Edgerton and Hoover, J Clin Exp Pathol 2012, 2:8
http://dx.doi.org/10.4172/2161-0681.1000e114

Clinical & Experimental Pathology

Editorial Open Access

Clinical Biobanking of Frozen Tissue and Nucleic Acid Derivatives: A Call to Action

Mary E. Edgerton* and Tyron C. Hoover

Department of Pathology, University of Texas MD Anderson Cancer Center, USA

The push forward in genomic, and thus personalized, medicine has focused a spotlight on an ethical dilemma-when and if to return research results to participants. Several attempts have been made to establish guidelines. The National Bioethics Advisory Commission (NBAC) [1], the National Heart, Lung, and Blood Institute (NHBLI) [2,3], the National Research Council (NRC) [4] together with the Institute of Medicine (IOM) [4], and the Association for Molecular Pathology (AMP) [5] have all commented on this issue, although only about half of them have added a stipulation that the testing should be performed in a CLIA (Clinical Laboratory Improvement Amendments of 1988)-certified laboratory.

The ethical dilemma of reporting research results must address three problems: the validity of the test, the duty of the researcher to the patient/research participant, and adequate specimen custody procedures to minimize risk of erroneous test results. Of the proposed guidelines described above for reporting of research results to patients/research participants, none has specified the custody trail of the tissue to be used, an issue CLIA covers. We address here specimen custody issues as they apply to reporting of research results to patients/research participants.

Pathology labs process tissue for diagnostic purposes. In appropriate circumstances tissue considered to be "redundant" may be harvested for research. Such research harvests are normally permitted by Institutional Review Boards (IRBs) when tissue is either anonymized, de-identified via an Honest Broker System (HBS), or when informed consent from the donor has been established, which can permit tissue to be harvested with identifiers in place. The first two scenarios (anonymization and de-identification) may permit the IRB to grant a waiver of informed consent under the Common Rule.

In clinical pathology labs, as a consequence of maintaining CLIA certification, a chain of custody is maintained for tissue used for clinical care. In contrast, research labs have no mandatory requirement for maintaining a chain of custody or documenting applicable pre-analytical factors that might affect the tissue. Labeling may be ad hoc, and therefore may not be subject to quality improvement procedures, guidelines for handling mislabeled specimens, or similar risk mitigation measures. This is not to say that there are not best practice guidelines, such as those issued by the International Society for Biospecimen and Environmental Repositories (ISBER), the College of American Pathologists (CAP), and the Biorepositories and Biospecimen Research Branch (BBRB) within the National Cancer Institute (NCI), but compliance with these guidelines is currently voluntary.

As pathologists, we know that in spite of best practices, mislabeled specimens do occur, even in CLIA-certified laboratories. Required quality improvement and risk mitigation measures, along with an understanding of the downstream ramifications of injuries caused by mislabeled specimens and other mishaps, including inappropriate medical treatment, work to minimize this risk for patients. The often-stated argument put forth by those advocating for release of results from research laboratories to guide clinical care, is an expression of "do no harm" to the patient, where harm is viewed as omitting meaningful results from the patient's medical record. In focusing on a move to address this omission, we point out that there is a counter-"do no harm" argument to be made: issuing erroneous or misleading lab results from a non-CLIA-certified laboratory can also cause injury.

Some advocates of returning research results recommend repeating research lab tests in a CLIA certified laboratory. This requires additional sample; however, if there is no longer any lesional tissue left in the patient, or if the surgical procedure for obtaining tissue is high risk, such as a brain biopsy, then there is no realistic means for accessing more of the "same" tissue to re-test in a CLIA-certified environment. One possible solution to this problem is to create a "clinical biobank" that is covered by CLIA certification for the general pathology laboratory. Paraffin block archives can be thought of as "clinical biobanks." They are maintained under existing specimen retention requirements (e.g. CAP and CLIA), at least in part, for future clinical care purposes. However, paraffin embedded samples are not always ideal for molecular and genetic test platforms. Frozen tissue is often more suitable. So there is a need for "frozen clinical biobanks," a novel concept which current retention requirements do not address. These banks would fall under the CLIA-certified laboratory so that quality improvement and risk mitigation procedures, along with chain of custody, would be readily addressed.

Clearly, there are some additional costs to creating any additional archive of samples, especially such "frozen clinical biobanks" with space and temperature requirements that may not be available to all pathology labs. We suggest here that storage of frozen tissue, or extraction of nucleic acids with subsequent temperature appropriate storage in a CLIA certified environment, may be outsourced to major medical institutions or to businesses that specialize in such services in order to mitigate costs. Perhaps it is time to add CLIA rules specific to clinical biobanking as it concerns frozen tissue or nucleic acid derivatives, and to encourage the practice of clinical biobanking as opposed to research biobanking. Someone diagnosed today might be able to avail themselves of a genomic test in the near future, with potentially actionable results that could be life-saving; these actionable results can only come from CLIA-certified labs.

As a step forward in addressing this very important issue pertaining to the return of research results to patients/research participants, we call upon pathology laboratories to consider the addition of sample retention of frozen tissue or of nucleic acid derivatives for future

***Corresponding author:** Mary E. Edgerton Department of Pathology, University of Texas MD Anderson Cancer Center, Houston, USA, Tel: +1 713-745-1212, Fax: +1 713-792-1964; E-mail: medgerton@mdanderson.org

Received October 25, 2012; **Accepted** October 27, 2012; **Published** October 30, 2012

Citation: Edgerton ME, Hoover TC (2012) Clinical Biobanking of Frozen Tissue and Nucleic Acid Derivatives: A Call to Action. J Clin Exp Pathol 2:e114. doi:10.4172/2161-0681.1000e114

genomic testing as part of CLIA and CAP requirements for surgical and cytological specimens.

References

1. NBAC (1999) Research Involving Human Biological Materials. Ethical Issues and Policy Guidance. 1:72.
2. Bethesda (2004) NHLBI Working Group on Reporting Genetic Results in Research Studies, Meeting Summary. National Heart, Lung, and Blood Institute.
3. National Heart, Lung, and Blood Institute working group, Fabsitz RR, McGuire A, Sharp RR, Puggal M, et al. (2010) Ethical and practical guidelines for reporting genetic research results to study participants: updated guidelines from a National Heart, Lung, and Blood Institute working group. Circ Cardiovasc Genet 3: 574-580.
4. CoGfHESC (2005) Guidelines for Human Embryonic Stem Cell Research: The National Academies Press
5. Behrman RE. Letter from AMP to the Secretary's Advisory Committee on Genetics, Health, and Society. 2007.