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Medial: a cost-effective back office laboratory solution integrated with the primary medical care process

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The clinical biochemistry laboratory has in the Netherlands always been considered as an inalienable diagnostic part of a hospital.
Dutch healthcare strives to make all medical services available for all, without waiting lists, but for 'affordable' costs. Our government now introduces competition in order to improve price and quality: the development of a 'free' health care market. The organisation of the medical laboratory care will be affected by these developments.
In these circumstances clinical biochemists have to take a position. 10 years ago the clinical biochemists in Haarlem and surrounding area, the Netherlands, discussed different future scenarios.
- Wait and see what will happen, or
- decide to send expensive specialties out to reference labs in order to reduce costs, or
- create regional laboratory networks with colleagues in the area to distribute costly reference tasks, or
- join minds with your neighbours to create together a strong and expert regional laboratory center.

We considered the medical laboratory to be just an ordinary health care enterprise, which deserves its existence from its customers and that anticipates future market developments. It keeps its customers, and obtains new ones by proactive market behaviour. It seeks efficacy and efficiency to create better price/quality offers. It develops an organisation that effectively copes with these challenges and is governed by financially sound management. And last but not least, realizes an efficient knowledge environment for professionals to excel in their profession in order to serve their professional medical clientele.

Structure

As a result of these discussions we realized, in 2000, a merger of 1 general practitioners lab with all 5 hospital labs and 2 thrombosis services in the area to a privately owned foundation; according to Dutch rule not for profit. The activities of the laboratories and 2 thrombosis services were subsequently consolidated into one regional core laboratory. "Concentrate production whenever possible, analyze on location if necessary". The activities cover a complete spectrum of services in clinical chemistry, hematology, blood transfusion, infectious disease virology, drug testing and disease management. Close cooperation with the adjacent microbiology and clinical pharmacy is realized in joined sample logistics, an integrated IT environment and work floor consolidation. We realized an integrated result database, in which all lab results are accessible by the internet for all authorized customers. Only stat requests are handled in the hospitals, if needed by point of care testing. We developed an intensive external logistic network, in which all samples but stats are transported to the core laboratory. We systematically improved our in-laboratory sample logistics using three principles:
- eliminate the need for human handling and decisions;
- robotize pre-analytical processes,
- ICT-controlled sample tracking, including post-analytical storage and retrieval.

Human handling and decision making was significantly reduced by the use of a manual sample-sorting system fully based on the appearance and color of the sample tubes. At first sight it is clear to which worksite the sample has to be transported, eliminating the need for reading labels. We installed state-of-the-art pre-analytic robotics, directly linked to our chemistry and immunology analyzers (Roche MPA and Modular P and E systems), which perform more than 90% of the assays without human interference. In addition, we implemented a fully IT-controlled tracking system, also facilitating post-analytical storage and retrieval of all samples during a 5 day storage period. As a result, logistics, consolidated (pre-)analytics and IT solutions enable a high volume, cost-effective and safe and scalable laboratory production process. We realized this integrated laboratory work floor serving also adjacent disciplines, e.g. microbiology and clinical pharmacology.

Our clientele comprises at this moment 2 large general hospitals generating about 350.000 requests p.a., psychiatric hospitals. About 300 general practitioners generate an additional number of up to 250.000 requests, and the thrombosis service amounts to 130.00 requests per year. Our lab performs about 630.000 venipunctures p.a., of which 80.000 at the patients home. The number of samples processed exceeds 2.000.000 p.a. We handle about 12.000 units blood products for transfusion p.a. In addition we offer disease-management services e.g. for diabetes, chronic heart failure etc.
Our certified ISO-based Quality System acted as an effective tool for implementation in the process of merging the organisations. At first we decided to focus on reducing our costs. To achieve lower costs we payed

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a lot of attention to improving our logistics, analytical and IT processes, resulting in operational quiet. A significant elimination of errors by the improvement of processes enhanced patient safety. This subsequently added to the quality, availability and the appraisal of our product by our customers. In 2007 our costs subdue the 'list-price' value of our production by more than 20%, including all overhead. Despite the rigorous centralization of our analytical facilities, our services extend to the direct proximity of the patient and their doctors. Our patients benefit because we stay 'always near the patient'. We have blood-drawing rounds in the clinics, tube-transport connections of our stat labs with critical wards, blood-drawing services in outpatient wards. More than 34 outposts for venipuncture are spread all over the area, and our co-workers perform venipuncture at home if needed. We offer expert support of point of care and patient self testing to our clientele.
The clinical biochemists participate in the hospital and patient-care processes as they did before the merger. Their role as a nearby consultant to specialists and general practitioners is maintained and even improved by some professional 'super-specialisation'. Professional education and research in specific fields of interest is facilitated by the size of the organisation. Almost the full spectrum of possible assays is implemented on an affordable base, due to the large number of requests. Almost all results are available the same day, even of rare specialties. We have a complete test offer, and expert staff expertise originating in a large and diverse customer environment. We offer integrated logistics, analytics and reporting of results with the microbiology and pharmacology departments. Last but not least, our academic staff experiences a great deal of freedom in shaping professional activities and the spectrum of laboratory services.
Our co-workers experience more variation in daily work and career opportunities. We experienced a shift in our personnel formation from analytical work to patient oriented services; e.g. venipuncture services, blood drawing at home.

Conclusions
Medial combines the advantages of high volume cost efficacy with explicit responsibility for the client's primary medical care process. Measures primarily aimed to reduce labor appear to have a large effect on total laboratory performance by reducing human error and uncertainty, and significantly contribute to over-all laboratory reliability and safety. The customer experiences lower costs, improved results, prompt service and expert consultancy.

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PSA-isovormen verbeteren de prognostische waarde van prostaatkankerbiopten, maar kunnen deze niet vervangen

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In 2003 werden in Nederland 7.902 nieuwe gevallen van prostaatkanker vastgesteld. Hiermee is prostaatkanker de meest voorkomende vorm van kanker bij mannen (bron: Nederlandse Kankerregistratie). Een gedeelte van deze patiënten zal in opzet curatief worden behandeld door middel van een radicale prostatectomie (RP). Bij ongeveer 30% van deze patiënten wordt echter binnen 10 jaar een recidief geconstateerd (1, 2). Het accuraat en preoperatief kunnen voorspellen van het risico op recidivering is essentieel voor het plannen van adjuvante therapie, postoperatieve controles en het geven van goed patiëntenadvies.

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Klinische stagering, preoperatieve tPSA(totaal prostaatspecifiek antigeen)-concentraties en de pathologische gradering van prostaatbiopten zijn significante voorspellers voor het optreden van ziekteterugkeer gebleken (3, 4). Recente publicaties suggereren echter dat PSA in patiënten met preoperatieve tPSA waarden < 10 ng/ml niet voldoende voorspellend zou zijn voor recidivering (5, 6). Voor deze groep patiënten kunnen nieuwe markers, specifiek gerelateerd aan de agressiviteit van de tumor, uitkomst bieden.
Uit recente publicaties blijkt dat bepaalde pro-enzymvormen van tPSA, die onderdeel uitmaken van de vrije PSA-fractie (fPSA) beter gerelateerd zijn aan tumoragressiviteit dan tPSA (7, 8). Doel van deze studie is dan ook om te evalueren of enkele van deze PSA-isovormen gebruikt kunnen worden, naast het tPSA, bij het voorspellen van het risico op recidivering.