Establishment of a method for algorithm-based screening for hematologic malignancies in the clinical laboratory

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In the past decades the incidence of blood cancer has consistently increased. A major contributing factor for this development are aging societies worldwide. Up to now, no systematic screening programs for identification of unrecognized hematopoietic malignancies are available. This is largely due to the enormous diversity of hematologic neoplasms on the one hand, and the low and in some cases excessively low frequency of individual blood cancer subtypes on the other hand.

This project contributed a key component to a framework program that aimed at the development and testing of an algorithm-based screening system for hematologic neoplasms in large cohorts. The resulting system, designated HEMAWATCH (HEmatologic MAlignancies: Widespread Algorithm-based Testing and Classifying in a Hub-and-spoke network) represents the world-first successful blood cancer screening program which enables opportunistic systematic detection of previously unknown malignancies at a population level.

In this work, the digital patient management platform, a key element of the HEMAWATCH project, was developed, tested and optimized for the use as an embedded hematologic decision support system for clinical pathologists. The resulting system provides an efficient, automated diagnostic support tool that presents computed information on patients with suspicion of an unrecognized hematopoietic malignancy to the hematologist for real-time review. It enables rapid case evaluation and communication with the treating physician and the digital documentation thereof. Moreover, it facilitates continuous automated follow-up of previously identified malignancies in the daily laboratory routine.

The results of this work enable systematic and robust identification of patients with unrecognized hematologic neoplasms in the clinical laboratory and improve monitoring of individuals with previously diagnosed blood cancer.