylketonuria since 1992. Moreover, in four regions expanded newborn screening program is also mandatory in virtue of regional laws approved more recently. This is the reason why the Italian Joint Group CNB - CNBBSV recommended to inform parents on neonatal screening, storage and research use of residual specimens, and to obtain a written authorization only for storage and use of DBS, not for screening. Although some authors have shown that people's attitude towards research with human biological samples is somewhat favourable and that a system of informed consent with clear-cut opt-out would correspond with people's feelings [8], the recommendation of an opt-in model for storage and use of residual specimens has been thought to avoid any risk of exploitation which can jeopardize the nation- and region-wide newborn screening programs. Successful newborn screening should remain the prime objective of these public health programs.

To work together with families to protect these valuable resources and allow for important public health research uses implies: i) to ensure newborn and family privacy and confidentiality, ii) to provide parents with adequate education on residual DBS storage and uses, and iii) to increase parents' awareness and responsibility for the improvement of knowledge

and for possible benefits for new generations. The idea is that the greater is the awareness of parents the more successful will be this initiative. Specifically, the main concerns about storage and use of residual newborn screening blood spots (as well as of other biological samples) are appropriate about privacy safeguards. In 2011 the Italian Authority for the Protection of Personal Data issued a new "General authorisation for the processing of genetic data" [9] which confirms rather restrictive rules about the possibilities of research with human biological samples. Nevertheless, biological medical samples are a precious resource for biomedical research. Therefore, it is necessary to find an adequate balance between the respect of personal rights versus the potential for public good deriving from medical research. We believe that these two requirements are not in conflict: individual is the core value and medical research should try to achieve the common good by promoting and enhancing the good of the individual. This concept is applicable to newborn screening, and also to storage and research use of residual specimens if newborn and family confidentiality and privacy are provided. However, to obtain an active involvement of families in this initiative it is crucial that parents, before they give authorization for storage and use of their baby's blood spot, know why, how, and where the DBS of their baby will be stored. This step also implies that staff deputed to parents education on this issue be trained not only on technical care of the sample, but also on the rights of the newborn and family concerning confidentiality, personal data protection and privacy. Furthermore, the Italian Joint Group CNB - CNBBSV recommended that, by signing the authorization for storage and use of residual specimens, parents are requested "to donate" the blood spot of their baby. There is a large amount of literature on the ethical value of the donation of biological samples. Kohane and Altman, for example, have argued that individuals who donate biological samples to research databases must be perceived as "health information altruists" [10]. Obviously, parents are making many important decisions that affect their children's future: in the case of biobank participation, the consequences of the donation may have unpredicted and favourable consequences decades later. Therefore, as research that bears the prospect of advancing medicine and that can be carried out at no risk to individuals should be endorsed and facilitated, the Italian Joint Group CNB - CNBBSV is confident that the combination of privacy guarantees and parent's awareness of the importance of their donation for future generations can help to carry out this initiative successfully. To further reassure families,

the Italian Joint Group CNB - CNBBSV recommended that a portion of the “donated” residual specimens is not used for research, but stored for parents who can request it at any time and for any reason.

Finally, the availability of a national population-based repository of residual dried blood specimens represents a great opportunity for researchers to improve knowledge on rare and common diseases, resulting in direct public health benefits. The Italian Joint Group CNB - CNBBSV recommended establishing a National Network of Regional Newborn Screening Repositories for the collection of residual specimens coordinated by the Istituto Superiore di Sanità (ISS, Italian National Institute of Health). The ISS will be also available to store the biological material coming from those regional Screening Centres that, due to intrinsic structural deficiencies, are non adequate for the long-term preservation of the residual material from neonatal screening, or that opt for a voluntary centralisation, according with regional authorities. The Italian National Network of Regional Repositories has been thought as a tool to facilitate exploitation of these collections for research use and health improvement, and to promote collaboration and interaction among researchers. We are moving to a future where biobanks, existing biorepositories and

reference databases will be linked and networked for research purposes in ways that has not been possible before. Therefore the Italian Joint Group CNB - CNBBSV recommended the establishment of a governance system of the National Network. This will guarantee that all the Regional Repositories operate according to standardized criteria, either in terms of acquisition and donation of the samples, or in terms of quality and personal data protection, and will regulate and optimize the use of residual specimens for research.

In conclusion, in Italy as in other parts of the world, residual newborn screening specimens derive from mandatory public health screening program. Therefore, the real challenge with the storage and use of this material is not to harm long-standing and highly effective nation-wide newborn screening program and to improve public trust in an initiative that will be of benefit to the individual and to the future generations.

#### **Conflict of interest statement**

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this study.

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