EHMA
European Health Management Association

Insights for value-based healthcare

Lessons from the UNIVANTS of Healthcare Excellence awards

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"The greatest danger in times of turbulence is not the turbulence –

it is to act with yesterday's logic"

– Peter Drucker

Healthcare is entering its much expected and desired **'future'.** Clinical Laboratories can facilitate **value well beyond their contribution to medical diagnosis and therapy** as they can be the driving force for precision and personalized medicine and for the shift in focus toward prevention and population health management.

Laboratories are protagonists of transformations that can be **exemplary**. There are several areas in which we expect laboratories to move to the next level via changes and innovations that generate a value-based paradigmatic shift and can provide inspiration to health organizations and to the whole health system.

For these reasons, the best practices associated with the UNIVANTS of Healthcare Excellence awards are illustrated, discussed and amplified within both the clinical laboratories and the entire health sector.

In this perspective, this paper presents insights from the winning initiatives of the UNIVANTS of Healthcare Excellence awards in an accessible and direct manner. The intent is to foster scalability, replication and understanding of the core of each initiative while promoting adoption by other laboratories and by interdisciplinary teams around the globe.

UNIVANTS of Healthcare Excellence Award:
innovations and transformations towards value-based laboratory medicine

The UNIVANTS of Healthcare Excellence program was created by Abbott in partnership with other leading healthcare organizations globally to inspire and foster healthcare excellence. The UNIVANTS award recognizes multidisciplinary teams that with their work, transform the delivery of healthcare. In this paper, we will focus on recognized best practices from the 2019 and 2020 UNIVANTS award cycles, for a total of 12 best practices in 2019 and 24 best practices in 2020.

Seven important dimensions were identified for improvement and innovation in the context of value-based laboratories. Those dimensions are patient flow and patient experience, productivity, safety, networking, clinical governance, and leading research.

Using existing literature and experience, a definition was attributed to each dimension within the framework including information on what to search for within each project for classification purposes. Many of the 2019 and 2020 initiatives spanned more than one dimension with consultation among stakeholders, experts, and literature relevant for categorization.

A second step of the analysis was identification of the different approaches towards value-based healthcare. Thereafter, the most important change drivers and improvements were identified. Thus, readers should be able to understand the key actions in order to replicate those actions in their own organizations. The aim has been to foster scalability, replication and the understanding of the core of each initiative while promoting adoption by other laboratories and by interdisciplinary teams around the globe.

a) Patient flow, patient experience and new service models

Patient flow described the range of interactions that patients have with the healthcare system (e.g. waiting times, quality of basic amenities, and communication with health-care providers) and that determine quality improvement for patients. Patient experience describes the ability of healthcare systems to manage patients effectively and with minimal delays as they move through stages of care. Related indicators include satisfaction, reduced stress and improved patient outcomes.[1][2]

In this perspective, *inter alia,* what was investigated in the projects were issues including:

- Reconfigurations and changes in the way patients access;
- How and where blood samples are collected from patients;
- How waiting lists are managed;
- Different ways of designing reports, how information is given back to physicians and patients;
- Reorganization of labor through multidisciplinary and multi-professional teams;
- Specific and/or customized design of the delivery process for specific targets;
- Changes/innovations in flows (request-booking/access-waiting-collection-production-feedback);
- Any innovation and new action that increases and improve the experience of “clients”.

[1] Bleich S. N., Özaltin E. & Murray C.J.L., (2009), How does satisfaction with the health-care system relate to patient experience? Bulletin of the World Health Organization 2009;87, pp. 271-278)
[2] NHS England (2017), National priorities for acute hospitals. Good practice guide: Focus on improving patient flow, p.3, National Health Service England Improvement, p.3.

b) Productivity & efficiency

The measure of volumes achieved with a specific amount and type of resource (staff, hospitals and medical technology)[3] and the measure of process improvements.

In this perspective, *inter alia,* what was investigated in the projects were issues like:

- changes/innovations that significantly increased efficiency (higher volumes, costs/resources savings for same volumes, or combinations);
- improvements in delivery times;
- improvements in timing of each specific phase of the flow.

c) Safety

Absence and/or prevention of errors, (unnecessary) harms and adverse effects to patients during the process of health care[4].

In this perspective, *inter alia,* what was investigated in the projects were issues connected to two areas:

- Safety for patients. Improvements in safety during the whole flow, from collection of blood samples to privacy of feedback.
- Robustness of the production process. Improvements in the reliability of the production, higher levels of accreditation and standardization, quality of the analysis, control of false results etc.

d) Networking

The activity of creating cooperative structures where an interconnected group, or system, coalesce around shared purpose, and where members act as peers on the basis of reciprocity and exchange, based on trust, respect and mutuality[5].

In this perspective, *inter alia,* what was investigated in the projects were changes/innovations that include collaboration, cooperation, reconfiguration, restructuring of different laboratories. Actions to create interorganizational and interinstitutional links, from strategic alliances, to hub & spokes networks, to mergers. Included are also public-private partnerships and cooperation.

e) Clinical governance

The systems through which organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which clinical excellence can flourish.[6]

In this perspective, *inter alia,* what was investigated in the projects were changes and innovations that envision a different role for laboratory physicians, where they:

- challenge requests from clinicians/patients when not clinically sound/appropriate;
- develop pathways and clinical guidelines that modify practices;
- participate and/or lead groupworks or teams to develop good practices in clinical services lines;

[3]NHS England, https://www.health.org.uk/what-we-do/sustainability-of-health-and-social-care/efficiency-and-productivity-of-the-health-and-social-care-system; Sheiner L and Malinovskaya A. (2016), Measuring Productivity In Healthcare: An Analysis Of The Literature, Hutchins Center on Fiscal & Monetary Policy at Brookings, p.2.
[4]WHO Europe, https://www.euro.who.int/en/health-topics/Health-systems/patient-safety; WHO, https://www.who.int/patientsafety/en/
[5] Malby B. and Mervyn K. (2012), Summary of the literature to inform the Health Foundation questions. Leeds: Center for Innovation in Health Management, University of Leeds; Randall S. (2013), Learning report: Leading Networks in Healthcare, The Health Foundation, p.8
[6] https://www.gmc-uk.org/-/media/documents/governance-handbook-2018_pdf-76395284.pdf

- develop more informative feedback to clinical requests;
- develop case management of specific clusters of patients;
- define standards and benchmarks for scientific societies.

f) Adopting/developing disruptive technology

Encompasses any innovative concept, product and service that creates new opportunities by applying new sets of rules, values and models which ultimately disrupt and/or overtake existing service models by displacing earlier technologies and alliances.[7]

In this perspective, *inter alia,* what was investigated in the projects were changes and innovations in technologies used to collect blood samples, to produce analysis, and to provide feedback. Any technology that changed significantly the flow and the production process.

g) Leading research

Laboratories leading research are laboratories that lead in generating, participating, and steering innovative research projects. Research that fundamentally changes quality, capacity, production processes, clinical knowledge etc. New tests, new procedures, new links of analysis with clinical therapies, new research that changes the way healthcare is delivered.

In this perspective, *inter alia,* what was investigated in the projects were projects or programs of innovative, state of the art, paradigm shifting research that produced innovations in laboratory testing, production processes, knowledge, skills, and any other dimension of its operations. It should be noted that these specific dimensions are strictly interconnected with clinical governance issues, therefore projects when necessary were classified under both categories.

[7] https://ec.europa.eu/digital-single-market/en/open-disruptive-innovation

Insights and best practices from UNIVANTS. Seven major threads.

Laboratories represent one of the key organs of any health system. The XXI century brought new challenges, exacerbated by moments of crisis like the COVID-19 pandemic. With challenges though, opportunities arise. The projects of the UNIVANTS of Healthcare Excellence all have a common thread that unites them: facing challenges, grasping the opportunities, and innovating. The numerous projects that have been the protagonists of UNIVANTS in 2019 and 2020 tackled many issues in widely different, creative and innovative ways. What are the common threads that these projects have in common and what then is the key recipe for change and innovation?

Based on the framework introduced in the previous paragraph, the assessment of the projects presented for the UNIVANTS of Healthcare Excellence award revealed seven common threads. Seven recipes for change. Each project was then classified according to the following seven threads and the specific insights are highlighted in the tables that follow (on page 8) creating food for thought for laboratory clinical leaders:

1. **Improving systems and safety standards**: Optimizing logistics and adopting improved and standardized quality systems to increase the output, efficiency, and revenues of laboratory services while decreasing risks and costs and improving patient safety and quality of care. Improving systems also leads to:

   - **Less risk with better monitoring**: Reduces risk of re-hospitalization and risks for patients via follow-ups and specialized screenings that use laboratory data;
   - **Better alert and early risk detection**: Set up improved cross-departmental automatized alerts and early risk detection systems to increase response-timing, patient safety and to better and faster connect laboratory data with the pathways;
   - **Less burden on laboratories for stronger laboratories**: Improve care pathway management and safety to decrease the burden on laboratories while strategically using laboratory tests and ensuring hospital capacity even during crises (e.g. improved COVID.19 safety measures in hospitals to minimize infections and thus pressures on hospitals and laboratories)

2. **Multidisciplinary and multi-professional teams:** this horizontal and transversal recipe focuses on teamwork and its capacity to dramatically improve the appropriateness of decision-making and capacity to steer clinical governance.

3. **Less for more:** Improve processes to decrease the unnecessary use of resources that can then be reinvested into the health system.

4. **Leading research with new tests and models for better results:** Adding new types of tests, integrating and embedding specific tests in the care pathway and clinical practice, and using new clinical models to improve diagnosis, therapy, test uptake, and consequently patient safety and experience.

5. **New delivery models, through point-of-care and improved tracing:** Capitalizing on point-of-care testing and maximizing tests' traceability to achieve better patient safety and resource usage efficiency. Point-of-care testing can also be used with e-health tools to connect the laboratory directly to communities that do not have access to care.

6. **Better communication for stronger impacts:** Using better communication, networking and marketing strategies to involve citizens, companies and organizations to increase the available resources in the laboratory and hospitals (e.g. via blood increased blood donations), increase safety and decrease costs and pressure on care pathways by providing in-situ screening and tests and test results electronically (e.g. for situations like COVID-19 PCR tests and COVID-19 test results sent via email), and making citizens aware of specific sicknesses to foster prevention.

7. **Synergizing laboratories, physicians and patients to improve clinical governance:** Using laboratory diagnostic logics to provide physicians, and the clinical care pathway in general, with feedback on patients' diagnostics, recommendations, test results to improve patient safety, decrease risks and improve effective clinical decision-making.

Table legend

The graphs on the subsequent pages use the legend below. A reference of the laboratories and teams behind these inspiriting projects can be found on page 12.

Main dimension	Best Practice Change Drivers		
	Standards	St	Improving systems and safety standards (including less risk with better monitoring, better alert and early risk detection, and less burden on laboratories for stronger laboratories)
	Teams	Te	Multidisciplinary and multi-professional teams.
	Less for More	L	Less for more.
	Leading Research	LR	Leading research with new tests and models for better results.
	Delivery Models	DM	New delivery models, through point-of-care and improved tracing.
	Communication	C	Better communication for stronger impacts.
	Synergies	S	Synergizing laboratories, physicians and patients to improve clinical governance.

Primary dimension	Secondary dimension	Dimensions
PE	PE	Patient experience
Sa	Sa	Safety
Pr	Pr	Productivity
Ne	Ne	Networking
CG	CG	Clinical governance
DI	DI	Disruptive innovation
LR	LR	Leading research

	Reference Number	BEST PRACTICE	Standards	Teams	Less for More	Leading Research	Delivery Models	Communication	Synergies	INSIGHTS	YEAR	Patient Experience	Safety	Productivity	Networking	Clinical Governance	Disruptive Innovation	Leading Research
Patient Flow/Experience	1	**Enhanced Discovery of Unidentified Comorbidities and Diagnosis Through the use of Diagnostic Logics Empowered by Laboratory medicine and Informatics**		Te					S	*Improving logistics within an organization even in the diagnostic phase can support clinicians in diagnostic choices with consequent repercussions on patient safety.*	2020	PE						
	2	**Reducing Patient Risk and Enhancing Care through the Development and Implementation of a New Chest Pain Pathway, Expedited by and for the COVID-19 Era**		Te					S	*The reduction of costs and the increase in the quality of services cannot be separated from the improvement of the logistics of the patient's journey.*	2020	PE		Pr				
	3	**Increased Population Engagement, Enhanced Patient Experience, and Safe Blood Donations Through Strategic Partnerships and Targeted Media Campaigns**						C		*Social media is not exclusive to businesses. Using them to foster citizens' involvement in improving healthcare by attracting more blood donations for instance is a strong, fresh and effective strategy.*	2019	PE			Ne			
	4	**Improving Population Health Through Screening for Hepatitis C to Enable Treatment for Undetected Viral Infections**						C		*Screening programs are fundamental to increase awareness in the population of some pathologies to facilitate their identification in time to start a treatment process.*	2020	PE						
	5	**Early Detection and Management of Gestational Diabetes Mellitus for Improved Outcomes of Mothers and their Babies**	St	Te						*Using a multidisciplinary approach to implement new diagnostic pathways can allow to identify almost immediately and treat, in pregnant women, pathologies which, if not treated in time, could lead to serious consequences on the mother and the fetus.*	2019	PE				CG		
	6	**Maintain High Quality Patient Care During the COVID-19 Pandemic**	St							*Adding new diagnostic tests can increase the quality of the assistance provided, the safety of patients and lead to a reduction in costs related to inappropriate hospitalizations and services.*	2020	PE		Pr				
	7	**COVID-19: Using Data, Innovation, and Collaboration to Support Better Patient Experience and Systems**	St							*Often near is better and faster during crises. Foreseeing in-house tests in cases of pandemic can help speed up the process and decrease burden on laboratories*	2020	PE						
	8	**Use of Faecal Immunochemical Tests (FIT) Unlocks the Door to Efficient and Effective Investigation of Patients with New Bowel Symptoms**				LR				*Sometimes more is better. Adding new key tests in the patient pathway can help to avoid unnecessary invasive tests and greatly improve patient experience*	2020	PE						
	9	**Maximizing Delivery Method and Clinical Resources for Timely Patient Communication of COVID-19 Status**						C		*Easing communication processes using a simple method such as email can have important repercussions both in economic terms for the organization and in terms of safety for the patient.*	2020	PE						

	Reference Number	BEST PRACTICE	Standards	Teams	Less for More	Leading Research	Delivery Models	Communication	Synergies	INSIGHTS	YEAR	Patient Experience	Safety	Productivity	Networking	Clinical Governance	Disruptive Innovation	Leading Research
Productivity	10	**Improving Quality, Patient Care and Experience, While Lowering costs Through Enhanced Laboratory Stewardship**			L					*Reducing unnecessary tests can decrease the burden on laboratories, make them more productive, and reduce costs.*	2019			Pr				
	11	**Reduction of Inpatient Daily Blood Draws with Data Science and Clinical Collaboration**			L					*It is important within an organization to monitor both the appropriateness of performance and the inappropriate timing of the same to eliminate redundancies and unnecessary waste of resources.*	2020			Pr				
Safety	12	**Optimized Detection and Management of Thyroid Dysfunction During Pregnancy for Improving Maternal and Offspring Outcomes**	St							*Improving the accuracy of diagnostics in the laboratory has various benefits, among them the optimization of conditions detection is key.*	2020		Sa					
	13	**Reducing Catastrophic Adverse Events in Patients with Hemorrhagic Shock through Early Recognition of Risk and System-Wide Automatic Alerts**	St							*The introduction of an alert system can improve the management of patients with blood loss and can increase the risk identification.*	2020		Sa					
	14	**Strategic SARS-CoV-2 Testing for Risk Mitigation and Optimal Health of Healthcare Workers and Patients**				LR				*To face pandemics such as COVID-19, adopting ad hoc safety measures and policies to ensure safety is vital to decrease the burden on health systems.*	2020		Sa					
	15	**Avoiding Insufficient Therapies and Overdosing with Co-Reporting EGFRs for Personalized Drug Therapy and Improved Outcomes**					DM			*Adding specific testing methods and parallel reporting can help decrease errors and consequently foster better treatment.*	2019		Sa					
Networking	16	**Laboratory-Led Company-Wide Screening Programs for Safe, Back to Work Strategies during COVID-19 Pandemic in Saudi Arabia**						C		*Crises such as pandemics put strain on health systems and laboratories. Networking with stakeholders for them to set up tests and safety measures can reduce that strain.*	2020	PE			Ne			
	17	**Novel Collaborative Approach Among Public and Private Sectors for Streamlined SARS-CoV-2 Testing Towards Optimized Patient Outcome During COVID-19 Pandemic**						C		*Crises can bring negative competition between private and public sector laboratories. Institutions' engagement and negotiation with each of them can help solve tensions and focus efforts to better address the crisis.*	2020				Ne			

	Reference Number	BEST PRACTICE	Standards	Teams	Less for More	Leading Research	Delivery Models	Communication	Synergies	INSIGHTS	YEAR	Patient Experience	Safety	Productivity	Networking	Clinical Governance	Disruptive Innovation	Leading Research
Clinical governance	18	**Procalcitonin (PCT): A successful clinical formula for the early recognition and management of sepsis in the emergency department**				LR				*Adding new diagnostic tests allows timely detection and treatment of patients with life-threatening diseases such as sepsis.*	2020					CG		
	19	**The Global Impact of Troponin and Biomarkers on Ischemic Myocardial Injury and Surgical Care**				LR				*Developing new clinical models revolving around specific conditions to better understand them can help to achieve better risk stratification and early risk identification.*	2019					CG		
	20	**Reducing Post-Operative Complications in Cardiac Surgery Patients**					DM			*The implementation of new algorithms helps avoid the provision of dangerous services for the patient and to reduce costs related to the length of hospitalizations.*	2020					CG		
	21	**Enhanced Identification and Care for Patients with Undetected HCV and/or HIV via Opt-Out ED Screening with Active Education and Linkage to Care**	St							*Treatment is important but so is knowing who to treat, using opt-out screening programs can help to benefit a large part of otherwise undetected cases needing intervention.*	2020					CG		LR
	22	**Improving Care and Overall Experience for Patients who present to a Tanzania Clinic with suspected Cardiovascular Diseases**							S	*Adding new diagnostic tests allows timely detection of patients with cardiovascular diseases and can contribute to improved network and synergy between different facilities.*	2020					CG		
	23	**Improved Identification of Patients with Familial Hypercholesterolemia (FH) to Allow for Early Treatment and Improved Patient Wellness**	St							*Using algorithms in diagnosis can provide more and better data that can be used for better assessments and treatments.*	2019					CG		LR
	24	**Improving Patient Experiences via Reliable Pre-Surgical Biomarker Risk Assessments in Patients Undergoing Eye Surgery**	St							*Creating new care processes revolving around biomarkers can be an effective way of increasing comorbidity identification in outpatients.*	2020					CG		
	25	**Identifying Untreated Hepatitis B and Hepatitis C Via Opt-Out Screening Program in Urban ED Settings**	St							*Opt-out screening programs can be an effective way of increasing detection of conditions and increasing awareness in citizens.*	2019					CG		
	26	**Increased Detection of Acute Myocardial Infarction in Women Using Sex-Specific Upper Reference Limits in Clinical Pathways for Patients Presenting with Suspected Acute Coronary Syndrome**					DM			*Making diagnostic tests more specific, for example by referencing the patient's gender, can help doctors make more accurate diagnoses and better identify patient risk.*	2020					CG		LR
	27	**Early Diagnosis and Improved Management of Patients with Diabetes through Strategic and Automated Test Algorithms via Primary Care**					DM			*Investing in adding new diagnostic tests supports detection of undiagnosed diabetes mellitus (DM) and enables better monitoring of patients with known DM.*	2020					CG		
	28	**Optimization of heart failure management using biomarkers in patients with low risk for rehospitalization**	St							*Stratifying patients based on risk can help optimize resources and decrease unnecessary rehospitalizations.*	2019					CG		

	Reference Number	BEST PRACTICE	Standards	Teams	Less for More	Leading Research	Delivery Models	Communication	Synergies	INSIGHTS	YEAR	Patient Experience	Safety	Productivity	Networking	Clinical Governance	Disruptive Innovation	Leading Research
Disruptive Innovation	29	**Improved Diagnostic Pathway and Treatment for Hospitalized Patients with Acute Kidney Injury (AKI)**	St							*Using electronic condition-specific alert systems can help with better treatment and prevention, decrease costs and ensure better patient safety.*	2019		Sa				DI	
	30	**Reducing Medical Errors and Enhancing Patient Care Through Pathology Lead Strategic Activation of Point-of-Care Testing in an Emerging Market**						C		*Strengthening point-of-care testing can help to boost the capacity of health systems even in contexts of emerging markets to reduce errors and improve standards.*	2020						DI	
	31	**Maximizing Patient Care and Reducing Mortality Through Expanded Investments in Laboratory Medicine Including a Comprehensive External Quality System**	St							*Adopting external standardized quality management systems can be a game changer in revolutionizing the laboratory and the health infrastructure.*	2019						DI	
	32	**Kidney Check: The Next Generation of Surveillance for Hypertension, Diabetes and Chronic Kidney Disease**						C		*The insertion of point of care testing and therefore the diagnostic activity carried out in the vicinity of the patient can help diagnose and prevent the onset of kidney diseases even in poorly served geographical areas, making the provision of health care widespread.*	2020						DI	
Leading research	33	**Intelligent Liver Function Testing (ILFT): a Cost-Effective Way to Increase Early Diagnosis of Liver Disease**	St							*Using algorithms for early detection of conditions is synonymous with faster and better results, stronger processes, and better care overall.*	2019							LR
	34	**Improved Safety for Patients with Indeterminant Pulmonary Nodules Through Optimized Diagnostic Pathways for Lung Cancer**				LR				*Implementing novel diagnostic pathways through the addition of new tests and models can reduce unnecessary invasive diagnostics and therapeutic procedures in patients with lung cancer.*	2020							LR
	35	**Improving the safety of mothers and babies using angiogenic biomarkers for pre – eclampsia**				LR				*Improving and adding new tests for diagnosis can be an effective solution to improve patient outcomes.*	2019							LR
	36	**Improving Clinical and Quality Outcomes For Prenatal Care – a Clinical Laboratory Driven Initiative**							S	*Laboratory results have an enormous potential of application. One such potential is to use insights deriving from the results to develop a prospective nation-wide program that is evidence-based and that can result in largely impactful benefits for citizens.*	2019							LR

The Healthcare Teams behind the projects in the previous table – by reference number

1	Seirei Hamamatsu Hospital, Hamamatsu-Shi, Japan. **Team**: Kentaro Naoda, Hidenori Nakamura, Keiko Oba, Kenta Usui, Osamu Yonekawa.
2	Canterbury District Health Board, Canterbury, New Zealand. **Team**: Martin Than, Sally Aldous, Chris Florkowski, Jacques Loubser, John Pickering.
3	Dubai Health Authority, Dubai, United Arab Emirates. **Team**: May Raouf, Sawsan Trabously, Humaid Al Qatami, Ranjita Sharma.
4	Biomédica de Referencia, Mexico City, Mexico. **Team**: Clara Corona de Lau, Dana Lau Corona, Evelin Najera López, Alicia Arana Grimaldo, Maria Concepción Gutiérrez Ruiz.
5	Hospital Clinico San Carlos Madrid, Spain. **Team**: M. Cruz Cardenas, Alfonso L. Calle-Pascual, Nuria García de la Torre, Miguel Ángel Herráiz.
6	Institut für Medizinische und Chemische Laboratoryordiagnostik, Mein Hanusch Krankenhaus Vienna, Austria. **Team**: Nazanin Sedille-Mostafaie, Johann Bartko, Felix Keil, Andreas Krauter, Andrea Schlögl, Elisabeth Zwettler.
7	North West London Pathology London, United Kingdom. **Team**: Claire Kennedy, Paul McManson, Saghar Missaghian-Cully, Panos Pantelidis, Paul Randell, Gabriel Roberts.
8	NHS Tayside, Dundee, United Kingdom. **Team**: Judith Strachan, Andrew Cowie, Ian Kennedy, Craig Mowat, Lynne Taylor.
9	Nova Scotia Health, Halifax, Nova Scotia. **Team**: Pam Butler, Don Dorion, Amy MacDonald, Jamey Martell, Linda Plummer.
10	Cleveland Clinic, Cleveland, Ohio. **Team**: Gary Procop, Robert Wyllie, Anita Reddy, Brian Rubin.
11	St. Paul's Hospital, British Columbia, Canada. **Team**: Janet Simons, Mirjana Besir, Camille Ciarniello, Astrid Levelt, Deborah Shaw.
12	Hospital Virgen de la Luz, Cuenca, Spain. **Team**: Enrique Prada De Medio, Vanessa Martinez Madrid, Sandra Serrano Martinez, Andres Moya Plaza, Duce Maria Calderon Vicente.
13	Hospital Israelita Albert Einstein, São Paulo, Brazil. **Team**: Priscilla Derogis, João Carlos de Campos Guerra, Michele Jaures, Roseny dos Reis Rodrigues, Carlos Eduardo do Santos Ferreira.
14	Marienhospital Stuttgart, Germany. **Team**: Matthias Orth, Markus Bauer, Sr. Karin-Johanna Haase, Stefan Reinecke.
15	Marienhospital, Stuttgart, Germany. **Team**: Matthias Ort, Karin Johanna Hase, Sebastian Maus, Manfred Hofmann.
16	Dr. Suliman Al Habib Medical Group, Riyadh, Saudi Arabia. **Team**: Faisal Abdullah Ali Owaidi, Tarif Bizrah, Naser Al Huqbani, Abdullah Al Jurayyan.
17	Dubai Health Authority (DHA), Dubai, United Arab Emirates. **Team**: Rana Nabulsi, Mohammed Daoud, Laila Al Dabal, Hussain Al Samt, Hanan Al Suwaidi.
18	The Princess Alexandra Hospitals NHS Trust Essex, United Kingdom. **Team**: Andrea Annoni, Nick Kroll, Helen Pardoe, Marie Parsons.
19	Hamilton Health Sciences/Population Health Research Institute, Ontario, Canada. **Team**: Matthew McQueen, Peter Kavsak, PJ Devereaux, Daniel Sessler, Ralph Meyer, Emmanuelle Duceppe.
20	Hospital Virgen Macarena, Sevilla, Spain. **Team**: Isabel Rodriguez Martin, Jesús Villanueva Mena-Bernal, Francisco Javier González Fernández, José Garnacho Montero, Juan Galán Paez.
21	University of Alabama-Birmingham Alabama, USA. **Team**: Joel Rodgers, Sherichia Hardy, Sonya Heath, Sherry Polhill, Wendy Tissier.
22	Faith Medical Tanzania Clinics Dar es Salaam, Tanzania. **Team**: Joyce Mazuma, Felician Kibacha, Pendo Kibona, Saum Seif.
23	SYNLABORATORY Holding Deutschland GmbH. **Team**: Winfried Marz, Felix Fath, Uwe Fraass, Adrienne Schmittat, Mathias Barresi.
24	St. Petersburg Hospital Number Two, St. Petersburg, Russia. **Team**: Timur Akhmedov, Alexey Lebedev, Vadim Nikolaenko, Alexandr Pushkin.
25	Guy's and St Thomas' NHS Foundation Trust and Viapath Pathology Analytics, London, United Kingdom. **Team**: Sam Douthwaite, Gaia Nebbia, Laura Hunter, Jane Mullen, Terrence Wong.
26	Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute, Maharashtra, India. **Team**: Das Beranli, Jamshed Dalal, Sanjay Sm Mehta, Prashant Nair, Osamu Yonekawa.
27	Hospital Universitari Sant Joan d'Alacant San Juan de Alicante, Spain. **Team**: Maria Salinas, Emilio Flores-Pardo, Maite López-Garrigós, Beatriz Massa, Francisco J Pomares-Gómez.
28	University Medical Center Groningen, Groningen, Netherlands. **Team**: Wouter C. Meijers, Anneke C. Muller – Kobold, Martje H. van der Wal, Rudolf A. de Boer.
29	Diaverum Kidney Care Center Potsdam affilitated with Otto-von-Guericke University. Magdeburg: Dialysis Center Potsda & Ernst-von-Bergmann Hospital Potsdam. **Team**: Elisabeth Engelmann, Annamarie Albert, Saban Elitok, Jens Ringel, Michael Haase.
30	Aga Khan University Hospital, Nairobi, Kenya. **Team**: John Waigwa, Serafino Gatwiri, Nancy Kunyiha, Daniel Maina, Gregory Muruga.
31	General Directorate of Allied Health Services, Ministry of Health, Palestine. **Team**: Osama Najjar, Lana Nazzal, Dirgham Yaseen, Nidal Alawneh, Ali Alhelou.
32	Seven Oaks General Hospital, Manitoba, Canada. **Team**. Paul Komenda, Barry Lavallee, AbdulRazaq A.H. Sokoro, Jon Tomkun, Patrick Turcotte.
33	University of Dundee, Dundee, United Kingdom. **Team**: John Dillon, Ellie Dow, Michael High Miller, Elizabeth Furrie, Ian Kennedy, Jennifer Nobes.
34	The First Affiliated Hospital, Sun Yat-sen University Guangdong Province, China. **Team**: Canmao Xie, Yanbin Zhou, Suilin Mo, Honghe Luo, Min Liu, Lixia Huang.
35	Clinical Biochemistry, Oxford University Hospitals NHS Foundation, Trust and Nuffield Department of Women's and Reproductive Health, University of Oxford, UK. **Team**: Tim James, Manu Vatish, Matthew Covill, Guy Checketts, Julia Eades, Sofia Cerdeira.
36	TriCore Reference Laboratories, Albuquerque. New Mexico. **Team**: Kathleen Swanson, David Grenache, Amy Freeman, Mark Koenig, Eugene Sun, Eve Espey.