

Serumbank@UZA: A Hospital-Integrated Oncological Serumbank

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Introduction & Aim

In 2009, Tumorbank@UZA was established and integrated within the department of Pathology of the Antwerp University Hospital, which is funded by the National Cancer Plan (initiative 27) of Ministry of Health of the Belgian Federal Government. Residual tumour specimens are systematically collected, processed and stored according to international guidelines and recommendations. The tumourbank is managed by the Multidisciplinary Oncological Centre of Antwerp (MOCA), which represents all oncological specialisms at the hospital. Serum is another biospecimen widely used in clinical routine analyses as well as cancer research, which consist of a complex mixture of proteins, chemical and metabolites. It has shown overall potential in disease marker research and is one of the preferred specimens for diagnostic testing. Despite the daily processing of hundreds of samples at the department of Clinical Chemistry, residual oncological sera have not yet been routinely collected for research purposes. Therefore, the aim of this project was to establish an oncological serumbank integrated within the current hospital infrastructure and workflow.

Material & Methods

Workflow and procedures (figure 1) for the systematic collection of residual sera was designed, which starts at the department of Oncology (1), followed by the department of Clinical Chemistry (2) and ends at Tumorbank@UZA (3):

1. Medical staff are automatically notified of each eligible patient with a control visit and blood analysis using a scheduling system (UltraGenda, CSC company, Belgium). The collected blood samples are subsequently marked as 'tumorbank' specimens on the application form for laboratory testing.
2. Samples and forms are delivered and processed for analyses at the clinical laboratory. The application forms are scanned and tumorbank-marked forms are recognized by the laboratory system (MOLIS, vision4health, Belgium), enabling automated fractionation of residual sera following routine analyses.
3. Following fractionation, residual sera are transferred to the tumourbank for sample processing and storage at -80 °C. Three aliquots (0.5 mL) are stored per visit and 36 samples per subject. In addition to the specimens, sample characteristics (i.e. Sample tube), quality indicators (i.e. Collection date/time and freeze date/time) and laboratory results are imported from MOLIS to the sample management system (Slims, Genohm, Belgium). A unique identifier and freezer location are assigned to each aliquot.

Available consultation and sample lists are extracted from UltraGenda and Slims, respectively, in order to assess overall sample coverage of this workflow during the start-up period February – August 2012, as well as the numbers of subjects with available tissue and sera.

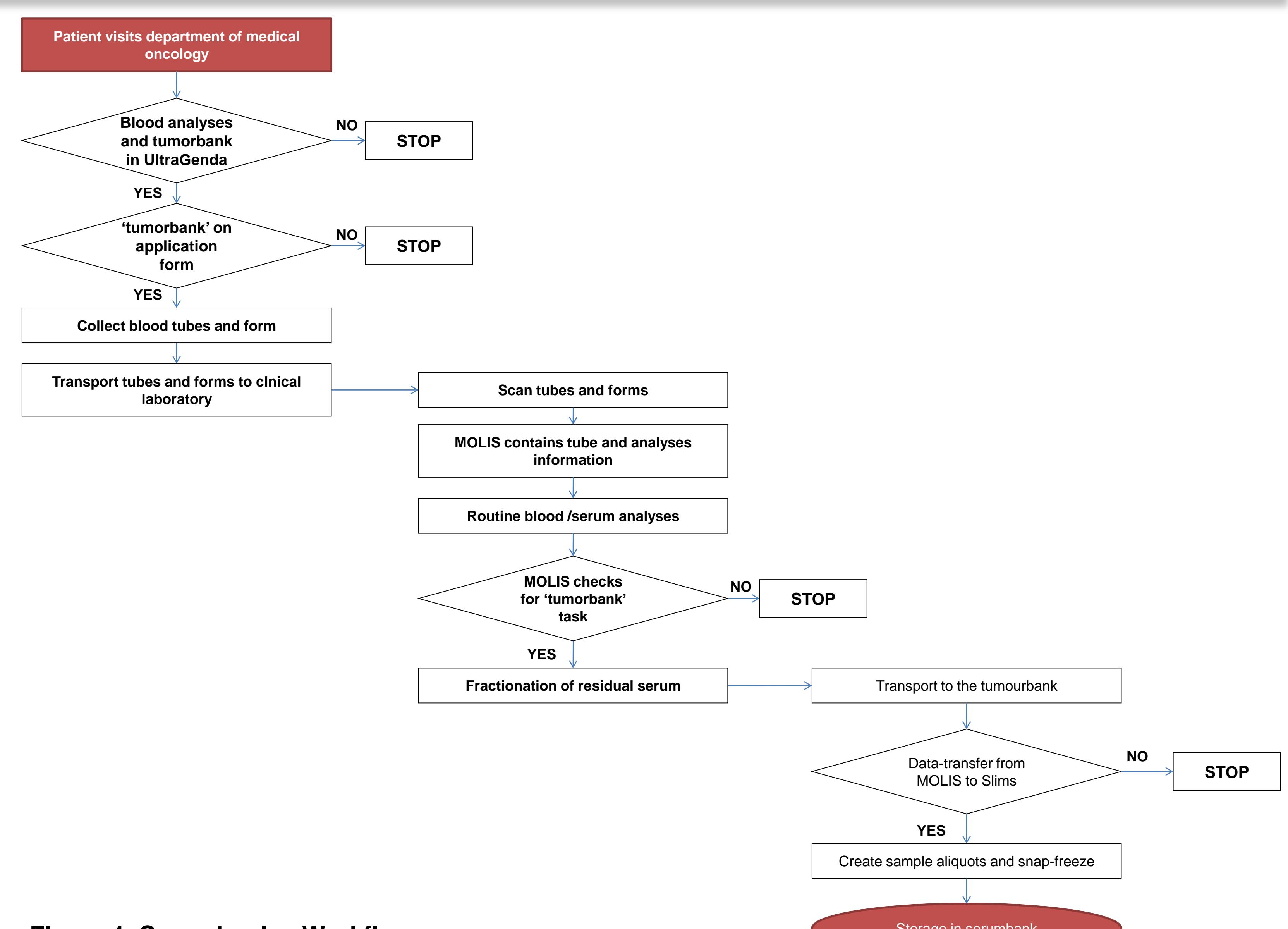


Figure 1. Serumbank – Workflow

Results

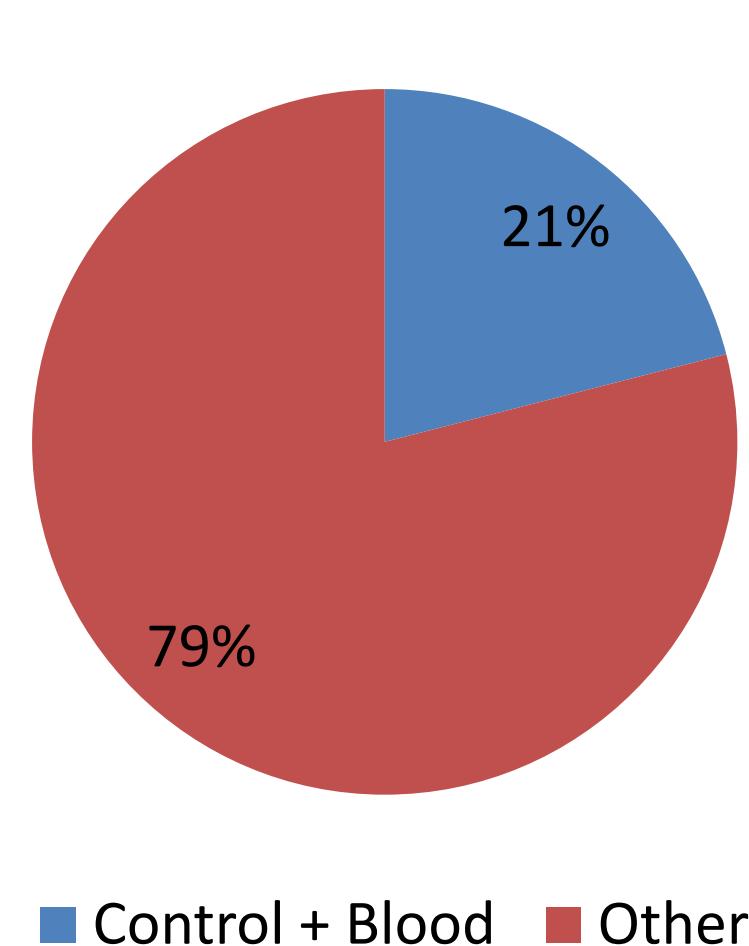


Figure 2. Oncology – Scheduled Visits*

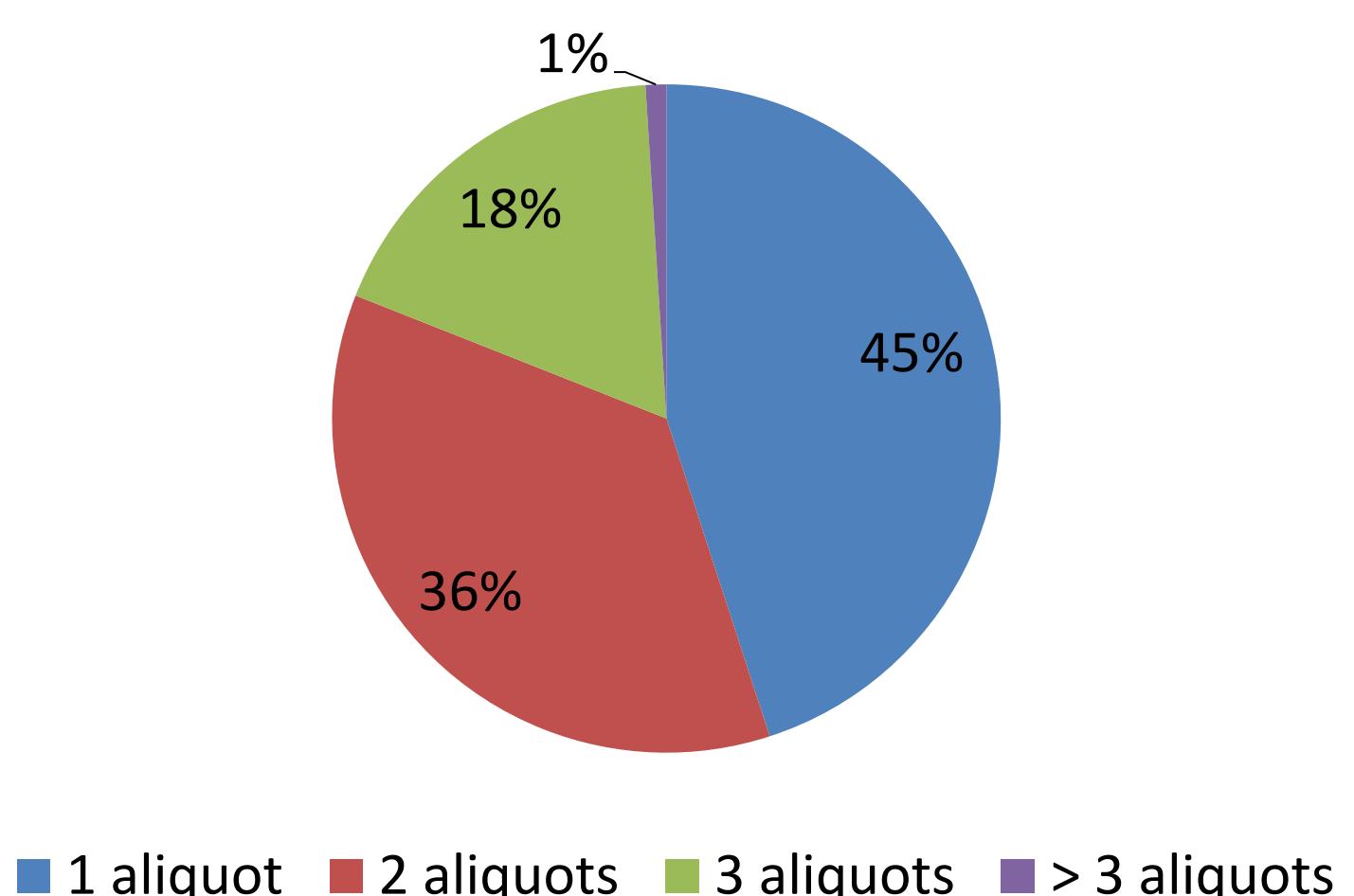


Figure 3. Serumbank – Serum aliquots

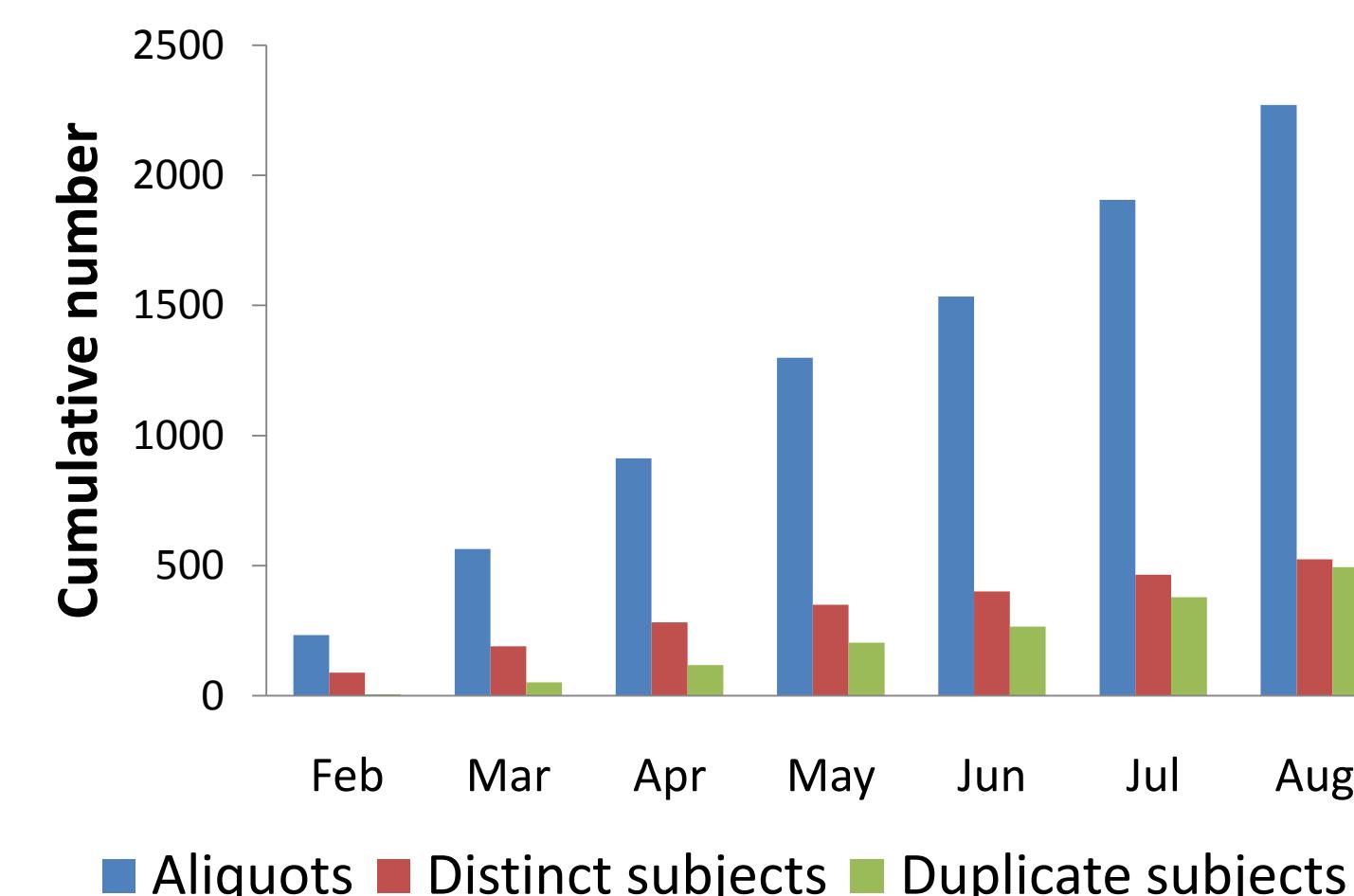


Figure 4. Serumbank – Cumulative numbers

Among the 5172 scheduled visits, 1100 (21%) were scheduled as 'control with blood analysis' of which 972 visits (88%) were actually confirmed. This number corresponded to 268 distinct subjects (Figure 2).

A total of 2271 aliquots have been stored corresponding to 1018 (45%) single aliquot, 818 (36%) two replicates, 415 (18%) three replicates and 17 (1%) more than three replicates. The 1018 samples correspond to 524 distinct subjects (Figure 3 and Figure 4).

311 (31%) samples were processed for storage in less than 4 hours, 433 (43%) between 4 and 8 hours and 274 (27%) after 8 hours. The median process duration (hh:mm:ss) was 05:12:00 [min 00:23:00 – max 116:25:00] (Figure 5).

781 (80%) samples matched with the scheduled visits according to UltraGenda, based on subject number and collection date. 192 (20%) samples were not recovered due to the fact that blood was not collected (16%) and insufficient material (3%).

The 781 matching samples correspond to 76% of the serumbank collection. 193 (19%) samples were also obtained from the department of Oncology under a visitation other than 'control with blood analysis'. 36 (4%) samples were obtained from different departments (incl. Oncology) (Figure 7).

About 114 subjects have both tissue and serum specimens stored in the tumourbank / serumbank.

(*cancellation not included)

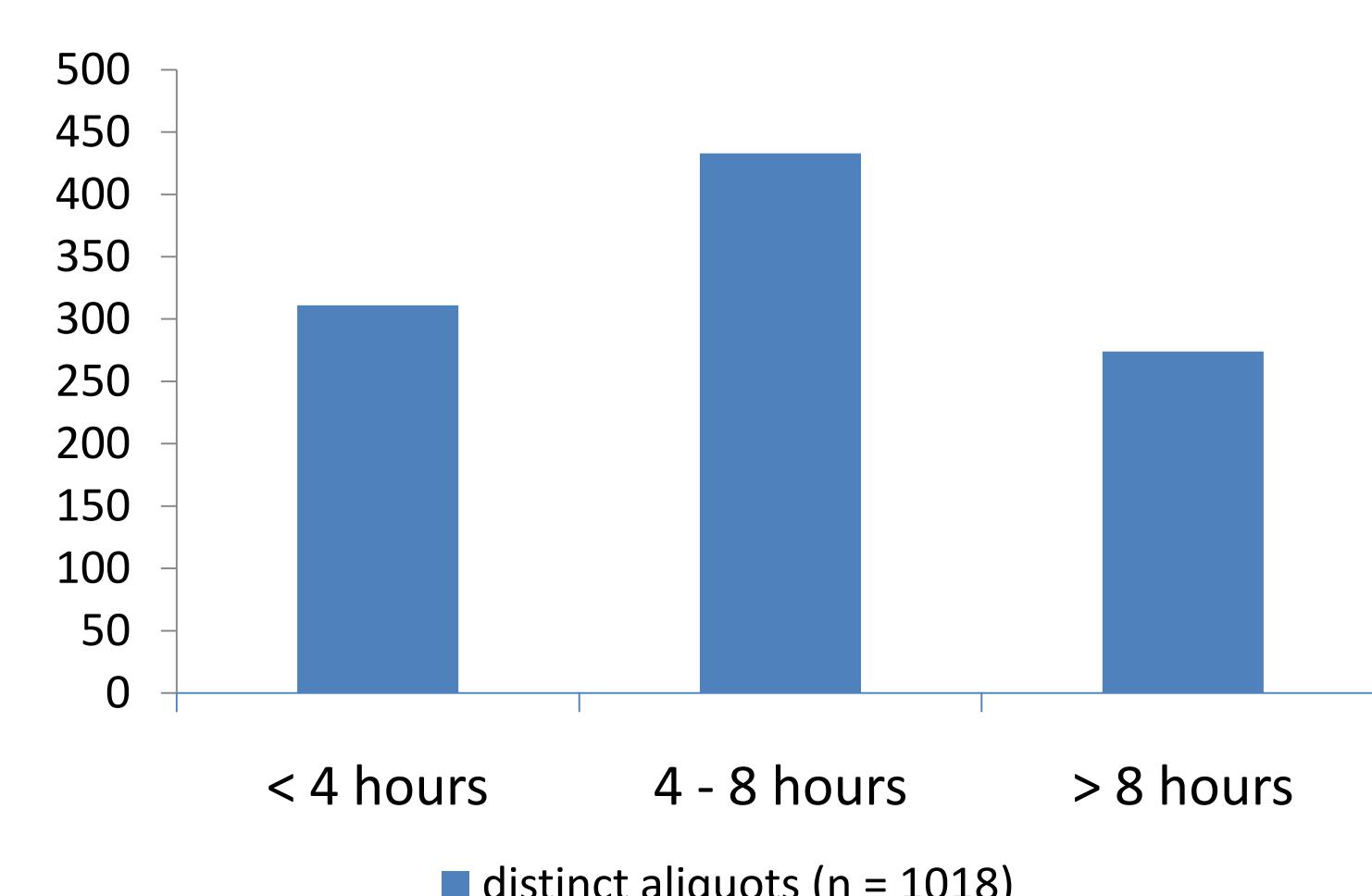


Figure 5. Serumbank – Process duration

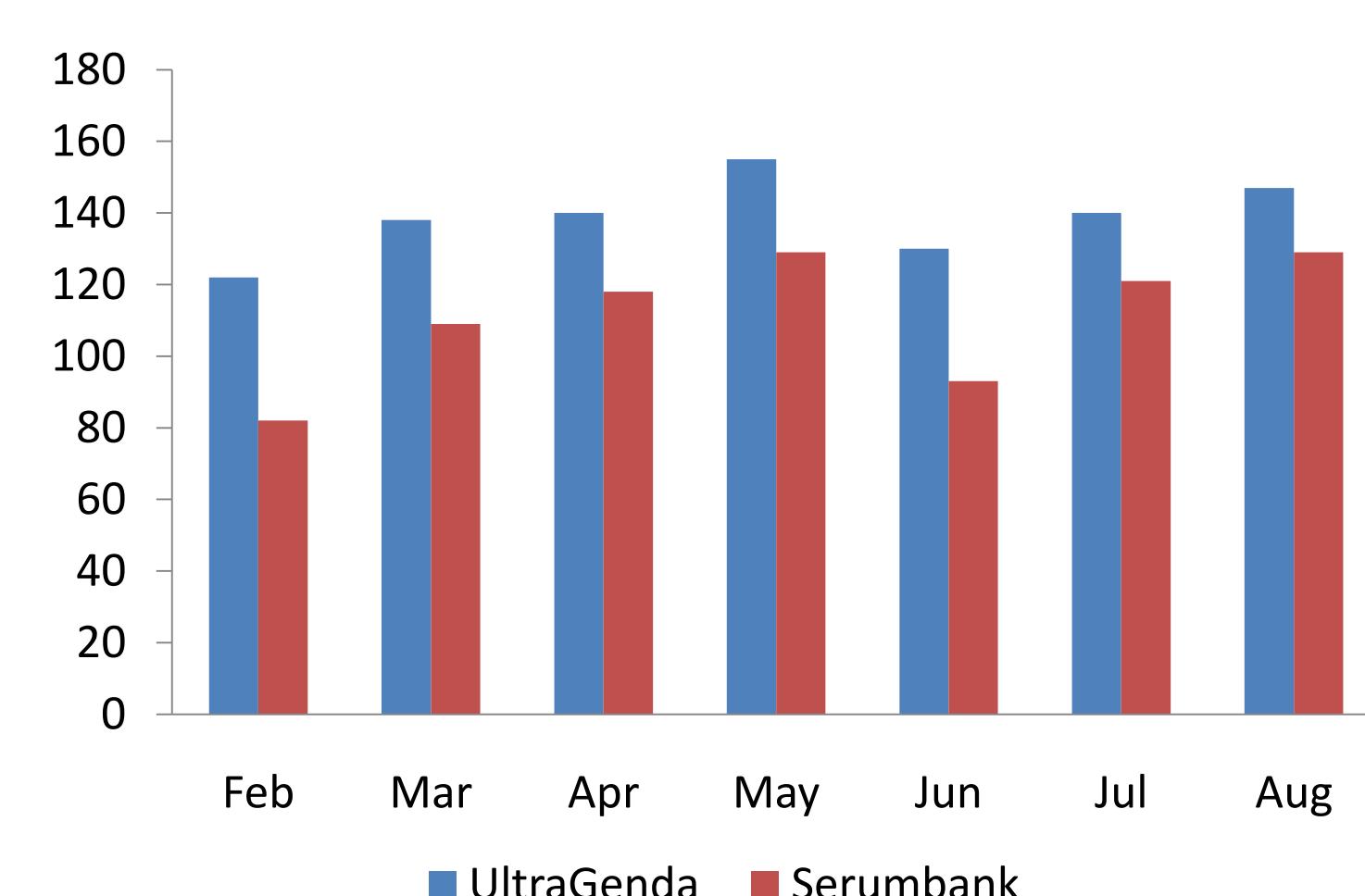


Figure 6. Comparison – UltraGenda VS Serumbank

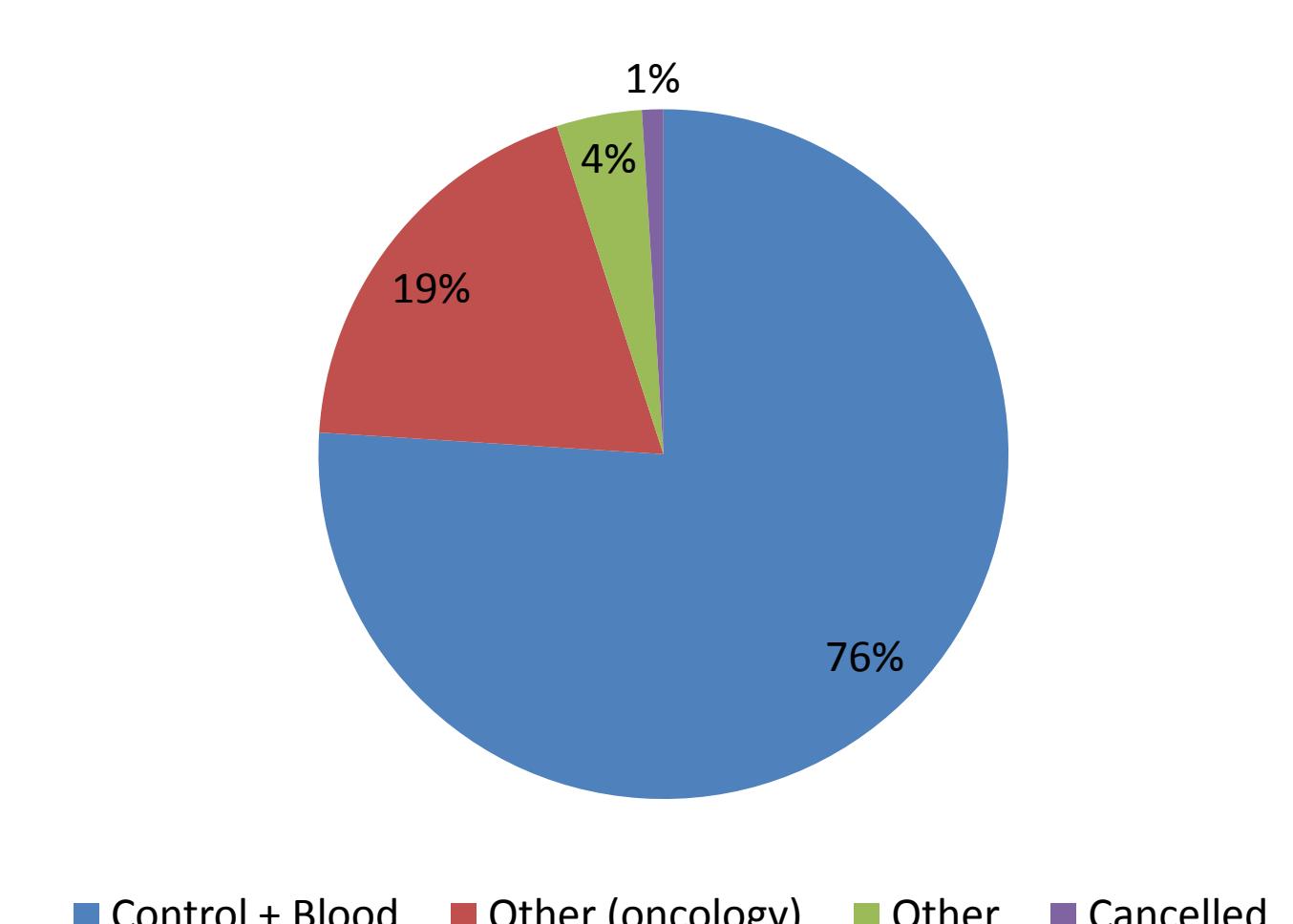


Figure 7. Distribution – Serum samples

Conclusion

The serumbank was successfully integrated within the existing hospital infrastructures by means of a semi-automated approach with a sample coverage of 80% over a 6-month period. In addition, quality control of these specimens, expansion to other departments and linkage to a minimal required clinical data-set are currently work in progress.

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