Establishing CAISIS for biobank projects at the University Hospital Zurich

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Introduction

“Biobanks need publicity” has recently been advocated in Nature (March, 10th 2011), urging the promotion of European repositories of tissue samples. In Switzerland the biobank-suisse (BBS) foundation is committed to building and supporting collaborative networks of human research biobanks. A survey of biobanks at Swiss university hospitals showed that on average more than 40 biobanks exist in a single university hospital.

At the University Hospital Zurich (USZ) several biobanks for both diagnostics and research are operational in stand alone facilities. So far no standardised infrastructure has been provided, and in particular, no centralised computer system has been implemented for data and specimen management of research biobanks. Heterogeneous technical and organisational solutions are used for storing, documenting, searching and tracing materials donated from patients.

The initial goal was to establish a computer system for a new biobank and subsequently to scale up its use for existing biobanks in an ongoing project. Establishing a centralised IT infrastructure for biobanking should allow better support for scientists and also assure patients that their donations are managed according to defined standards.

Methods

CAISIS is an open source biobanking system that has been developed at the Memorial Sloan-Kettering Cancer Center, New York, USA. This web-based system was evaluated and implemented at our institution in collaboration with BBS. It runs on Microsoft’s .net platform with MS SQL server as database.

The system was first implemented at the USZ for a biobank recently set up in the Centre of Regenerative Medicine. Subsequently this solution was parameterised for the management of a research biobank in the Department of Pathology. Data were extracted, transferred and loaded from existing databanks into CAISIS using the transfer software Flowheater.

Results

Standard operation procedures (SOPs) for technical and organisational processes were defined to collect and manage data and biospecimens, and to allow for transfer of information and samples in an anonymised form to local or international scientists. CAISIS was successfully implemented and parameterised for two biobanks in order to support these procedures. Some technical know-how was required to implement and adapt CAISIS for the specific requirements of the individual biobanks. Specimens of various biological sources are identified according to different entities and meta-informations. A total of 11,502 records of biological specimens obtained from 5,405 patients were uploaded into the system from two participating biobanks.

Discussion

Scaling up an information system to serve more than one biobank demands a more sophisticated solution with respect to (i) procedures for identifying and anonymising patient specimens (ii) user management and cooperations, including the creation of various access roles and individualised access rights (iii) separation of biobank use for diagnostic purposes, teaching and research and (iv) organisational issues including sharing and allocating human resources and expertise for computer system operations. Moreover, (v) new legal regulations for general or project-specific informed consent of patients have to be considered to further use their specimens and document the associated clinical data and (vi) corporate governance asks for comprehensive SOPs.

Conclusion

Establishing standards for local IT infrastructure and management software for biobanks may improve both efficiency and quality of operations within an institution and allow for more comprehensive support in the sharing of data between different institutions and researchers.

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