

Laboratory medicine and healthcare excellence – till death do us part

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ABSTRACT

The union between laboratory medicine and healthcare excellence is strong, interconnected and has stood the test of time. This partnership is essential in the quest for value-based health care, expanding the strategic role of the clinical laboratory from traditional, transactional models to strategic ones that expedite or activate new cascades of care.

This paper reviews outcomes and key trends following global recognition of integrated clinical care teams for exemplary outcomes of measurably better health care. In all cases, laboratory medicine was either a key contributor or leader in predictive risk management, preventative health, and integration of clinical care through active synthesis of relevant data: data that are too often under-used, under-recognized, or even missing in traditional models of care.

Outcomes connect multi-disciplinary teams with favorable key performance indicators across patients,

payors, clinicians and health systems, as well as top disease burdens and unmet gaps of care. Results affirm the possibilities ahead with proactive engagement across healthcare professionals including the vital and active role of laboratory medicine. With the future upon us, it is incumbent upon all healthcare professionals to work together, learn from others, champion health outcomes and join in a pledge for healthcare excellence.



INTRODUCTION

Partnerships that are built to last often require continuous effort, mutual appreciation, creativity, and commitment to making things better. The best partnerships not only complement one another but lead to growth. The marriage between laboratory medicine and healthcare excellence is no exception. Both interconnected entities are vital to the health of our communities and to the future of medicine.

Like-minded pathologists and clinical laboratory leaders have long urged healthcare professionals across the globe to strategically engage laboratory medicine for value-based health care [1-3], with value defined in terms of the outcomes achieved for patients relative to the money spent [2]. Excellent best practices for improving healthcare outcomes subsequently emerged, highlighting successful examples of laboratory-led healthcare projects that have re-engineered healthcare delivery pathways and the practice of medicine [4-6].

The insights from the UNIVANTS of Healthcare Excellence award program have been equally as inspiring, linking improved key performance indicators (KPIs) for patients, payors, clinicians and health systems through strategic engagement of laboratory medicine within integrated clinical care teams, which were unified across

disciplines in order to achieve measurably better outcomes [7].

This paper reviews the most common themes, disease areas and outcomes associated with the top-performing, award winning teams with recognized best practices from the UNIVANTS of Healthcare Excellence award program. In all cases, innovative or avant-garde healthcare professionals transformed traditional standards of care to achieve exceptional outcomes; outcomes that would not have been possible without the clinical laboratory. Thus, the connectedness of laboratory medicine to healthcare excellence is bi-directional. Laboratory leaders can drive healthcare excellence, just as the need for further healthcare excellence is a stimulus for innovations in laboratory medicine. Both entities are not only intertwined and a complement to one another, but also reflect opportunities for joint growth.

The trends and findings identified through this analysis offer multiple benefits. First, they increase awareness of existing best practices of measurably better health care. Second, the outcomes can serve as an inspiring call to action for others to emulate similar best practices or create new ones through integration of clinical care teams across their health system(s). Third, the findings identify areas of unmet needs whereby the successful integration of laboratory medicine hasn't been recognized yet by the program, enticing new care teams to quantify and share their success. Fourth, the key performance indicators highlighted in this report present alternative or additive approaches for quantifying the value of laboratory medicine in healthcare settings. Finally, the findings collectively underscore the importance of healthcare excellence and the need for healthcare professionals to unify across disciplines for the betterment of value-based health care.

THE UNIVANTS OF HEALTHCARE EXCELLENCE AWARD PROGRAM

The UNIVANTS of Healthcare Excellence awards inspire and recognize best practices in health care. Founded by Abbott in 2018 and made possible through strategic partnerships with seven other leading healthcare organizations worldwide, the program accepts nominations from integrated clinical care teams who have achieved measurably better health care. Eligible applications are scored across process attributes, in addition to impact scores that are calculated from submitted quantitative and qualitative metrics in the form of KPIs. Applications must involve laboratorians and healthcare teams with care initiatives that have been implemented into clinical practice, leading to measurable benefits for patients, payors, clinicians and health systems/administration. The award program is product-agnostic, open to all healthcare professionals, and standardized using online forms for nominations and scoring. Abbott has no role in the scoring of submitted applications, instead nominated experts across each of the seven partner organizations serve as judges and must score every application.

Some prestigious program partners include the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC), AACC (formerly known as the American Association of Clinical Chemistry), the European Health Management Association (EHMA), Modern Healthcare, the Healthcare Information and Management Systems Society (HIMSS), the National Association of Healthcare Quality (NAHQ), and the Institute of Health Economics (IHE); each in partnership with Abbott. Among many prestigious benefits, healthcare teams recognized with UNIVANTS of Healthcare Excellence awards earn widespread global amplification of their winning best practice(s), enabling education and replication across the world.

WINNING TEAMS AND BEST PRACTICES

The winning teams and associated best practices in the program's inaugural year have been summarized previously [7], with three teams receiving top recognition and earning the title of 2019 UNIVANTS of Healthcare Excellence winner. Seven teams also received global recognition for distinction with two additional teams receiving global recognition for achievement. The number of recognized teams doubled in the program's second year, underscoring a substantial increase in worldwide awareness of the program, as well as a potential increase in the number healthcare teams across the globe who are more readily measuring the effectiveness of their integrated clinical care initiatives. This is further substantiated by a 44% increase in the number of countries actively engaged on the program website (97 countries in year 1 to 141 countries in year 2). As outlined in Figure 1, the winning teams for 2020 included three top global winners, nine teams of distinction, and twelve teams of achievement. In addition, and among the 24 teams with recognition in 2020, five teams were highlighted as top area winners for best practices in (1) Asia Pacific, (2) Europe, (3) Latin American and Caribbean, (4) Middle East and Africa and (5) North America. More details across all 36 teams with recognition from the UNIVANTS of the Healthcare Excellence Program and their associated best practices from 2019 and 2020 can be found at www.UnivantsHCE.com.

METHODS

All nominations submitted to the UNIVANTS of Healthcare Excellence Program are assessed against minimum program eligibility and scored by a panel of judges, as previously described. For the purposes of this evaluation, all teams with a recognized best practice in 2019 and 2020 had their submissions further evaluated for industry

insights in accordance with Table 1. The attributes included, but were not limited to, leading causes of death worldwide [9, 10], as well as top industry trends in health care [11-14]. In addition, each best practice was also categorized for the dominant change agent, defined as the singular most influential impetus, power, or driving force behind the care initiative without

which the team could not have attained its project mission or measurable outcomes. Only one dominant change agent was attributed to each best practice. The latter recognizes that dominant change agents are either new test methods (i.e., new information), new insights associated with previously existing information (i.e., application of informatics), or new processes.

Figure 1 Winning teams of the 2020 UNIVANTS of Healthcare Excellence awards, including Top Global Winners (3), Distinction (9) and Achievement (12)

UNIVANTS OF HEALTHCARE EXCELLENCE GLOBAL WINNERS
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 – Canterbury District Health Board * ASIA PACIFIC AREA WINNER
Early Diagnosis and Improved Management of Patients with Diabetes through Strategic and Automated Test Algorithms via Primary Care – Hospital Universitari Sant Joan d'Alacant * EUROPE AREA WINNER
Kidney Check: The Next Generation of Surveillance for Hypertension, Diabetes and Chronic Kidney Disease – Chronic Disease Innovation Centre, Seven Oaks General Hospital * NORTH AMERICA AREA WINNER
UNIVANTS OF HEALTHCARE EXCELLENCE RECOGNITION OF DISTINCTION
Reducing Medical Errors and Enhancing Patient Care through Pathology Lead Strategic Activation of Point-of-Care Testing in an Emerging Market – Aga Khan University Hospital, Nairobi
Early Detection and Management of Gestational Diabetes Mellitus for Improved Outcomes of Mothers and their Babies – Hospital Clinico San Carlos
Reducing Catastrophic Adverse Events in Patients with Hemorrhagic Shock through Early Recognition of Risk and System-Wide Automatic Alerts – Hospital Israelita Albert Einstein * LATIN AMERICA AREA WINNER
Reduction of Inpatient Daily Blood Draws with Data Science and Clinical Collaboration – St. Paul's Hospital
Reducing Post-Operative Complications in Cardiac Surgery Patients – Hospital Virgen Macarena
Use of Faecal Immunochemical Tests (FIT) Unlocks the Door to Efficient and Effective Investigation of Patients with New Bowel Symptoms – NHS Tayside
Novel Collaborative Approach among Public and Private Sectors for Streamlined SARS-CoV-2 Testing towards Optimized Patient Outcome during COVID-19 Pandemic – Dubai Health Authority * MIDDLE EAST & AFRICA AREA WINNER
Improved Safety for Patients with Indeterminant Pulmonary Nodules through Optimized Diagnostic Pathways for Lung Cancer – The First Affiliated Hospital, Sun Yat-sen University
Enhanced Identification and Care for Patients with Undetected HCV and/or HIV via Opt-Out ED Screening with Active Education and Linkage to Care – University of Alabama at Birmingham Hospital
UNIVANTS OF HEALTHCARE EXCELLENCE RECOGNITION OF ACHIEVEMENT
Improving Patient Experiences via Reliable Pre-Surgical Biomarker Risk Assessments in Patients Undergoing Eye Surgery – St. Petersburg Hospital Number Two
Improving Population Health through Screening for Hepatitis C to Enable Treatment for Undetected Viral Infections – Biomédica de Referencia
Improving Care and Overall Experience for Patients who Present to a Tanzania Clinic with Suspected Cardiovascular Diseases – Faith Medical Tanzania Clinics
Optimized Detection and Management of Thyroid Dysfunction During Pregnancy for Improving Maternal and Offspring Outcomes – Hospital Virgen de la Luz
Procalcitonin: A Successful Clinical Formula for the Early Recognition and Management of Sepsis in the Emergency Department – The Princess Alexandra Hospital NHS Trust
Maintain High Quality Patient Care During the COVID-19 Pandemic – Institut für Medizinische und Chemische Labordiagnostik, Mein Hanusch Krankenhaus
Maximizing Delivery Method and Clinical Resources for Timely Patient Communication of COVID-19 Status – Nova Scotia Health
Laboratory-Led Company-Wide Screening Programs for Safe, Back to Work Strategies during COVID-19 Pandemic in Saudi Arabia – Dr. Suliman Al Habib Medical Group
COVID-19: Using Data, Innovation, and Collaboration to Support Better Patient Outcomes – North West London Pathology
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 – Kokilaben Dhirubhai Ambani Hospital & Medical Research Institute
Strategic SARS-CoV-2 Testing for Risk Mitigation and Optimal Health of Healthcare Workers and Patients – Marienhospital
Enhanced Discovery of Unidentified Comorbidities and Diagnosis Through the use of Diagnostic Logics Empowered by Laboratory Medicine and Informatics – Seirei Hamamatsu HP

Table 1 Attribute evaluation for each recognized best practice

Attribute	Criteria	Evaluation	
Dominant Change Agent		<i>Select only 1</i>	
Implementation of New Test Methods	Does this care initiative require the adoption and implementation of new biomarkers and/or test methods that were not previously used in clinical care at this institution to achieve the measurable success?		
Informatics	Is use of informatics likely the only way to achieve the best practice outcomes? Does this best practice strategically use informatics to automate, and/or perform reflexive testing, and/or calculate risk score critical to care pathways?		
Process Change	Was there a change to the standard of care? Were there changes to how existing information was communicated or acted upon?		
Disease States and Areas of Focus		Indicate all that apply	
Disease State(s)	Liver, Sepsis, Cardiac, Oncology, Infectious Disease, Endocrine, Diabetes, Kidney, Prenatal, Trauma, Respiratory, Fertility, Neurology		
Area(s) of Focus	Acute, Chronic, Prevention, Primary Care, Long-term Care, In-Patient Care, Women's Health, Clinical Informatics, Point of Care, Transfusion, Hematology, Molecular, Pediatric, Geriatric		
Emerging Trends		Yes	No
Laboratory Stewardship	Did this care initiative more accurately improve the ordering, retrieval, and interpretation of appropriate laboratory tests? Was the problem of over or under utilization of laboratory tests addressed? [8]		
Customized Reference Ranges	Were new, normal ranges established and implemented into clinical practice? Did implementation enable change to patient outcomes?		
Quality System	Did this care initiative more accurately improve quality control, quality improvements and/or involve new procedures or certifications related to quality in order to achieve the measurable outcomes?		
Patient Engagement	Were patients (or potential future patients) directly involved in new ways for health management, diagnoses or treatment?		
Screening	Does this care initiative involve strategic selection and/or wide-spread testing for specific disease and/or wellness areas?		
Surgical Relevance	Does this care initiative more accurately assess pre, post or peri-operative risk and/or action?		

**UNDERLYING CHANGE AGENTS
 ACROSS TOP PERFORMING TEAMS**

Healthcare excellence can happen in many ways. The route taken to achieve a measurable difference in health outcomes will undoubtedly vary by institution, location, patient type and more. Success involves a combination of teamwork, innovation thinking, and a commitment to drive change. Change in turn gets fueled by new information, new insights and/or new processes, as the single most influential force behind the

care initiative in order to achieve measurable outcomes.

Across both years of the UNIVANTS of Healthcare Excellence award program, new processes were the most common agent of change, with approximately 52% (Figure 2) of the recognized best practices involving changes to the delivery of care, without implementation of new biomarkers or algorithms.

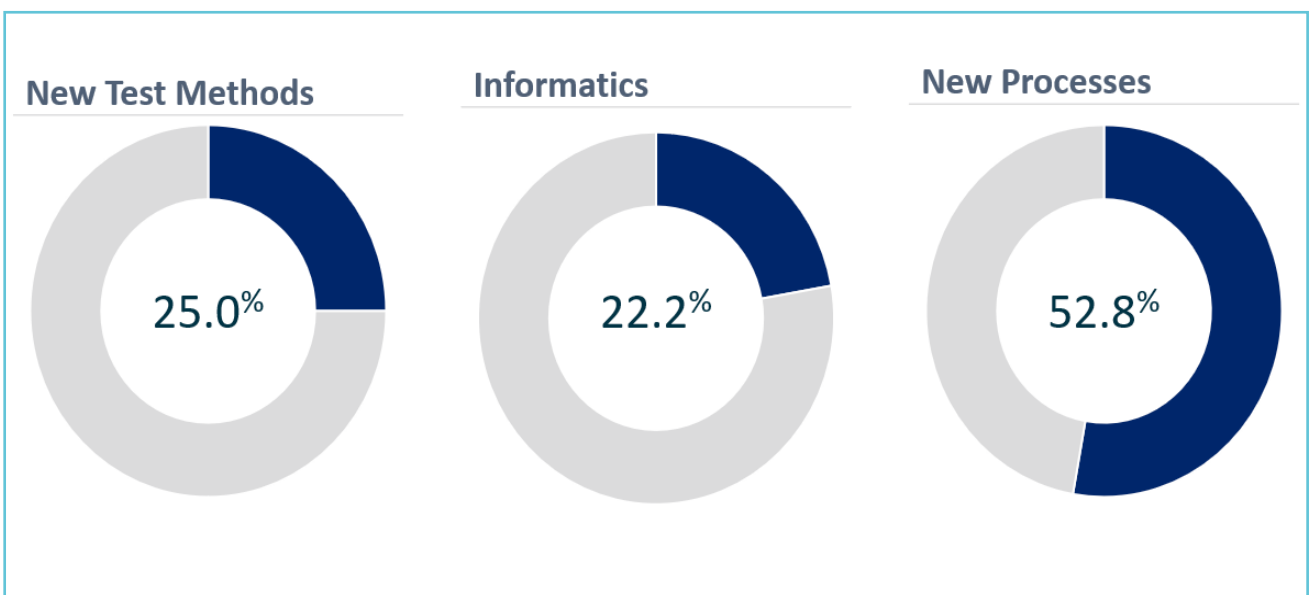
Examples include expedited triage for patients with chest pain [15, 16], improving the timely

communication of COVID-19 status through activation of online patient portals [17], and maximizing patient care via comprehensive or new quality systems [18] or enhanced quality processes [19]. Other dominant agents of change included the adoption of new test methods (25%) and new insights (22%) driven by implementation of informatics or clinical decision support. Thus, while it may be common to believe that implementation of new biomarkers into care is the customary way to innovate, even small changes within current systems can have long-lasting and substantial impact.

Not surprisingly, the COVID-19 pandemic has substantially increased the rates of new test methods implemented into clinical care between 2019 (16.7% of the recognized best practices) and 2020 (37.5% of the recognized best practices), as many institutions implemented newly developed SARS-CoV-2 assays into clinical care. Implementation of new test methods with instant

and sustained demand, such as SARS-CoV-2 assays, require innovative thinking to overcome capacity challenges [20], while ensuring patient-centric care [21, 22]. Traditional implementation of novel biomarkers can be equally as complicated, requiring wide-spread education, demand creation, and activation of consistent care pathways. However, best practices in this area have had proven success. Examples include implementing procalcitonin into clinical decision-making for the early recognition and management of sepsis [23, 24], use of placental growth factor (PLGF) for early identification of preeclampsia [25, 26], introduction of faecal immunochemical tests (FIT) to investigate patients with new bowel symptoms [27, 28], and implementation of viscoelastic point-of-care testing following cardiopulmonary bypass for reducing post-operative complications [29]. Collectively, teams working together can facilitate rapid adoption and transformational delivery of care.

Figure 2 Dominant change agents across recognized best practices through the UNIVANTS of Healthcare Excellence awards*



* Nine of thirty-six care initiatives involved the implementation of new test methods into clinical care as the main agent of change. Eight of thirty-six best practices were predominantly powered by clinical decision support or algorithms for actionable change in clinical care. While all thirty-six care initiatives had some level of process change, nineteen had process as the leading change agent.

Use of informatics and/or clinical decision support continues to emerge with time. Offering synthesis of data, either longitudinally or across biomarkers at single points in time can enhance patient diagnosis [4, 30-32], monitoring [5, 33-34] and/or care [35, 36]. These trends collectively suggest that while there will always be a time and place for novel test methods and/or biomarkers, innovation and measurable differences can be also achieved through strategic application of informatics and process changes, enabling immediate and actionable insights for resolving existing gaps in care.

PREVAILING DISEASE STATES AND AREAS OF FOCUS

Care gaps exist in medicine today across most disease areas with opportunities to improve or expedite care regardless of the disease burden. It is not surprising, however, that care teams often focus on areas with substantial unmet needs, enabling improvements to patient experiences, reducing clinical uncertainty, improving staff satisfaction, and/or lowering overall healthcare costs. Across and between award years, the disease states associated with the best practices for the award-winning teams include infectious disease, cardiovascular disease, kidney disease and prenatal care (Figure 3). While cardiovascular disease and kidney disease continue to be strong focuses globally, approaches to improving outcomes vary widely. Patient-centric initiatives in the field of cardiovascular disease span best practices in expedited triage of patients presenting with chest pain [15, 16, 37], long-term risk prediction [38, 39] and reducing cardiac complications in patients undergoing cardiac [29] and non-cardiac surgery [40, 41]. Strategies for improving outcomes related to kidney disease include identification of acute kidney injury [42] managing patients undergoing treatment with chronic kidney disease [35, 36] and reducing risk of dialysis in underserved

communities through early screening via point of care [43-45]. In terms of infectious disease, and beyond the aforementioned SARS-CoV-2 test method adoption, are leading best practices focused on hepatitis C virus (HCV) identification and elimination with strategies including highly successful awareness campaigns [46] as well as Opt-out [47-49] screening programs for earlier detection and enhanced linkage to care.

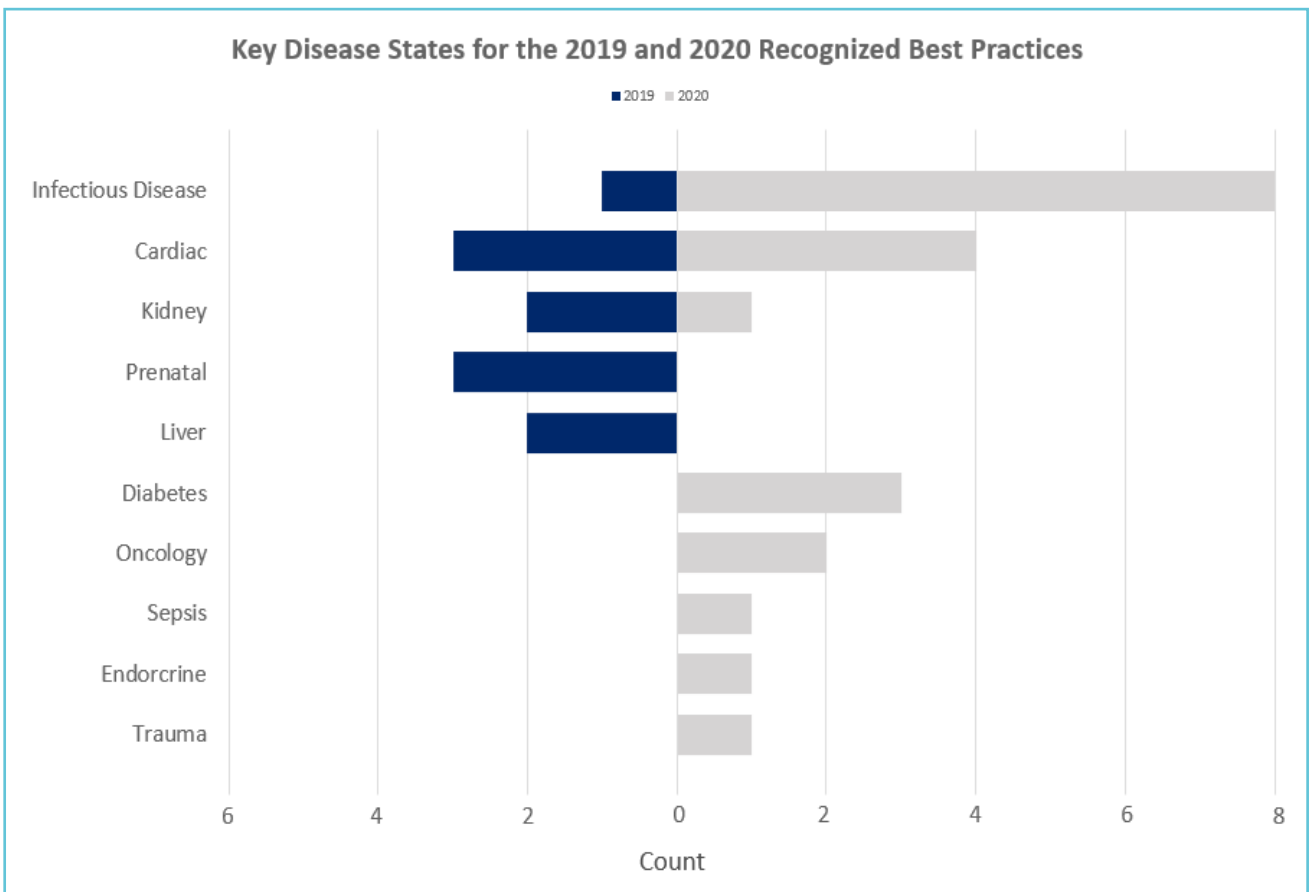
While commonalities prevail across years in the top four disease areas, differences can also be noted. Specifically, best practices in several new disease categories emerged in 2020, including but not limited to more strategic identification and management of patients with diabetes [5, 33], expedited decision-making for patients with suspected cancer [32], and improved identification and management of potential bleeding due to trauma [50, 51] (Figure 3).

In the years ahead, further expansion of categories is expected, including best practices that address other areas of unmet needs, including but not limited to fertility, respiratory disease and traumatic brain injury. Current gaps are not likely driven by an absence of engagement or use of laboratory medicine in these specialties, but rather the absence of award awareness and/or interdisciplinary connections necessary to quantify success or ensure award eligibility. This highlights new opportunities for care teams to further collaborate and measurably impact patient care.

LABORATORY INSIGHTS FOLLOWING TWO YEARS OF REFLECTION

Not all of the best practices submitted to the UNIVANTS of Healthcare Excellence award program involve laboratorians as the primary applicant. In fact, many of the top-performing teams were led by clinicians who approached laboratory medicine for help in solving gaps in care. Other superior care initiatives, however, did originate

Figure 3 Common and unique disease states associated with recognized best practices across the first two years of UNIVANTS of Healthcare Excellence awards.*



* Not graphed, but noteworthy, was the absence of recognized best practices in the fields of respirology, fertility and neurology.

and thrive through the leadership of the clinical laboratory. Multiple trends have emerged from the latter including some level of laboratory stewardship (Figure 4), which accounts for 19.4% (year 1: 25.0%, year 2: 16.7%) of all teams with recognized best practices. Ensuring the right tests are used for the right patients at the right time has broad relevance both within and beyond the lab.

Another key area of pathology-led excellence is the establishment and implementation of outcome-based reference ranges. Too often, generic reference ranges are used inappropriately in clinical care. Doing so can limit disease detection

and challenge potential treatment or wellness. One stand-out example is the more accurate classification of the thyroid status in pregnant mothers, using locally established, outcome-based reference ranges for thyroid stimulating hormone [52].

A final theme and long-standing focus of clinical laboratories is the crucial requirement of high-quality laboratory testing. Whether it is pathology-led oversight of point of care testing [19] or a complete redesign for a system-wide quality culture in an emerging market [18], the relevance of laboratory medicine and its impact to patient care remains vital and evident.

STANDOUT KEY PERFORMANCE INDICATORS (KPIs)

Measurement of outcomes is a common practice and core competency within laboratory medicine. Measurement of health system outcomes, however, is not. Often, the connection between laboratory medicine to measured KPIs outside the clinical laboratory are speculative or confounded at best. Experts have long tried to associate the value of laboratory testing with the value of the profession. In reality, these two entities, while intertwined, are also mutually exclusive. Laboratory professionals are uniquely positioned for strategic brainstorming irrespective of the implementation of new test methods. Similarly, successful implementation of new test methods within the core laboratory does not necessarily mean successful implementation into clinical care. For these reasons, trends associated with KPIs across the two years of the UNIVANTS of Healthcare Excellence Awards can be insightful, highlighting what is possible, connected, and measurable.

As outlined in Figure 4a, the most frequently measured KPI across recognized best practices in 2019 was improved clinical confidence. This outcome to most will be somewhat expected, as the power of laboratory data has long been recognized for its value in guiding clinical decisions.

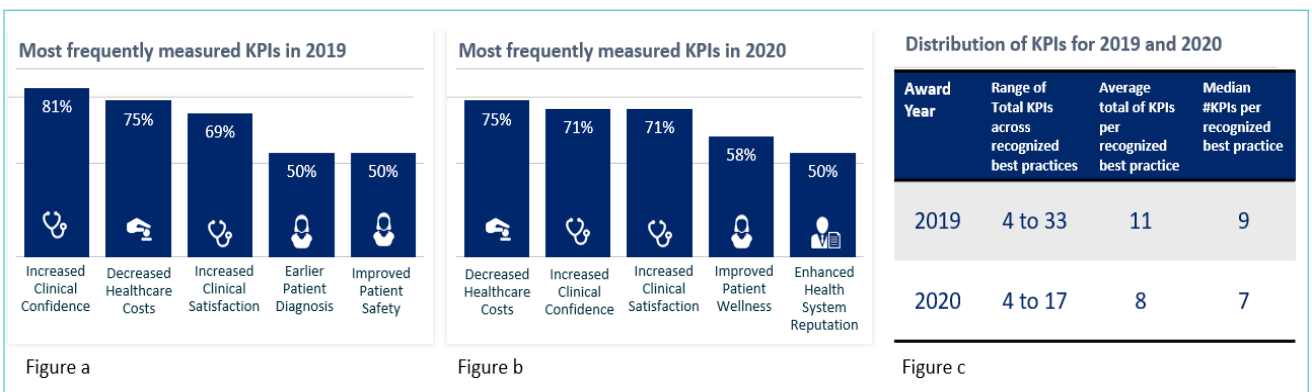
Interestingly, the most frequently measured KPI across recognized best practices in 2020 was reducing overall healthcare costs; surpassing the KPI of clinical confidence. Thus, more teams have either begun to more frequently connect the downstream value of laboratory medicine beyond clinical stakeholders, or perhaps they are more readily beginning to quantify it.

It is worthy to also note that the median number of submitted KPIs across both years reflect a near doubling of the minimum requirements for eligibility (Figure 4c). In addition, multiple best practices across consecutive years far surpassed the minimum requirement of 4 KPIs. This highlights the rewarding potential for measurable excellence from inter-connected teams working together towards common goals.

DISCUSSION AND A PLEDGE FOR HEALTHCARE EXCELLENCE

It has been said that “communication to a relationship is like oxygen to life. Without communication, relationships die.” In kind, so do marriages and long before ‘death does them part.’ Thus, commitments to any partnership require effort, time, trust and yes, communication. A joint commitment for healthcare excellence is no different. Healthcare professionals must work together, trust and communicate with one another,

Figure 4 Distribution analysis of KPIs associated with the UNIVANTS of Healthcare Excellence awards



appreciate and problem-solve with one another to achieve common goals. Opportunities to do that vary; across regions, health systems, disease states, processes and populations. Those that do it well achieve measurably better health care, and ideally, also achieve recognition both locally and globally for their best practice of elevating patient care.

The trends and findings of this paper suggest that the UNIVANTS of Healthcare Excellence program has been successful in recognizing teams for healthcare excellence whereby laboratory medicine has contributed in a measurable way. Even amidst the unprecedented COVID-19 pandemic, healthcare excellence has been thriving. Of note, in both years of the program at least one of the top three winning teams involved best practices in the field of kidney medicine. Further, cardio-renal care initiatives comprised 28% of all recognized best practices, surpassing infectious disease by 3%. Given the collective global burden of cardiac and renal diseases, in addition to substantial opportunities for improved detection and prevention, as well as the close connection of biomarkers to measurably better health care in these fields, this finding is not surprising. What is surprising is that HCV elimination strategies comprised 8% of all recognized teams, including best practices from England, Mexico and the United States. This favorably reinforces the global goal of HCV elimination by 2030 [53]. With approximately 30% more disease states with recognized best practices in 2020 compared to 2019, opportunities continue to emerge for measurably better health care.

A limitation of the trends and findings presented in this paper is that they were limited to the 36 best practices with recognition associated with the UNIVANTS of Healthcare Excellence awards. The award program however is global, spans engagement from over 141 countries and involves high-quality, diverse initiatives with recognition only to those with peer-approved

acknowledgement from seven prestigious healthcare organizations. Thus, while limited in total number, the themes and trends associated with the first two years of the program are genuine and reflect measurably better outcomes of healthcare excellence relevant to unmet clinical care gaps in health care today.

It is the intent of the UNIVANTS program and the hope of these authors that the award program continues to thrive with wide-reaching examples of excellence across the globe, while inspiring new and complementary best practices at other healthcare facilities that desire similar success. The quest for healthcare excellence is upon us and the way to achieve measurably better healthcare is to engage laboratory medicine, work across disciplines and lead with action and by example in value-based health care. We invite readers to join in this community of best practices, pledge to healthcare excellence, and inspire others to do the same.



A parodical Pledge for Healthcare Excellence

From this day forward, for better (and not worse), in sickness and in health, for patients and the community, for unborn babies to the elderly, to save and to heal, I commit to healthcare excellence all the days of my life. To be inclusive and innovative, and being open and strategic; all while maximizing the value of laboratory medicine until death do us part.



CONCLUSION

Life and death decisions are made every day. Healthcare professionals carry that burden and become the 'oxygen' to millions of patients in need. In the quest to do more, for patients and healthy communities, we must work together to achieve healthcare excellence; maximizing health

through laboratory insights, measuring success across stakeholders with quantitative and qualitative KPIs, and sharing those best practices with the UNIVANTS of the Healthcare Excellence award program. We are in this together, until death do us part.

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