Germano de Sousa Laboratory Medical Center

A journey of Quality:
Innovation, quality and accuracy

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Lessons Learned from Our Lab's Eight-Year Use of Quality Management Methods to Change the Culture, Boost Productivity, Increase Quality

- 40 Years of History: Our Lab's Lean journey
- Clinical Practice Improvement Landmaks:

  ISO9001, Lean Six Sigma Philosophy, Redesign
- Three successful process improvement projects
- Lessons learned
- Next steps: now is the future

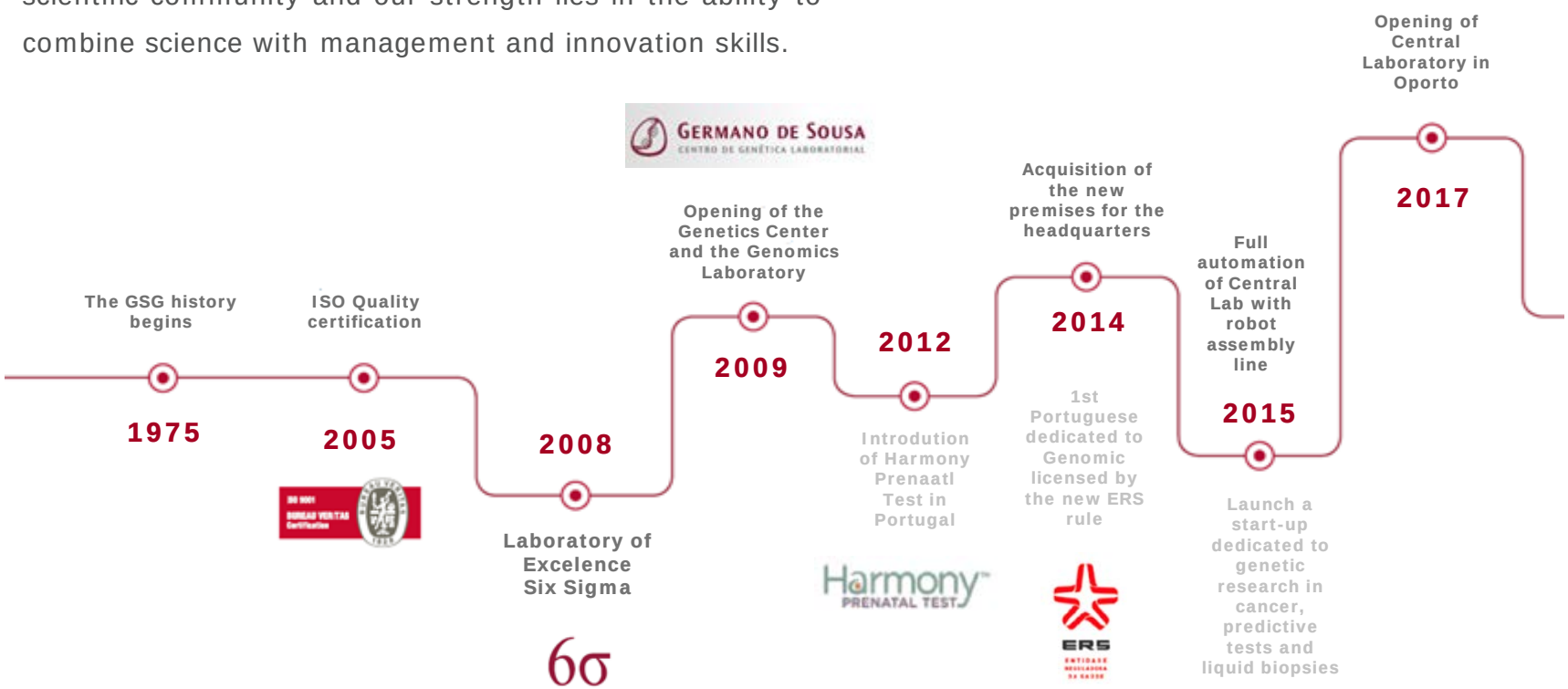
The change begins when someone sees the next step

LANDMARKS IN OUR HISTORY

More than 40 Years of Activity

The Germano de Sousa Group (GSG) has been firmly established in clinical laboratories for more than 40 years.

The Group grew and developed in the heart of the scientific community and our strength lies in the ability to combine science with management and innovation skills.



CENTRES OF EXCELLENCE

- Prenatal Diagnosis
- Combined First-trimester Screening
- Combined Second-trimester Screening
- Harmony Prenatal Test
- Precision Medicine
- Oncogenomics, Pharmacogenomics
- Genetic Markers of Hereditary Neoplasms
- Oncological Diagnosis (Tumour Markers, HPV, PCa3)
- Dyslipidaemia Studies
- Lipid parameters and lipoproteins
- Identification and determination of LDL and HDL subfractions in patients at risk
- Study of Systemic Autoimmune Diseases (Systemic Lupus Erythematosus, Rheumatoid Arthritis, Scleroderma, etc.)
- Study of Organ-Specific Autoimmune Diseases (Thyroiditis, Hepatic, Intestinal, etc.)
- Study of Neurological Autoimmune Diseases
- Immuno-allergology (RAST / ISAC)
- Morphological examination of peripheral blood and bone marrow
- Flow cytometry
- Genetic studies
- Autoimmune Diseases
- Haemato-oncology

GERMANO DE SOUSA IN NUMBERS

GERMANO DE SOUSA
CENTRO DE MEDICINA LABORATORIAL

The skills of our human resources, strong investment in technological capacity and research and innovation policies coupled with specialised management make Germano de Sousa the largest private operator in Portugal.

+50
Specialists in Clinical Pathology and Genetics

+800
Employees

+450
Collection Points

+15
Laboratories

+46
Thousands tests per day nationwide

+5500
Patients per day nationwide

+11,5
Million laboratory tests per year

+1,2
Million users per year

GEOGRAPHICAL PRESENCE

HOSPITALS

2 PUBLIC HOSPITALS

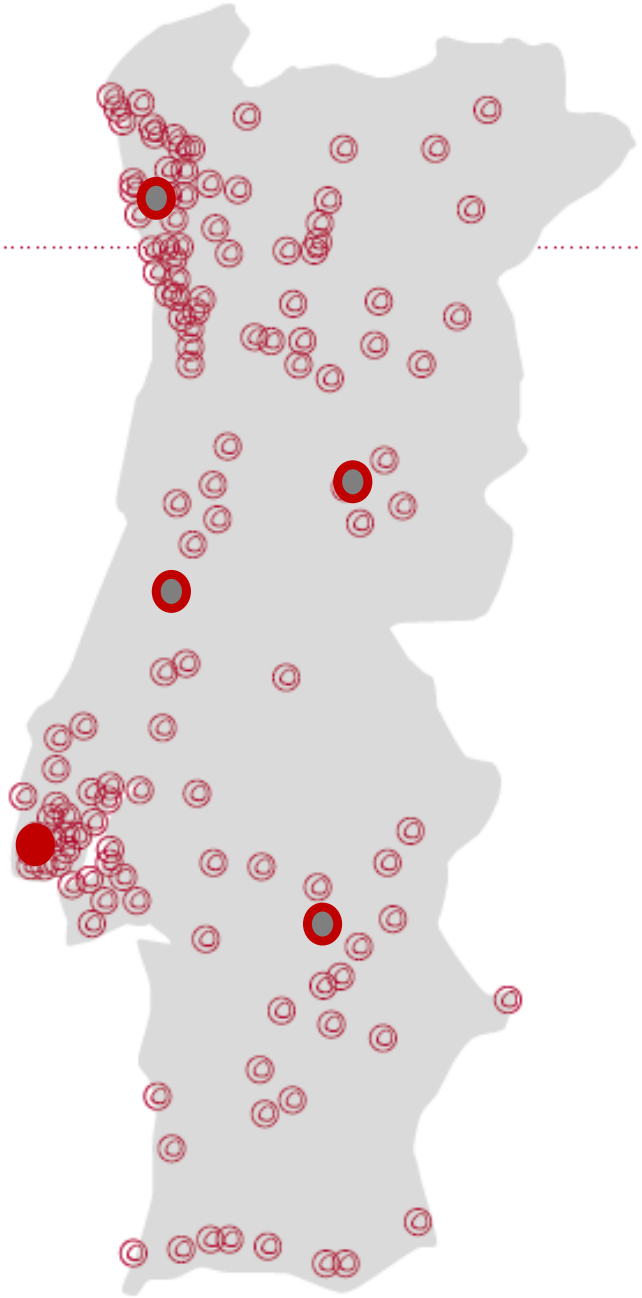
9 PRIVATE HOSPITALS

LABORATORIES

Leading Laboratory	1
Hospital Laboratories	11
Regional laboratories	4

COLLECTION CENTRES

+450 COLLECTION CENTRES



THE GERMANO DE SOUSA GROUP HAS A QUALITY MANAGEMENT SYSTEM [ISO 9001]

The application of these principles as a strategy of continuous improvement and control of their performance, meeting the requirements, needs and expectations of users, in an effective and efficient.

2005
Bureau Veritas Certification

- 1st Group lab - Labdiagnóstica

2010
Bureau Veritas Certification Germano de Sousa Group

- CML GS
- HCD
- HCIS
- HCP
- Labdiagnóstica

2016
GS Group Certification Restructuring

- CML GS
- Genetic Germano Sousa Lab
- HCD
- HCIS
- HCP
- Labdiagnóstica

SUSTAINING THE USE OF THE ISO 9001 QUALITY MANAGEMENT SYSTEM

3
Concession Audits

7
Recertification Audits

10
Follow-up audits

6
Continuously Certified GS Group Laboratory Units


Certificação
LABDIAGNÓSTICA, Lda.
NP EN ISO 9001:2008


Certificação
CENTRO MEDICINA LABORATORIAL GERMANO DE SOUSA, S.A.
ISO 9001:2008


Certificação
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Certificação
CENTRO MEDICINA LABORATORIAL GERMANO DE SOUSA, S.A.
ISO 9001:2008

LABORATORY LEAN JOURNEY

2005 — Bureau Veritas Certification ISO 9001

2009 — Lean Six Sigma Philosophy

2010 — Lean Project Biochemistry and Immunology

2011 — Lean Project Preanalytical

2014 — Restructuring - New headquarters

2016 — Lean Project Technical Restructuring - Automation

2017 — National technical consolidation

CLINICAL PRACTICE IMPROVEMENT APPROACH

Customer Focus

- Satisfaction of the expectations and demands of the Clients,
- Involvement of the Administration, Employees, Suppliers, Doctors and Entities.

Resource management

- Scientific method applied to our work
- Training and follow-up of all Employees
- Competent and conscious execution of own responsibilities
- Identify waste: reduce or eliminate it

Employee responsibility and involvement

- All Employees responsibility

Leaders Communicating and understanding the team

Compliance with standards and good laboratory practices

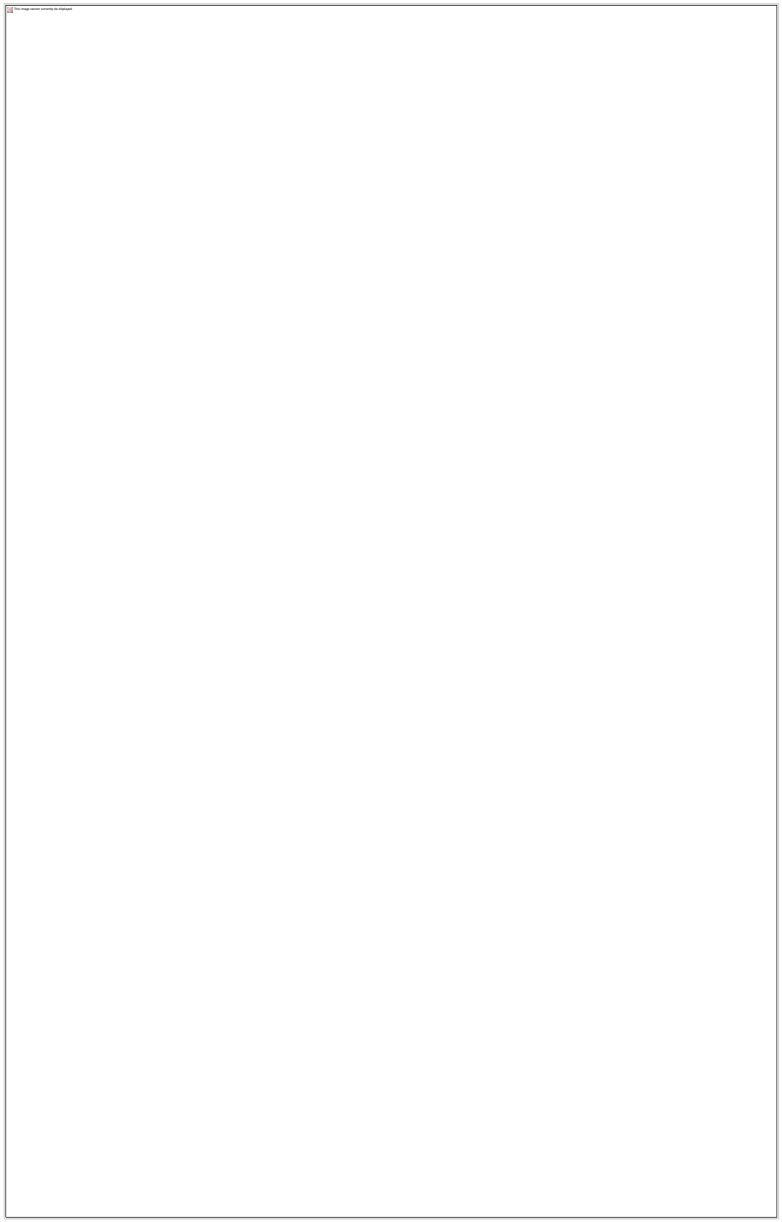
LEAN TOOLS

- 5 Why's
- Rapid Process Improvement Workshops
- Visual management
- Inventory management
- Metrics

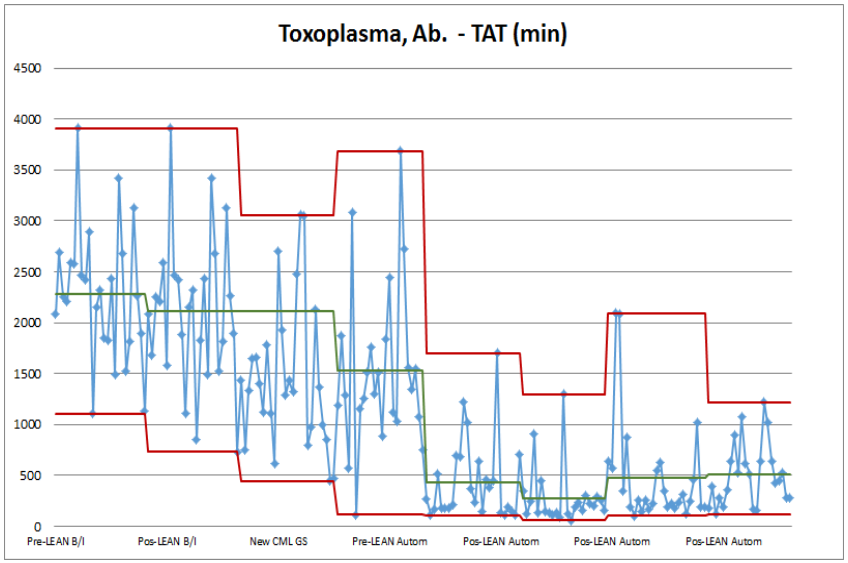
DMAIC PROJECT

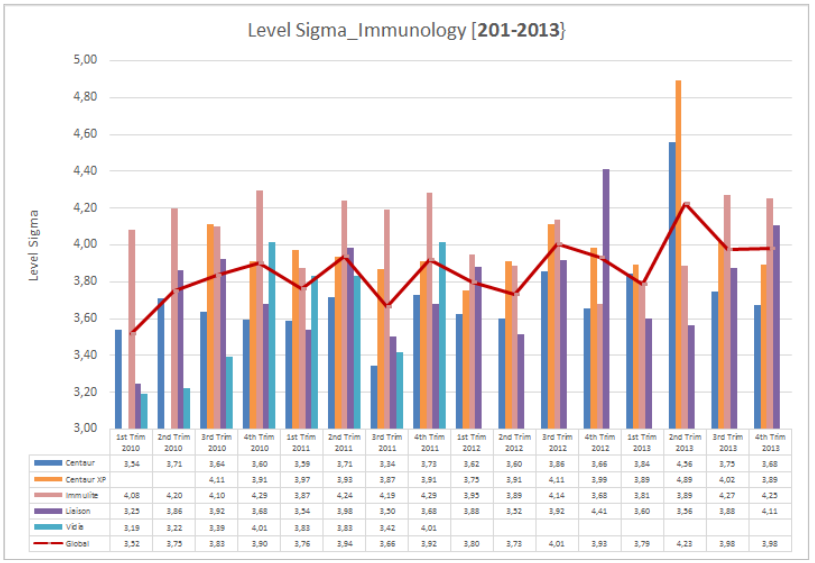
- Orientation of the company's objectives in a continuous improvement associated with the **reduction of costs related to non-quality**.
- In this project we want to find a solution that allows us to **improve not only technical performance but customer satisfaction.**

Focus on Reduction TAT: Eliminate the repetitions performed per equipment, according to the characteristics of the method used and studies of reproducibility and capacity.



DMAIC PROJECT





PROBLEM

POTENTIAL SOLUTION

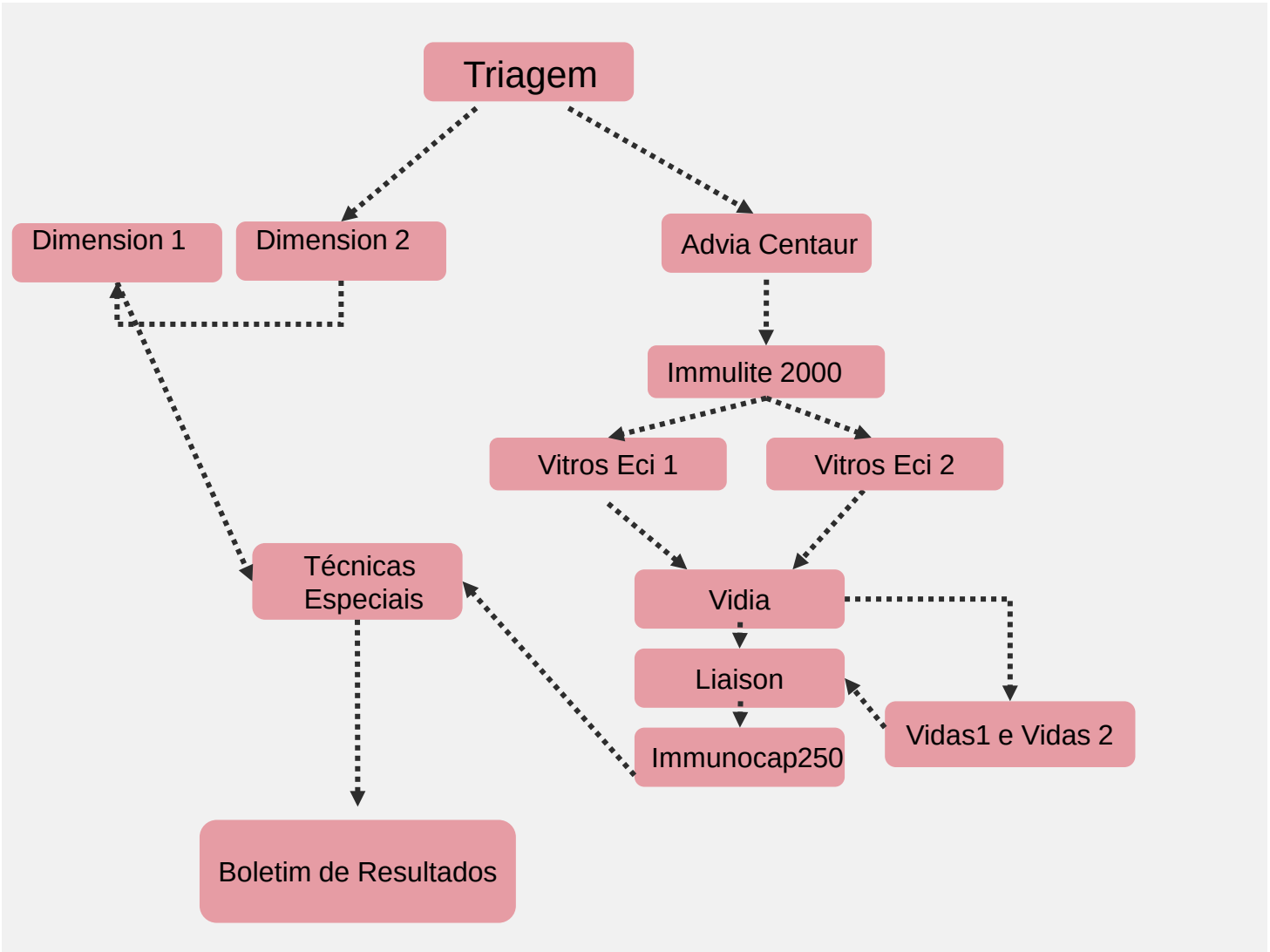
PROBLEM	POTENTIAL SOLUTION
Repetitions due to dilution	Implementation of algorithm for automatic programming of dilutions of biological samples
Influence of temperature on some parameters	Increase cooling in the field of realization of Biochemistry - Dimension
	Intensive training to new technician, and recycling to be provided to all technician, with review of pre-analytical procedures
Equipment: precision	Correlation studies were performed for the anaysed parameters Vidia equipment with other equipment on the market.

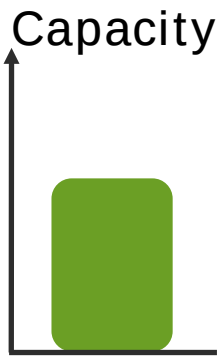
- TAT improvment
  36% reduction time

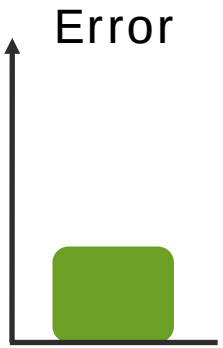
- Repetitions performed per equipment:
  Sigma 3.50 to 4.00

LEAN PROJECT: STREAMLINE WORKFLOW IN BIOCHEMISTRY AND IMMUNOLOGY

2010 PRE-LEAN







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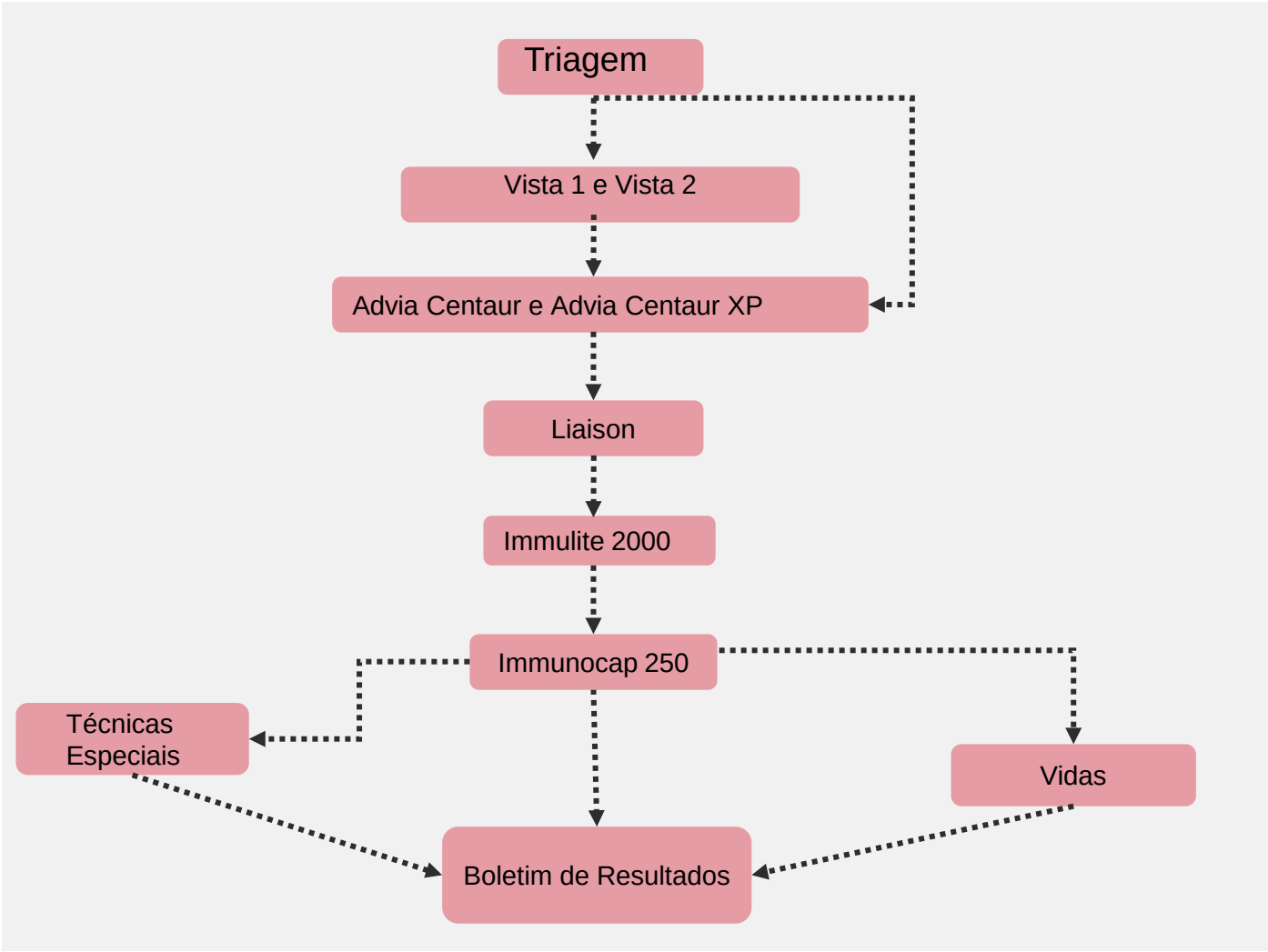
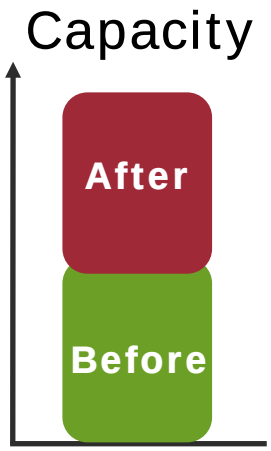
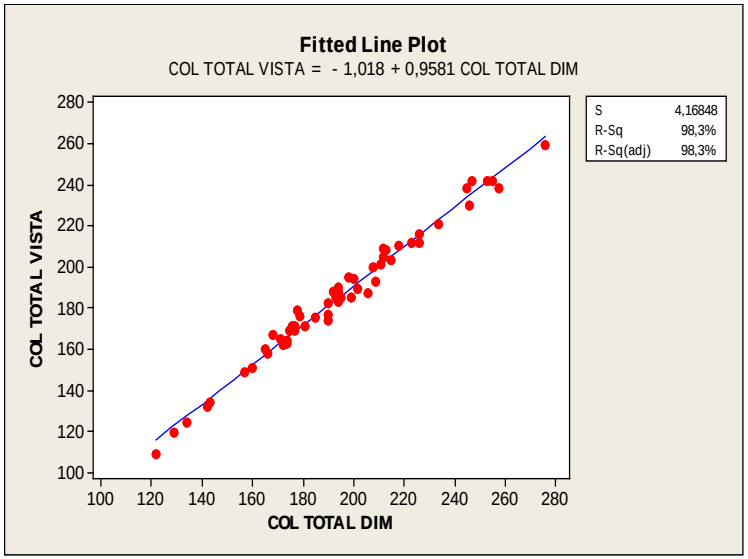
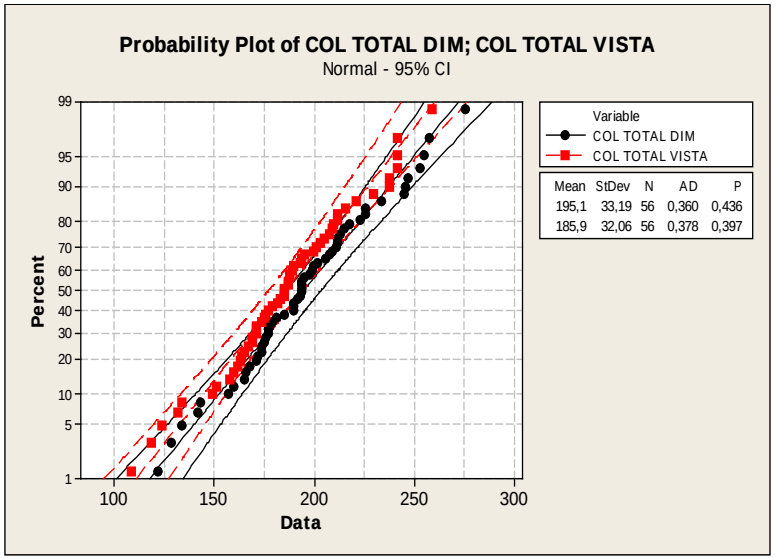




CHANGE MANAGEMENT - STRATEGIC AND OPERATIONAL LEVELS





Correlations: COL TOTAL DIM; COL TOTAL VISTA

Pearson correlation of COL TOTAL DIM and COL TOTAL VISTA = 0,992
P-Value = 0,000

	COL TOTAL DIM	COL TOTAL VISTA
MÉDIA	195,05	185,86
SD	6,50	
CV%	3,41	
MEDIANA	194,00	185,00
SD	6,36	
CV%	3,36	
VAR %	**-4,64**	
VAR u	**-8,79**	
CVw [betw een-subject bioloical variation]	**15,2**	

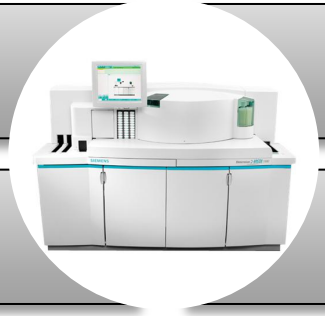
LEAN redesigns, new equipment acquisition and change methodologies, carried after validation of methods.

SUSTAINABLE IMPROVEMENT

TECHNICAL CONSOLIDATION - VISTA 1500: WHAT WE WANTED TO ACHIEVE

Homogeneous Process
3 steps

Fast TAT



High Sensitivity and Specificity

Small Sample Volumes

Unlimited Development Potential

240 tests/hour

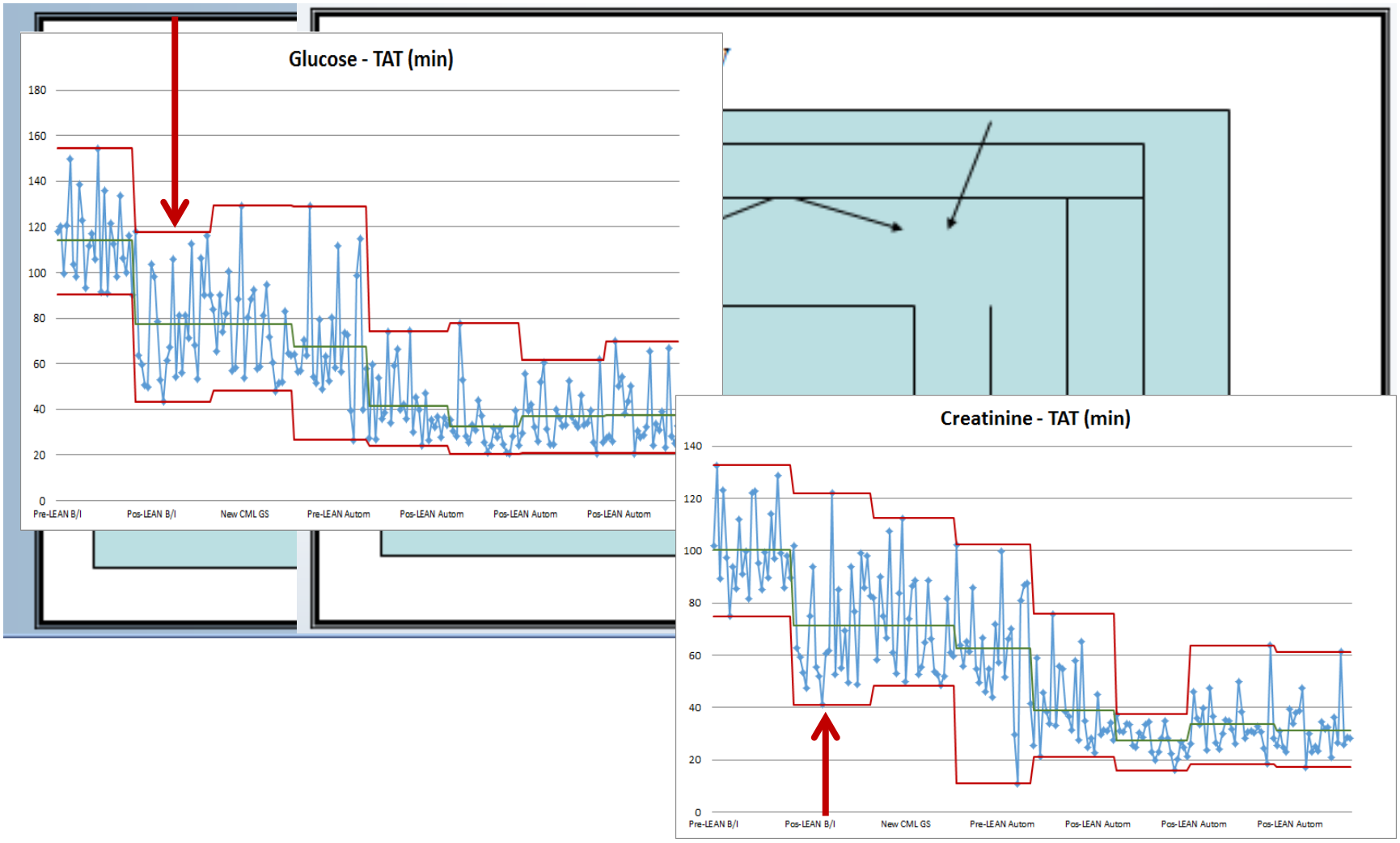
More than 6000 tests on-board

Always ready

SMART algorithm software

TECHNICAL CONSOLIDATION - VISTA 1500

LEAN PROJECT BIOCHEMISTRY AND IMMUNOLOGY



LEAN PROJECT
BIOCHEMISTRY AND IMMUNOLOGY

2010 PRE-LEAN

LEAN PROJECT
BIOCHEMISTRY AND IMMUNOLOGY

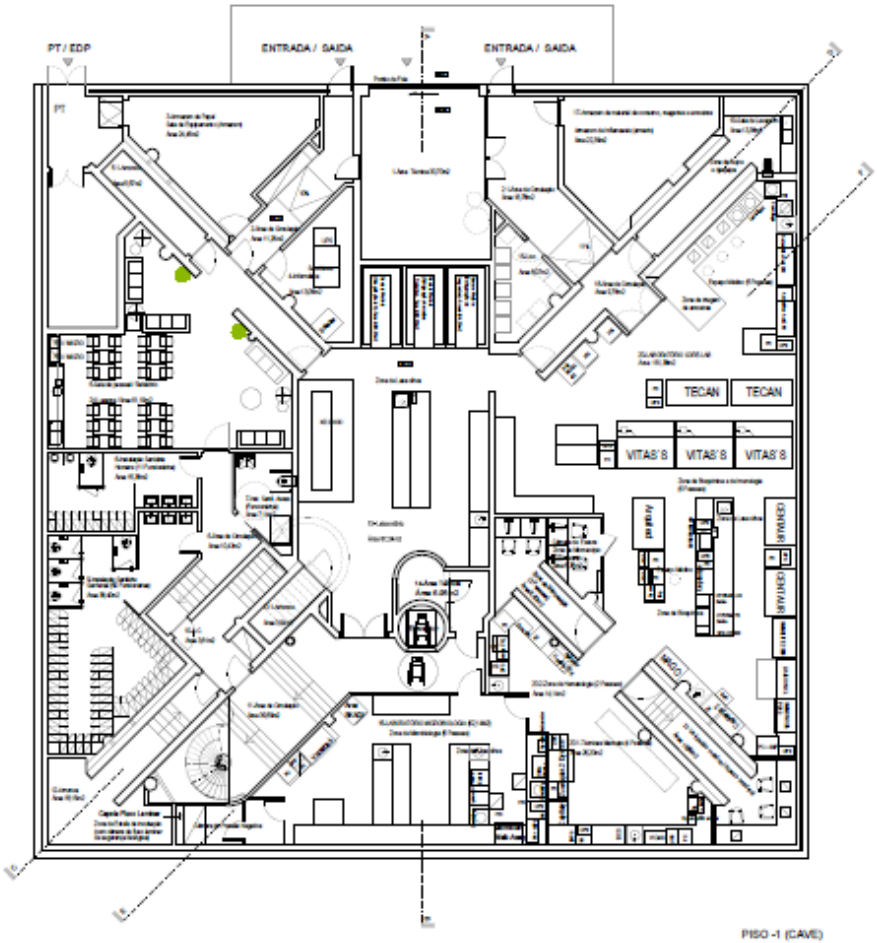
GERMANO DE SOUSA
CENTRO DE MEDICINA LABORATORIAL

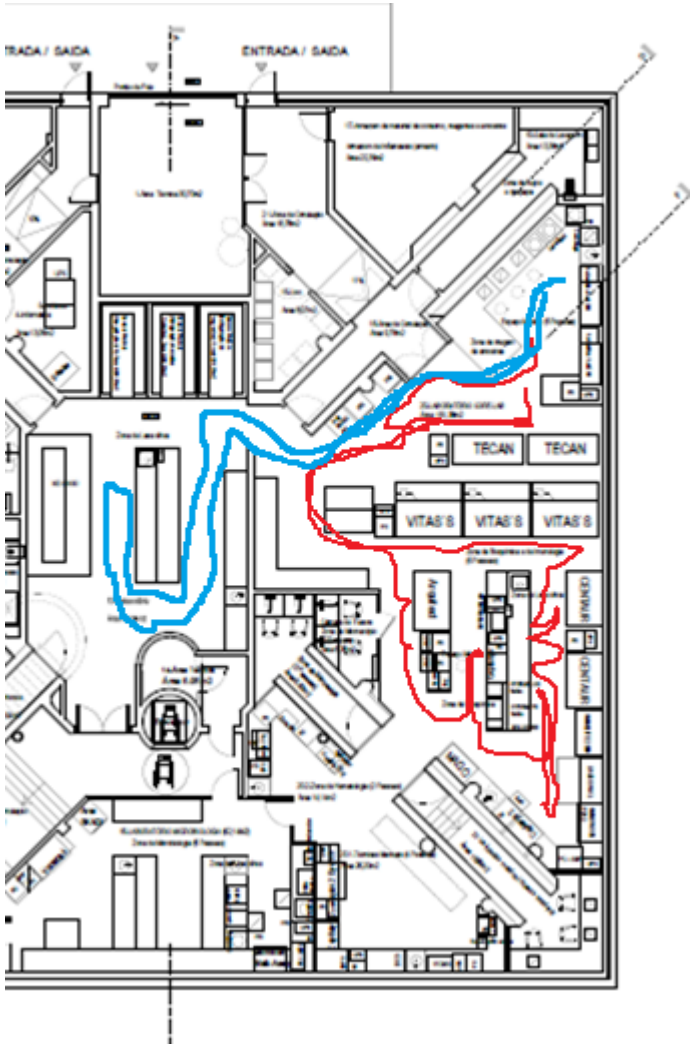
Pacote

LABORATORY JOURNEY - CREATING THE FUTURE

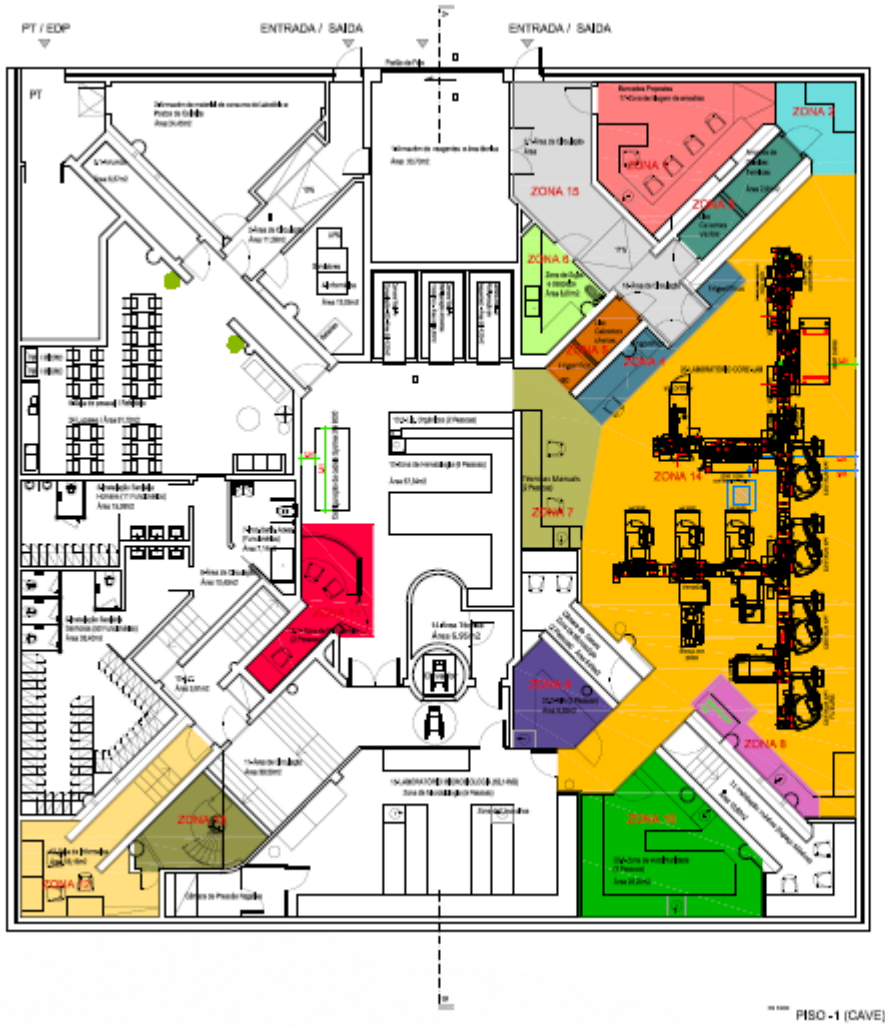
LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

2015 PRE-LEAN





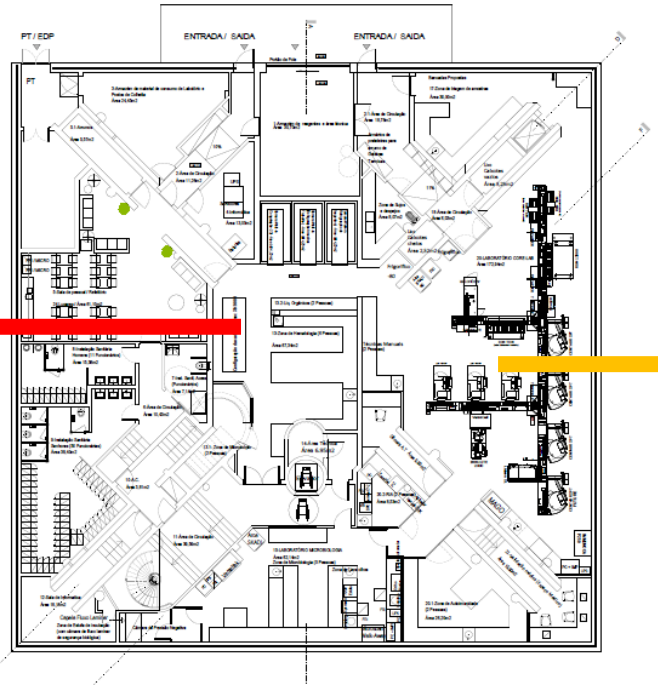
LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

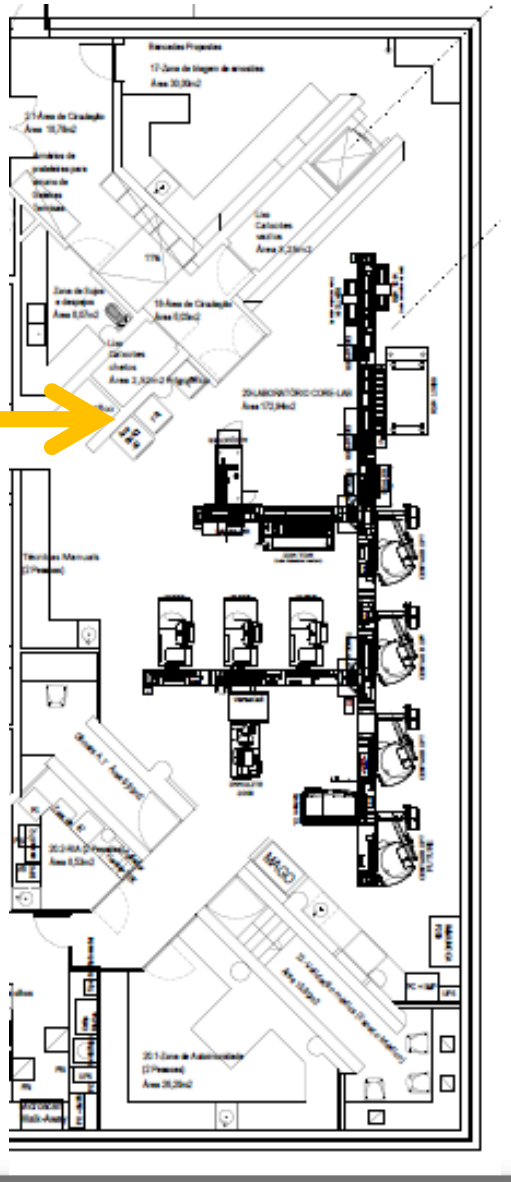


Zonas de Intervenção

Zona 1 - zona de triagem de amostras
Zona 2 - zona de triagem/circulação
Zona 3 - arrumos de geleiras térmicas e lixo, caixotes vazios
Zona 4 - frigoríficos, 1 posto de trabalho
Zona 5 - frigorífico e lixo, caixotes cheios
Zona 6 - zona de sujos e despejos
Zona 7 - técnicas manuais
Zona 8 - bancada e Immunocap 250
Zona 9 - RIA
Zona 10 - zona de autoimunidade
Zona 11 - zona de microscópio
Zona 12 - sala de informática
Zona 13 - zona técnica / esgotos
Zona 14 - CORE-LAB
Zona 15 - área de circulação

LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION





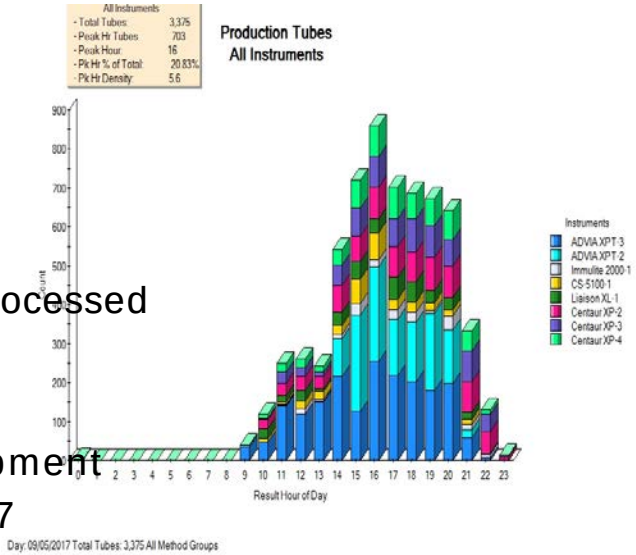
- **2016 - Total Laboratory Automation** (TLA) - improving traceability and efficiency.
- Whole of sample processing, from the beginning of the **workflow inside the lab (check-in) to the end (disposing)**, including any step in pre-analytical, analytical and post-analytical phases.

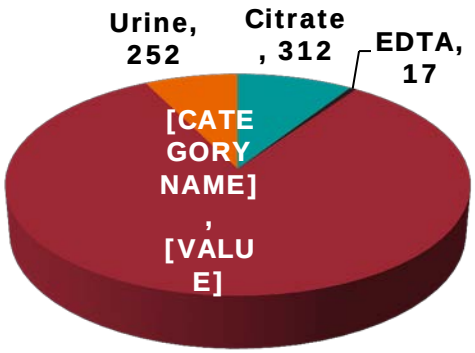
LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

PRODUCTION DATA
SAMPLES AND TESTS

December 2016

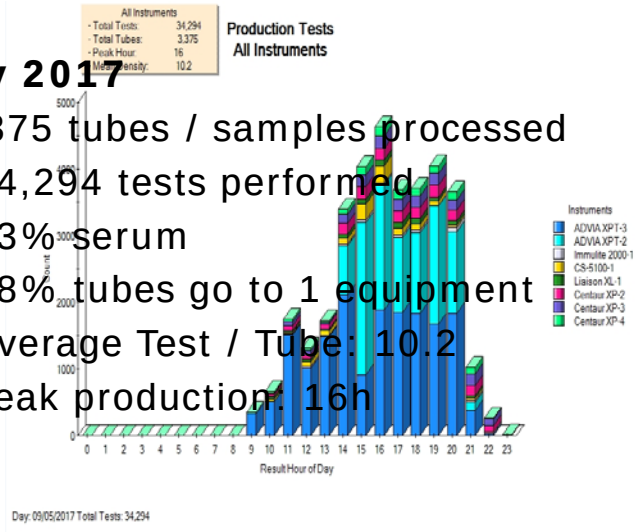
- 2927 tubes / samples processed
- 28456 tests performed
- 80% serum
- 57% tubes go to 1 equipment
- Average Test / Tube : 9.7
- Peak production : 18h

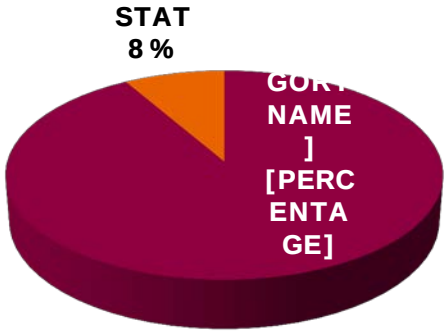




May 2017

- 3,375 tubes / samples processed
- 34,294 tests performed
- 83% serum
- 58% tubes go to 1 equipment
- Average Test / Tube: 10.2
- Peak production: 16h



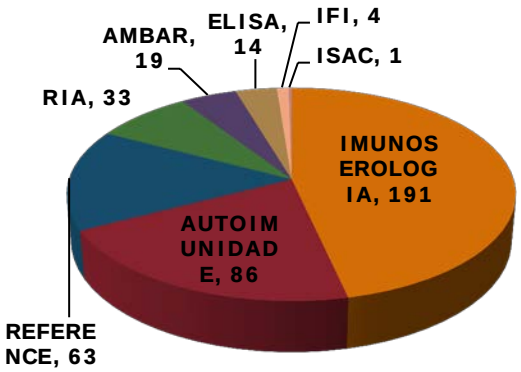


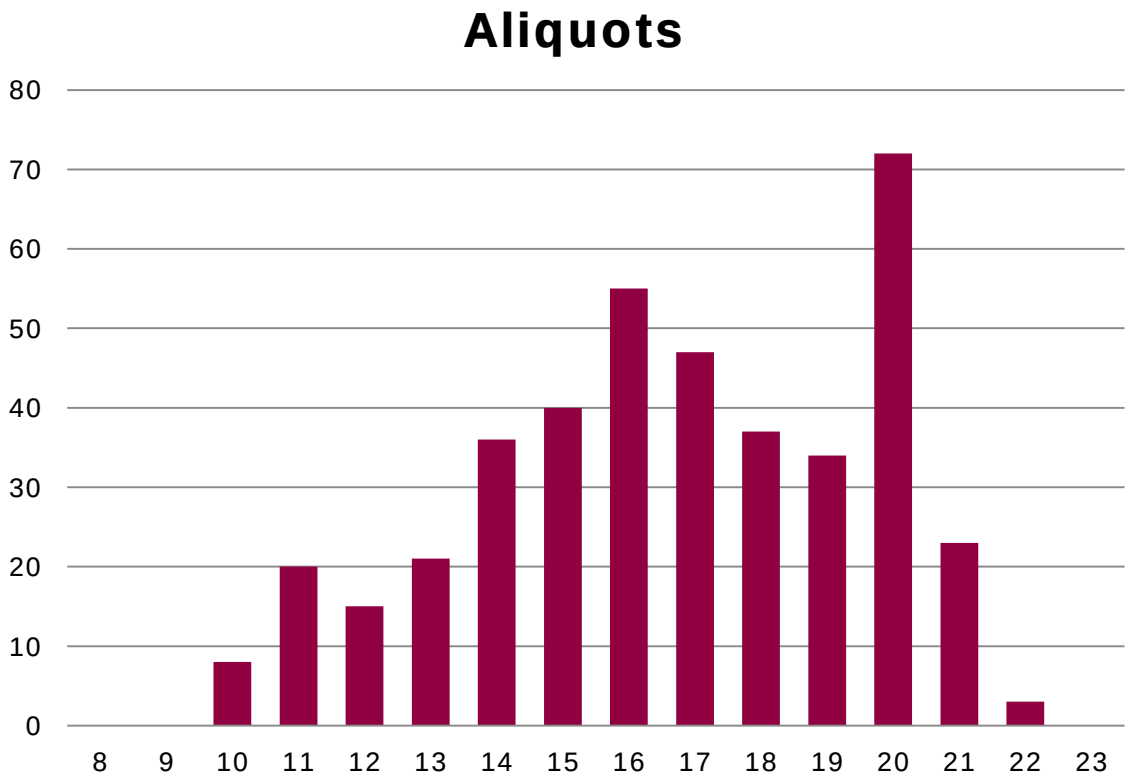
LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

PRODUCTION DATA
ALIQUOTS

May 2017
411 Aliquots
47% Immunoserology
Peak: 8pm

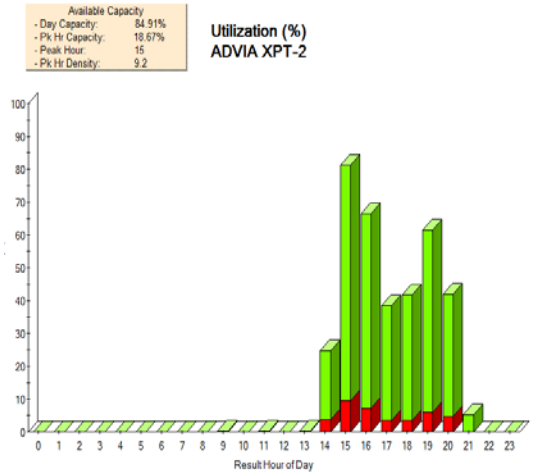
Dec 2016
- 355 Aliquots
- 50% Immunoserology
- Peak: 19h

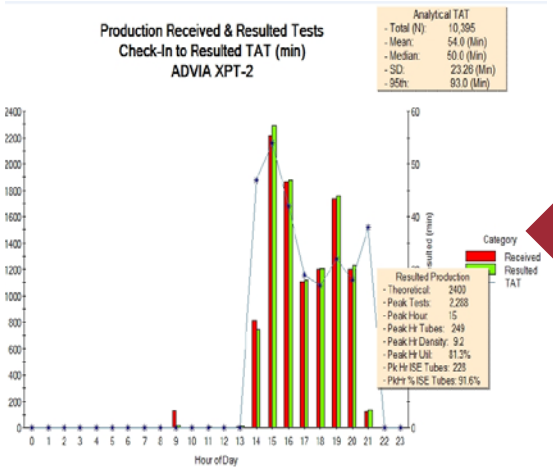




LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

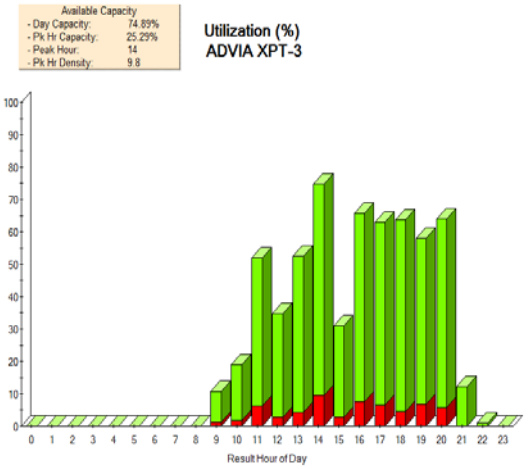
PRODUCTION DATA
CAPACITY

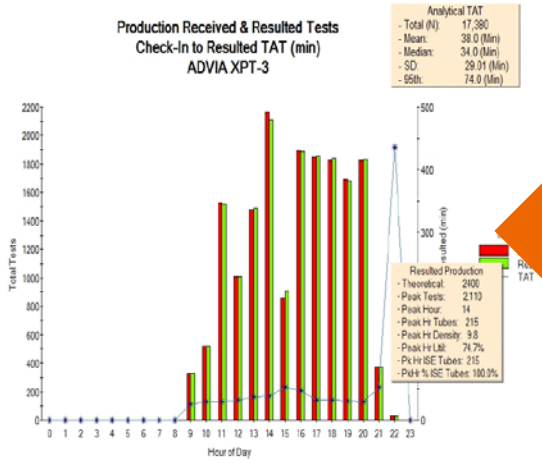




ADVIA® XPT-2 Production

		12/2016
- Theoretical:	2400	
- Peak Tests:	2,288	1,515
- Peak Hour:	15	14
- Peak Hr Tubes:	249	181
- Peak Hr Utilization:	81.3%	56,4%
- Total Test:	10,395	7,270



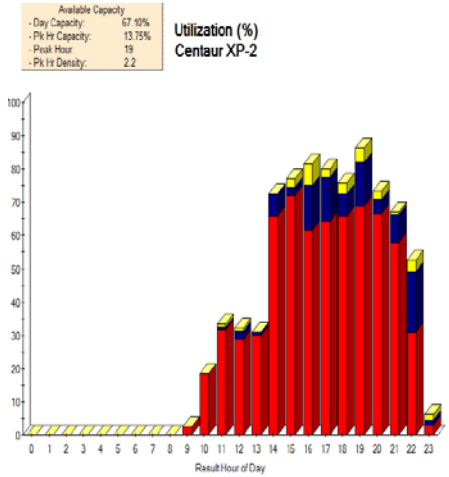


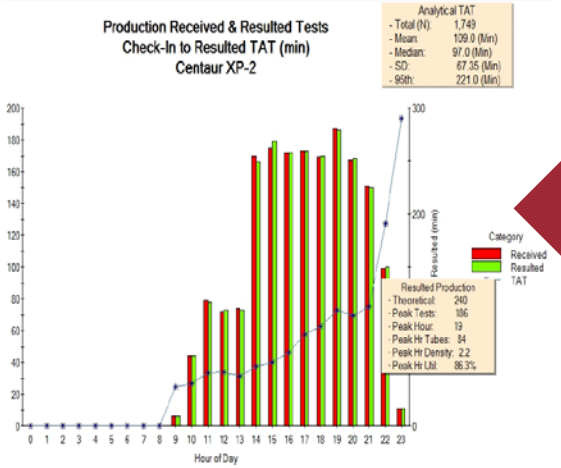
ADVIA® XPT-3 Production

		12/2016
- Theoretical:	2400	
- Peak Tests:	2,110	2,238
- Peak Hour:	14	14
- Peak Hr Tubes:	215	225
- Peak Hr Utilization:	74.7%	78.0%
- Total Test:	17,380	15,589

LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

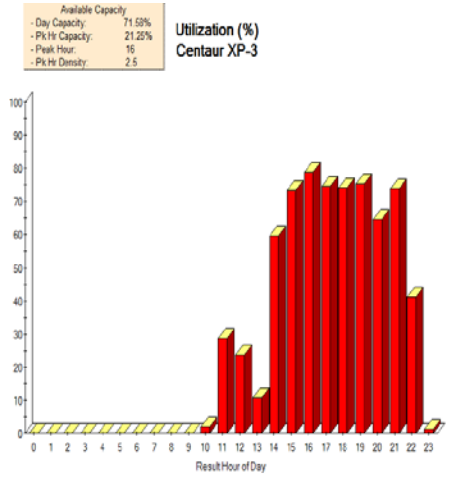
PRODUCTION DATA
CAPACITY

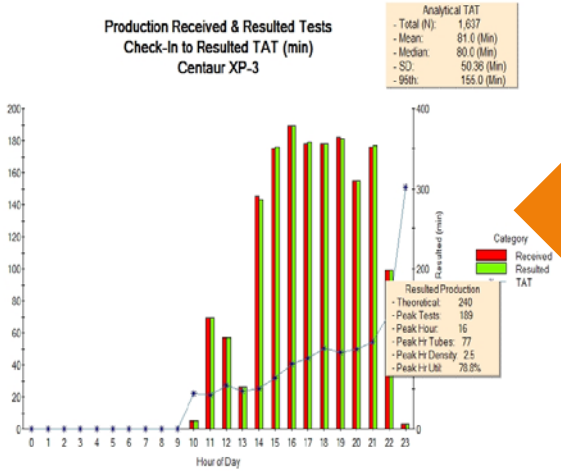




Centaur XP-2 Production — 12/2016

- Theoretical: 240		
- Peak Tests:	186	231
- Peak Hour:	19	18
- Peak Hr Tubes:	84	108
- Peak Hr Utilization:	86.3%	100%
- Total Test:	1749	1217





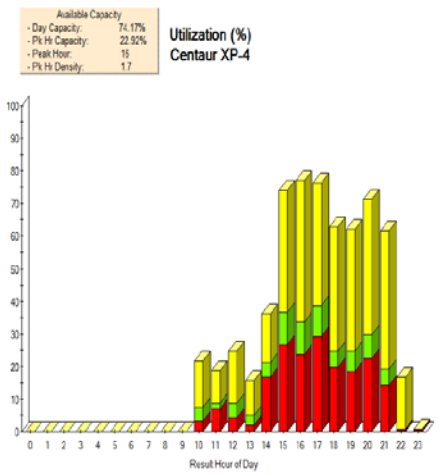
Centaur XP-3 Production — 12/2016

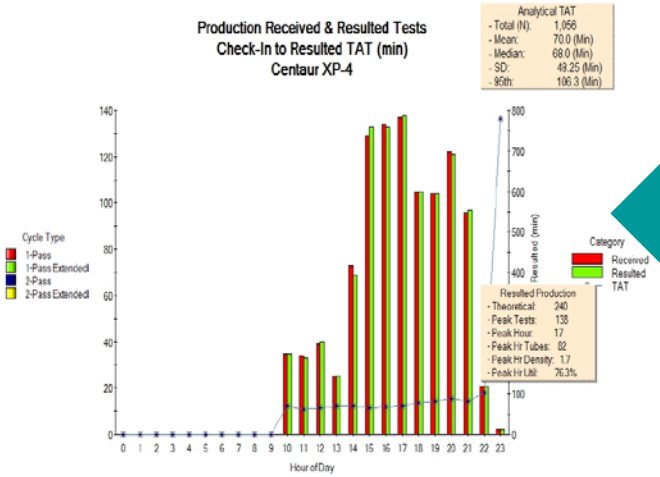
- Theoretical: 240		
- Peak Tests:	189	221
- Peak Hour:	16	18
- Peak Hr Tubes:	77	106
- Peak Hr Util:	78.8%	92.1%
- Total Test:	1637	1573

LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

PRODUCTION DATA

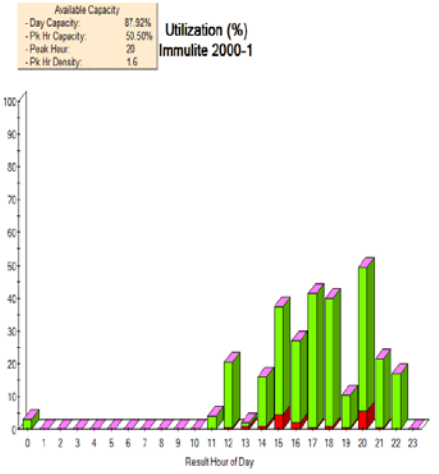
CAPACITY

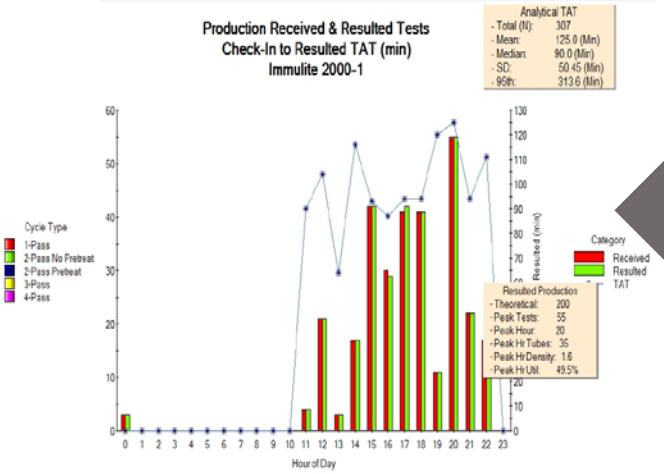




Centaur XP-4 Production

		12/2016
- Theoretical:	240	
- Peak Tests:	138	79
- Peak Hour:	17	15
- Peak Hr Tubes:	82	58
- Peak Hr Utilization:	76.3%	34.6%
- Total Test:	1,056	961



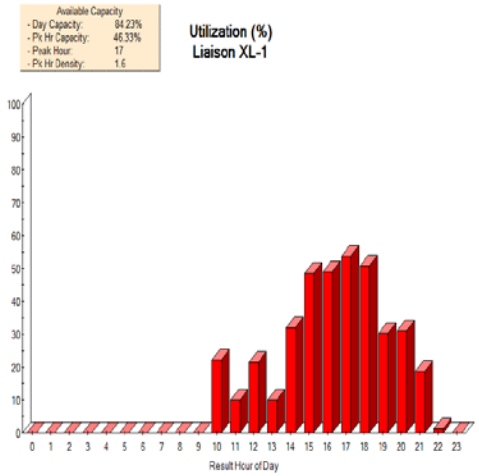


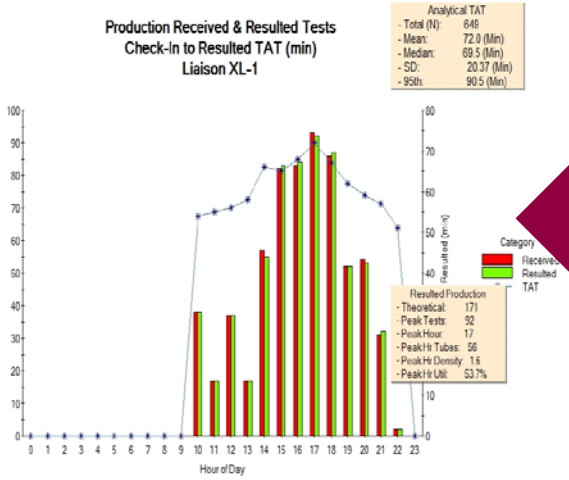
IMMULITE Production

		12/2016
- Theoretical:	200	
- Peak Tests:	55	41
- Peak Hour:	20	19
- Peak Hr Tubes:	35	26 39%
- Peak Hr Utilization:	49.5%	247
- Total Test:	307	

LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

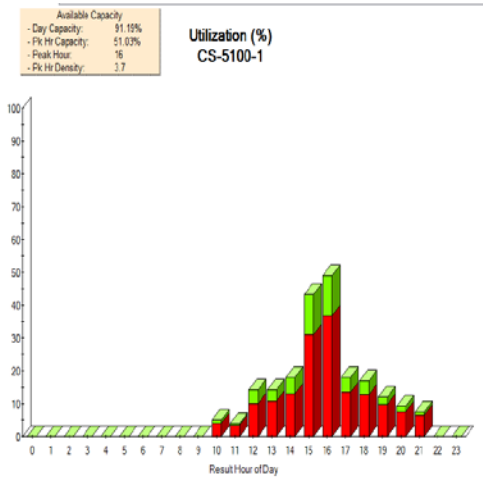
PRODUCTION DATA
CAPACITY

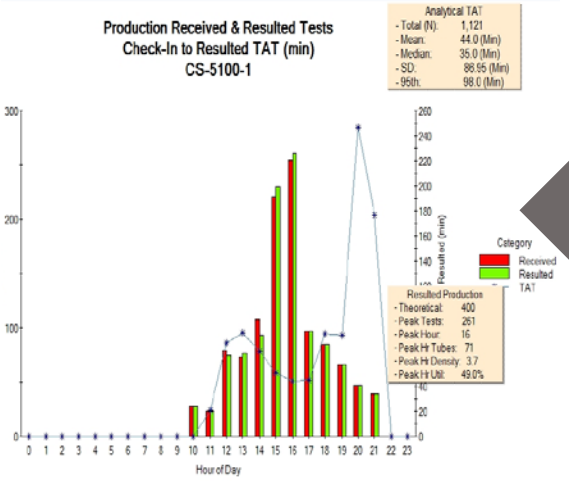




Liaison XL Production

	12/2016
- Theoretical: 171	
- Peak Tests:	92 / 90
- Peak Hour:	17 / 15
- Peak Hr Tubes:	59 / 59
- Peak Hr Utilization:	53.7% / 52.5%
- Total Test:	649 / 572



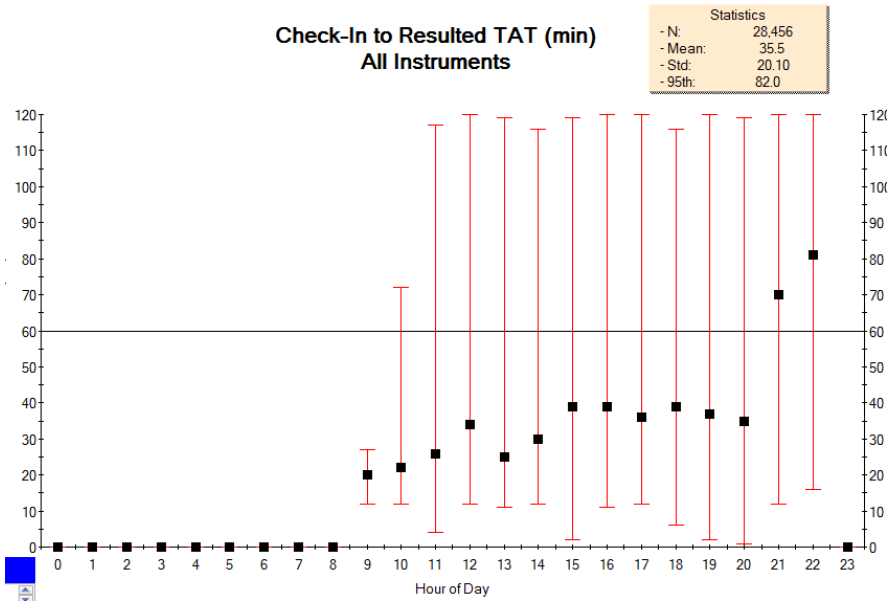


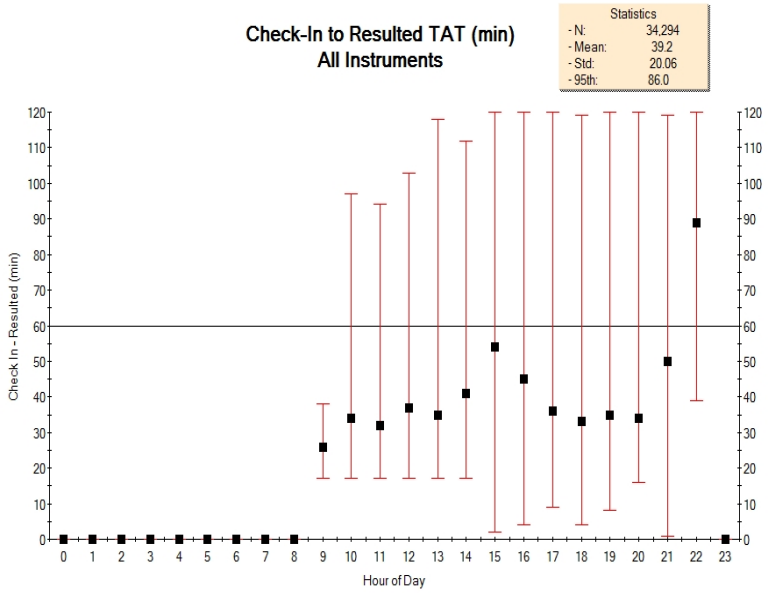
CS5100i Production

	12/2016
- Theoretical: 400	
- Peak Tests:	261 / 273
- Peak Hour:	16 / 16
- Peak Hr Tubes:	71 / 77
- Peak Hr Utilization:	49% / 51.2%
- Total Test:	1121 / 1007

LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

PRODUCTION DATA
TAT





Dec 2016

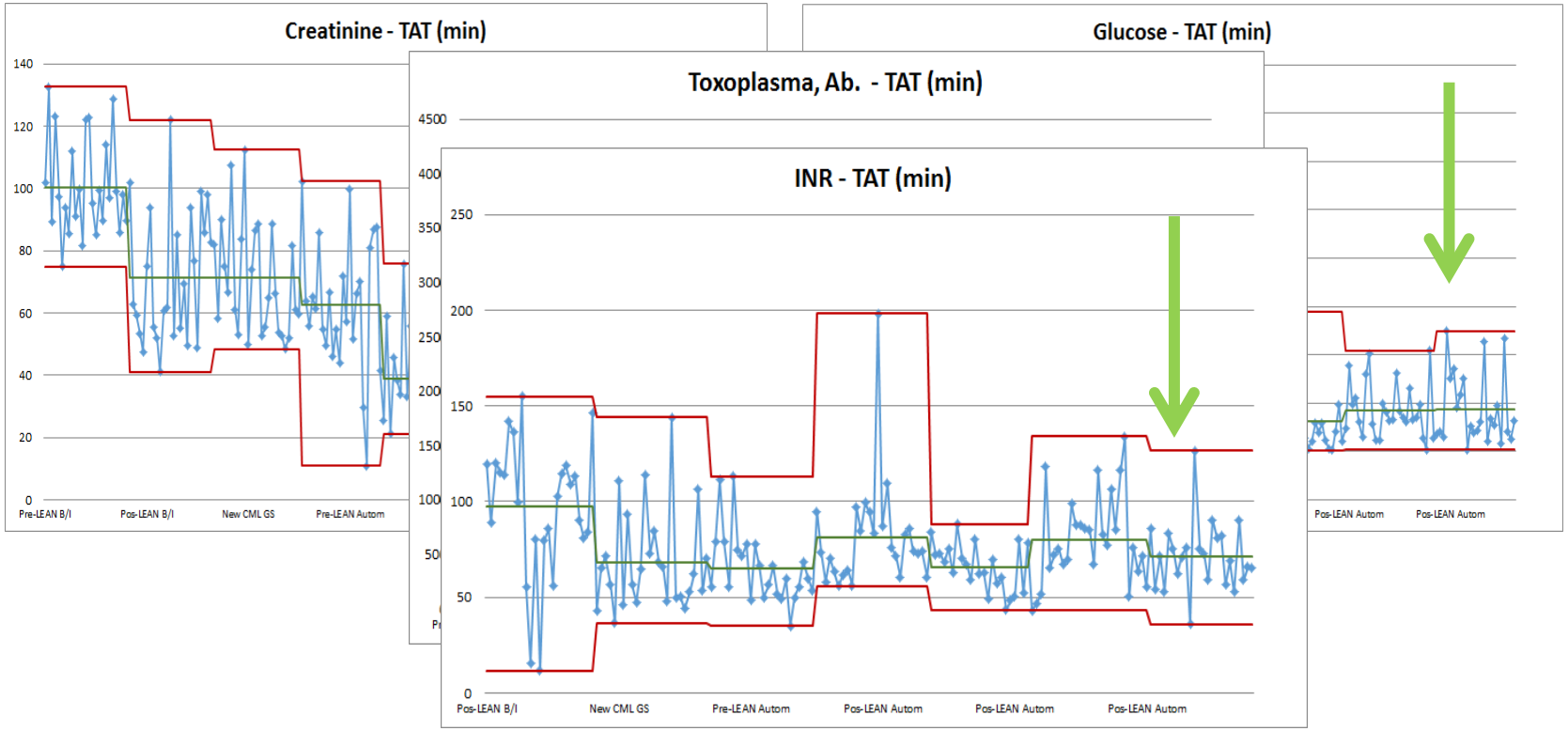
- ✓ TAT: 35.5 min
- ✓ 90 % Complete in less than 60 min
- ✓ 4.0 % re-run (4)

May 2017

- ✓ TAT: 39.2 min
- ✓ 86 % Complete in less than 60 min
- ✓ 2.5% re-run (4)

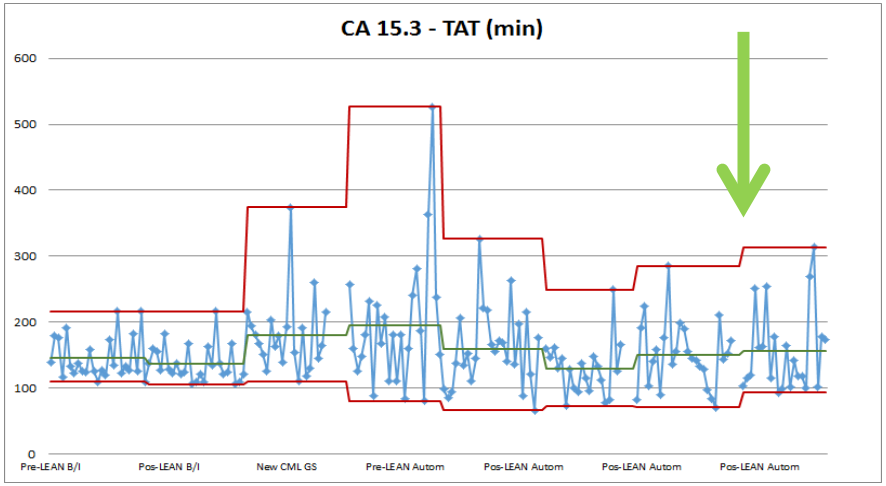
LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

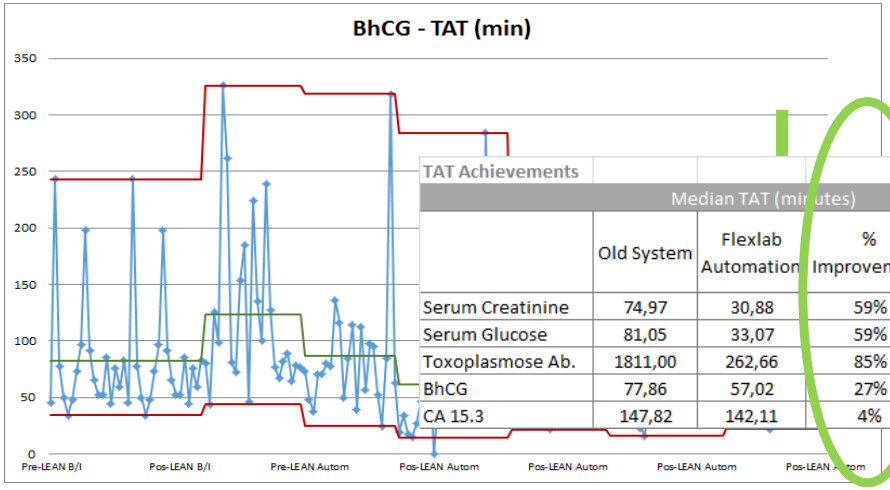
PRODUCTION DATA
TAT



LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

PRODUCTION DATA
TAT





TAT Achievements

	Median TAT (minutes)			95th Percentile (minutes)		
	Old System	Flexlab Automation	% Improvement	Old System	Flexlab Automation	% Improvement
Serum Creatinine	74,97	30,88	59%	85,30	32,84	62%
Serum Glucose	81,05	33,07	59%	90,29	36,04	60%
Toxoplasmose Ab.	1811,00	262,66	85%	1969,10	348,56	82%
BhCG	77,86	57,02	27%	83,01	63,45	24%
CA 15.3	147,82	142,11	4%	162,68	155,38	4%

LEAN PROJECT
TECHNICAL RESTRUCTURING - AUTOMATION

PRODUCTION DATA
GROWTH

30 março 2016

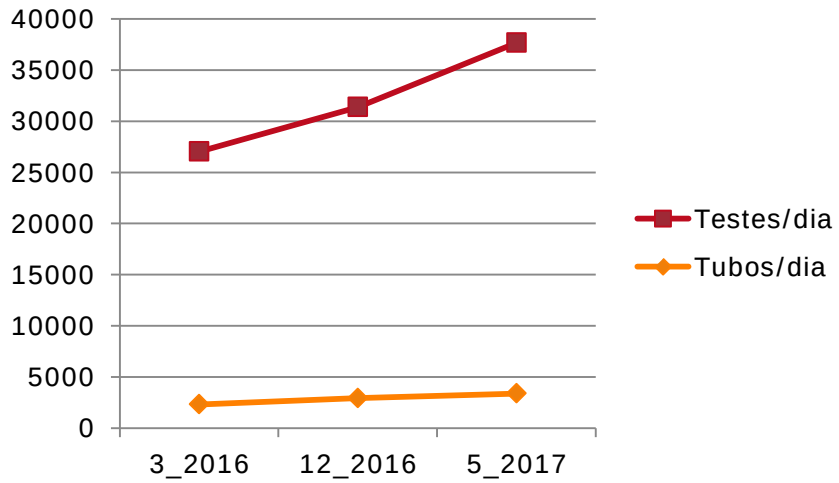
- 2,312 processed tubes
- 24,718 tests performed
- 80% serum
- 55% tubes go to 1 equipment
- Average Test / Tube: 6.5
- Peak production: 15h

5 dezembro 2016

- 2,927 processed tubes
- 28,456 tests found
- 80% serum
- 57% tubes go to 1 equipment
- Average Test / Tube: 9.7
- Peak production: 6pm

9 maio 2017

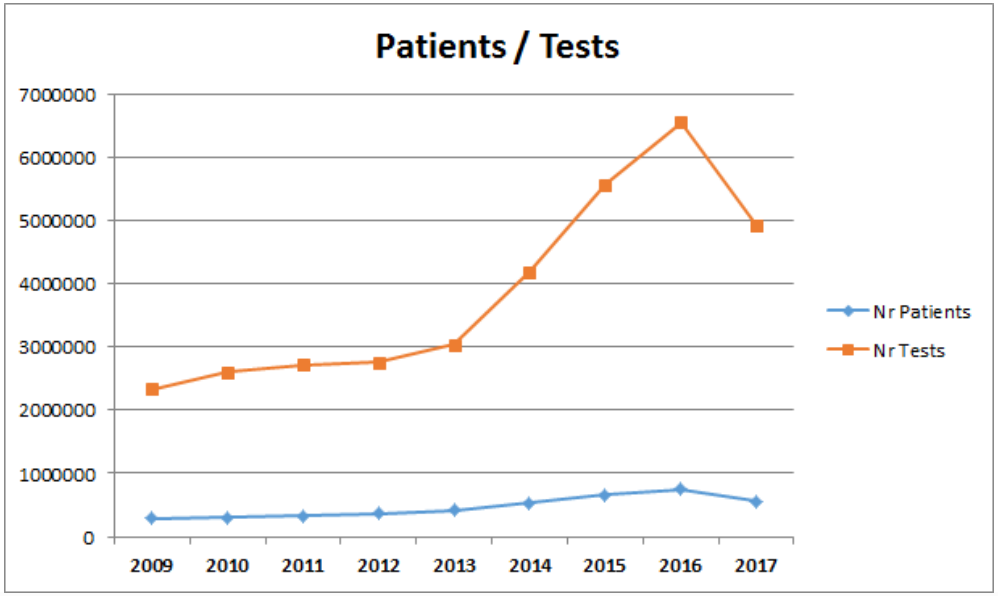
- 3,375 processed tubes
- 34,294 tests found
- 83% serum
- 58% tubes go to 1 equipment
- Average Test / Tube: 10.2
- Peak production: 16h



- Average Growth: **18% per year**
- Increased # tests / tube: **19%**

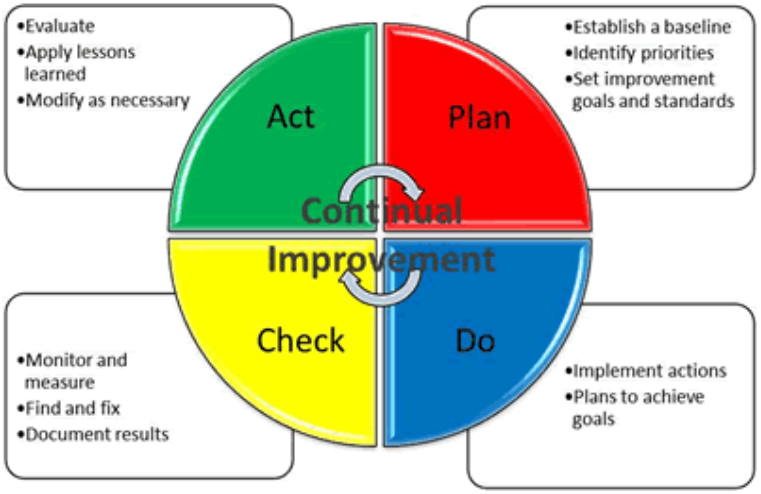
LEAN PROJECT
TECHNICAL RESTRUCTURING – AUTOMATION:
GOAL TO INCREASE PRODUCTIVITY

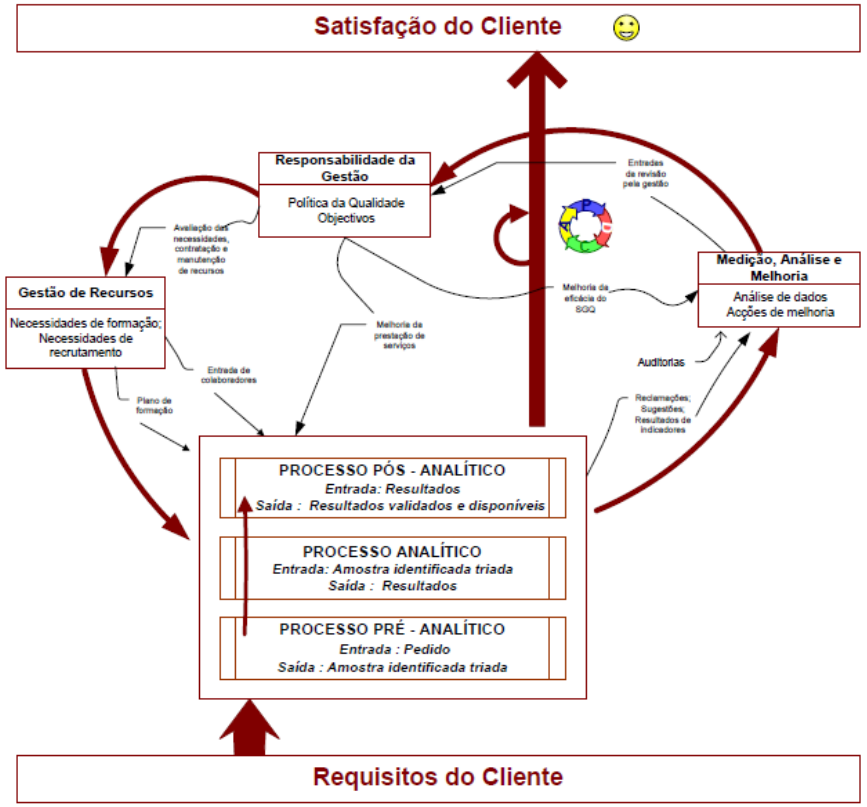
- BEFORE: Central processing lab assistants had to prioritize Promised STAT TAT: 1 hour
- LEAN: first in; first out
- **Routine** < 1 hour [average: 37 min]
- **STATS** only 8%
- Increase **Productivity** (Growth of 35% without an increase in technical costs and an increase in technical consolidation)
- Increase **Traceability**



QUALITY MANAGEMENT SYSTEM

ISO 9001





- Systematization / standardization
- Detect error and act effectively
- Accountability of the whole team
- Leadership
- Communication of results and improvements Team effort result

METRICS - MEASURE ALL PROCESSES, WHAT IS CRITICAL IN THE SYSTEM

PROCESS	ACTIVITY	METRIC	METHOD OF MEASUREMENT	OBJECTIVE	PERIODICITY
PRE-ANALYTICAL	Harvest	Repeated Crops	Repetition / Reason / Harvest Analysis	Sample Hemolysate <12%	Monthly
				Coagulated Sample <30%	
				Inadequate Proportion <5%	
				Sample Poorly conditioned <5%	
				Poorly identified sample <10%	
				Contaminated sample <1%	
				Inadequate container <20%	
				Poorly harvested harvest <15%	
	Inscription	Incorrectly entered user data	No. of processes with demographic data changed / Total number of entries	≥ 3.5 sigma	
	Triage	Non-conforming samples	No. of non-conforming samples / Total patients	≥ 4.0 sigma	
	Analysis conference	Added / canceled analyzes	Nº of analyzes added / canceled / Nº patients	≥ 3.5 sigma	

METRICS - MEASURE ALL PROCESSES, WHAT IS CRITICAL IN THE SYSTEM

REPEATED CROPS

	1st Trim 2015	2nd Trim 2015	3rd Trim 2015	4th Trim 2015	1st Trim 2016	2nd Trim 2016	3rd Trim 2016	4th Trim 2016	1th Trim 2017	2nd Trim 2017
Nº repetitions	169	328	468	452	539	397	424	449	515	561
Total patients	161,371	166,674	160,469	172,338	186,894	190,281	182,944	195,272	231,773	225,379
% repetitions	0.105	0.197	0.292	0.262	0.288	0.209	0.232	0.230	0.222	0.249
Sigma	**4.57**	**4.38**	**4.25**	**4.29**	**4.26**	**4.36**	**4.33**	**4.33**	**4.34**	**4.31**

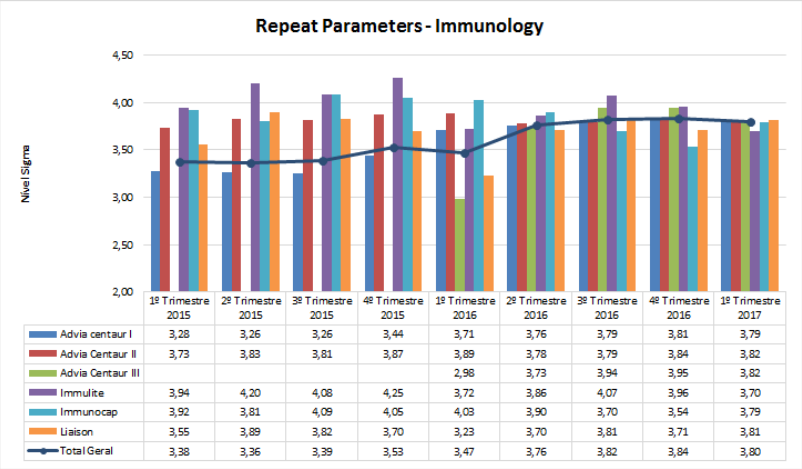
ADDED / CANCELED ANALYZES

	4th Trim 2015	1st Trim 2016	2nd Trim 2016	3rd Trim 2016	4th Trim 2016	1st Trim 2017	2nd Trim 2017
Nº of analyzes added / canceled	2317	2134	2578	2612	2895	2824	2025
Total patients	172,338	186,894	190,281	182,944	195,272	231,773	225,379
% defaults	1.344	1.142	1.355	1.428	1.483	1.218	0.898
Sigma	**3.71**	**3.78**	**3.71**	**3.69**	**3.68**	**3.75**	**3.87**

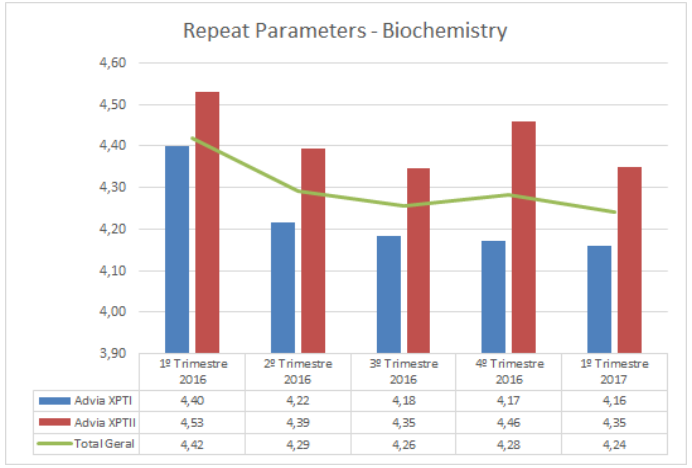
METRICS - MEASURE ALL PROCESSES, WHAT IS CRITICAL IN THE SYSTEM

PROCESS	ACTIVITY	METRIC	METHOD OF MEASUREMENT	OBJECTIVE	PERIODICITY
ANALYTICAL	Analytical Execution	Number of equipment malfunctions	Number of faults of the same type of equipment	≤ 50% of total faults	Annual
		% Calibrations / Maintenance performed	Nr. of Calibrations / Maintenance performed / Total Planned	100%	Annual
		Repeat Parameters	Método 6 Sigma (Nr. de resultados repetidos/ Total Parâmetros determinados)	≥ 3,5 Sigma [Por equipamento]	Quarterly
		IQC	Analysis of the Levey-Jennings letters according to Westgard's rules CV analysis by parameter	Westgard's rules [1:2s/1.3s] CV% Table [CLIA 2010]	Daily Monthly
		EQA	Previously defined with the Organization (NEQAS / PANEAQ-INSA / SEQC)	≥ 90% of analytes up to 2s ≥ 60% of analyzes up to 1s	According to defined programs
		Contaminated urine cultures	Rate of contaminated uroculture / Total number of uroculture applications	≤ 0.5%	Quarterly
		Positive blood cultures	Positive Hemoculture Rate / Total Nr of Hemoculture Requests	≤ 8%	Quarterly

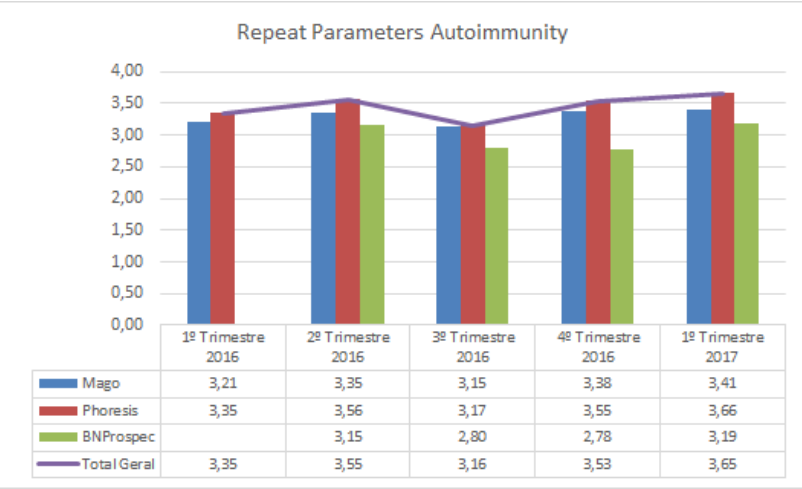
METRICS - MEASURE ALL PROCESSES, WHAT IS CRITICAL IN THE SYSTEM



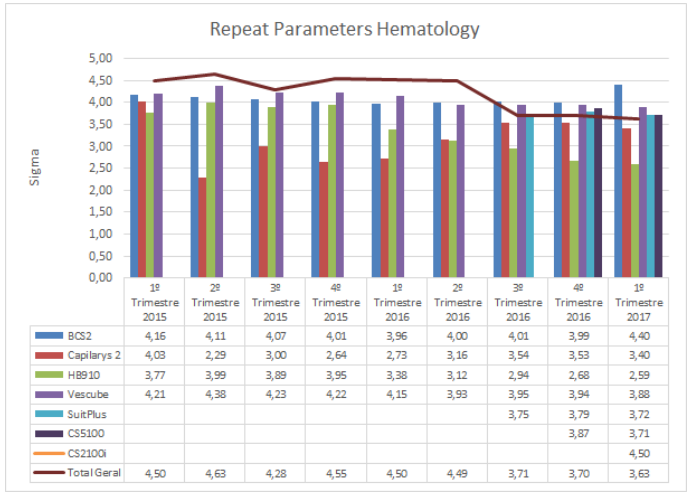
	1º Trimestre 2015	2º Trimestre 2015	3º Trimestre 2015	4º Trimestre 2015	1º Trimestre 2016	2º Trimestre 2016	3º Trimestre 2016	4º Trimestre 2016	1º Trimestre 2017
Advia centaur I	3,28	3,26	3,26	3,44	3,71	3,76	3,79	3,81	3,79
Advia Centaur II	3,73	3,83	3,81	3,87	3,89	3,78	3,79	3,84	3,82
Advia Centaur III					2,98	3,73	3,94	3,95	3,82
Immulite	3,94	4,20	4,08	4,25	3,72	3,86	4,07	3,96	3,70
Immunocap	3,92	3,81	4,09	4,05	4,03	3,90	3,70	3,54	3,79
Liaison	3,55	3,89	3,82	3,70	3,23	3,70	3,81	3,71	3,81
Total Geral	3,38	3,36	3,39	3,53	3,47	3,76	3,82	3,84	3,80



	1º Trimestre 2016	2º Trimestre 2016	3º Trimestre 2016	4º Trimestre 2016	1º Trimestre 2017
Advia XPTI	4,40	4,22	4,18	4,17	4,16
Advia XPTII	4,53	4,39	4,35	4,46	4,35
Total Geral	4,42	4,29	4,26	4,28	4,24



	1º Trimestre 2016	2º Trimestre 2016	3º Trimestre 2016	4º Trimestre 2016	1º Trimestre 2017
Mago	3,21	3,35	3,15	3,38	3,41
Phoresis	3,35	3,56	3,17	3,55	3,66
BNProspec		3,15	2,80	2,78	3,19
Total Geral	3,35	3,55	3,16	3,53	3,65



	1º Trimestre 2015	2º Trimestre 2015	3º Trimestre 2015	4º Trimestre 2015	1º Trimestre 2016	2º Trimestre 2016	3º Trimestre 2016	4º Trimestre 2016	1º Trimestre 2017
BCS2	4,16	4,11	4,07	4,01	3,96	4,00	4,01	3,99	4,40
Capilarys 2	4,03	2,29	3,00	2,64	2,73	3,16	3,54	3,53	3,40
H8910	3,77	3,99	3,89	3,95	3,38	3,12	2,94	2,68	2,59
Vescube	4,21	4,38	4,23	4,22	4,15	3,93	3,95	3,94	3,88
SuitPlus							3,75	3,79	3,72
CS5100								3,87	3,71
CS2100i									4,50
Total Geral	4,50	4,63	4,28	4,55	4,50	4,49	3,71	3,70	3,63

METRICS - MEASURE ALL PROCESSES, WHAT IS CRITICAL IN THE SYSTEM

PROCESS	ACTIVITY	METRIC	METHOD OF MEASUREMENT	OBJECTIVE	PERIODICITY
POS-ANALYTICAL	Delivery of Results	Satisfaction index	Nº of complaints / Total number of patients	≥ 4.5 Sigma	Annual
		Unconformities	Total Non-conformities / No. of patients	≥ 4 Sigma	Annual
		Delivery time	Number of Bulletins not printed (complete) in the established period / Total Bulletins	≤ 5%	Monthly

METRICS - MEASURE ALL PROCESSES, WHAT IS CRITICAL IN THE SYSTEM

DELIVERY TIME

	1st Trim 2015	2nd Trim 2015	3rd Trim 2015	4th Trim 2015	1st Trim 2016	2nd Trim 2016	3rd Trim 2016	4th Trim 2016	1st Trim 2017	2nd Trim 2017
Nr defaults	2765	4461	2419	3558	1684	1834	1401	1031	1254	1030
Total patients	161,371	166,674	160,469	172,338	186,894	190,281	182,944	195,272	231,773	225,379
% defaults Delivery time	1.713	2.676	1.507	2.065	0.901	0.964	0.766	0.528	0.541	0.457
Sigma	**3.62**	**3.43**	**3.67**	**3.54**	**3.86**	**3.84**	**3.92**	**4.06**	**4.05**	**4.10**

LEAN – FLEXLAB AUTOMATION

SATISFACTION INDEX

	1st Trim 2015	2nd Trim 2015	3rd Trim 2015	4th Trim 2015	1st Trim 2016	2nd Trim 2016	3rd Trim 2016	4th Trim 2016	1st Trim 2017	2nd Trim 2017
Nº of complaints	1	3	4	6	14	20	17	8	15	15
Total patients	161,371	166,674	160,469	172,338	186,894	190,281	182,944	195,272	231,773	225,379
% complaints	0.001	0.002	0.002	0.003	0.007	0.011	0.009	0.004	0.006	0.007
Sigma	**5.87**	**5.63**	**5.56**	**5.48**	**5.29**	**5.20**	**5.23**	**5.44**	**5.32**	**5.32**

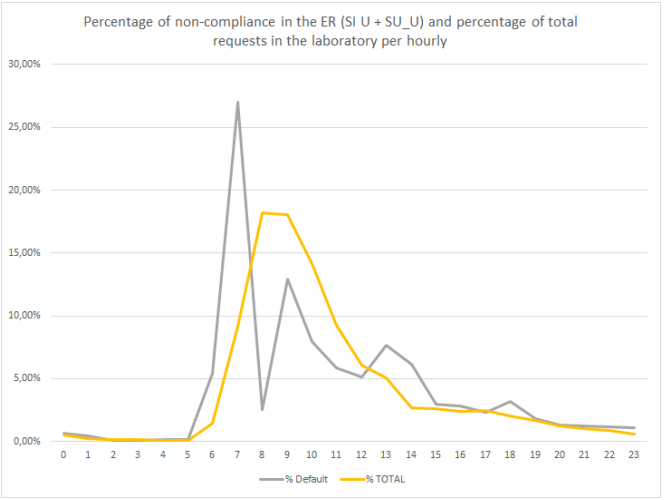
DAILY AUDIT: TAT MEASURED AS % MEETING TARGET

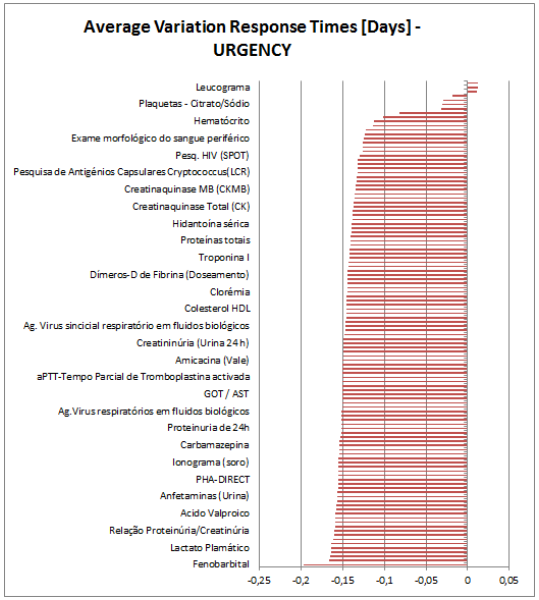
Average TAT – Emergency service

Ano: 2017
Mês: 7

Parameter

	Serviço Urgência (URG) Quant	Serviço Urgência (URG) Tempo	Serviço Urgência (ROT) Quant	Serviço Urgência (ROT) Tempo	Tempo Contratado
Acido Valproico	3	18			30
Albuminémia [Albumina sérica]	55	9			30
aPTT-Tempo Parcial de Tromboplastina activada	755	8			10
Benzodiazepinas (Pesquisa na Urina)	4	5			30
Carbamazepina	1	3			30
Creatinaquinase Total (CK)	476	10			30
Creatinina sérica [Creatininémia]	1.839	11			30
Desidrogenase Láctica-LDH (Soro)	954	11			30
Dímeros-D de Fibrina	132	14			20
Fibrinogénio [Factor I]	43	10			10
Fosfatase Alcalina [ALP]	770	12			30
Gasimetria	78	3			5
GGT (Gama-Glutamil -Transpeptidase)	1.018	12			30
Glicémia em jejum	785	11			30
GOT / AST [Aspartato Aminotransferase]	1.394	12			30
GPT / ALT [Alanina Aminotransferase]	1.334	12			30
Hemograma com Plaquetas	2.281	8			10
Ionograma sérico	1.789	11			30
Lipasémia [Lipase sérico]	148	16			30





TAT daily control

- STAT analyzes and verification of compliance with contracted times in the different Hospital laboratory units.

IN THE VANGUARD OF KNOWLEDGE

The Germano de Sousa Group today is much more than simply a network of Clinical Pathology Laboratories. It is also a research centre and a partner for professional colleagues, with whom it shares clinical and technological knowledge in a wide variety of ways.

RESEARCH

Development of various areas of research, the most recent being:

- Genetics
- Autoimmunity
- Molecular Biology
- Oncological Diagnosis

TRAINING AND EDUCATION

The Germano de Sousa Group, in partnership with the NOVA University of Lisbon - NOVA Medical School, and with Universidade Católica Portuguesa, teaches on Postgraduate and Integrated Master's courses.

HOSTING AND PARTICIPATION IN WORKSHOPS

PRODUCTION AND DISSEMINATION OF SCIENTIFIC INFORMATION

- Scientific Posters
- Newsletter
- Scientific Brochures
- Active Participation in International Research Groups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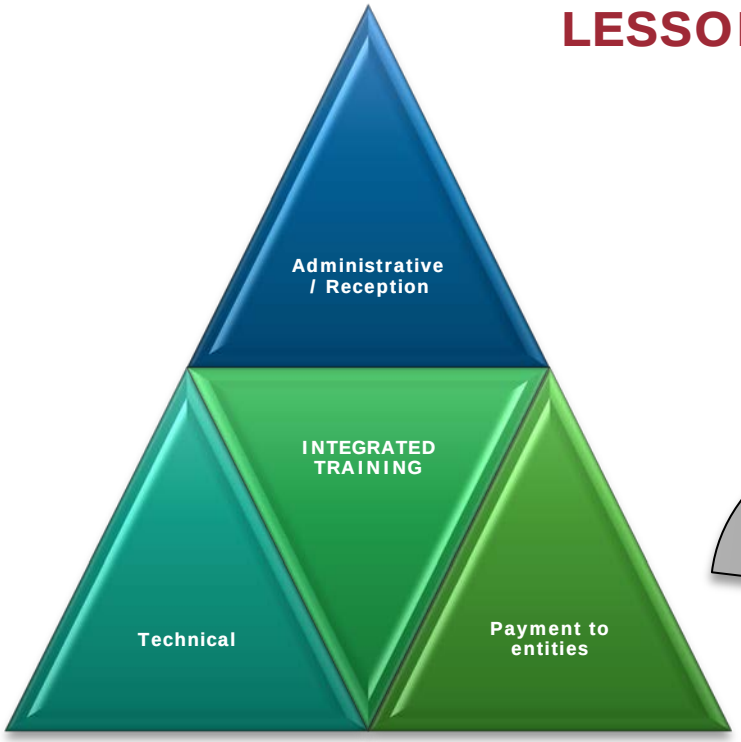
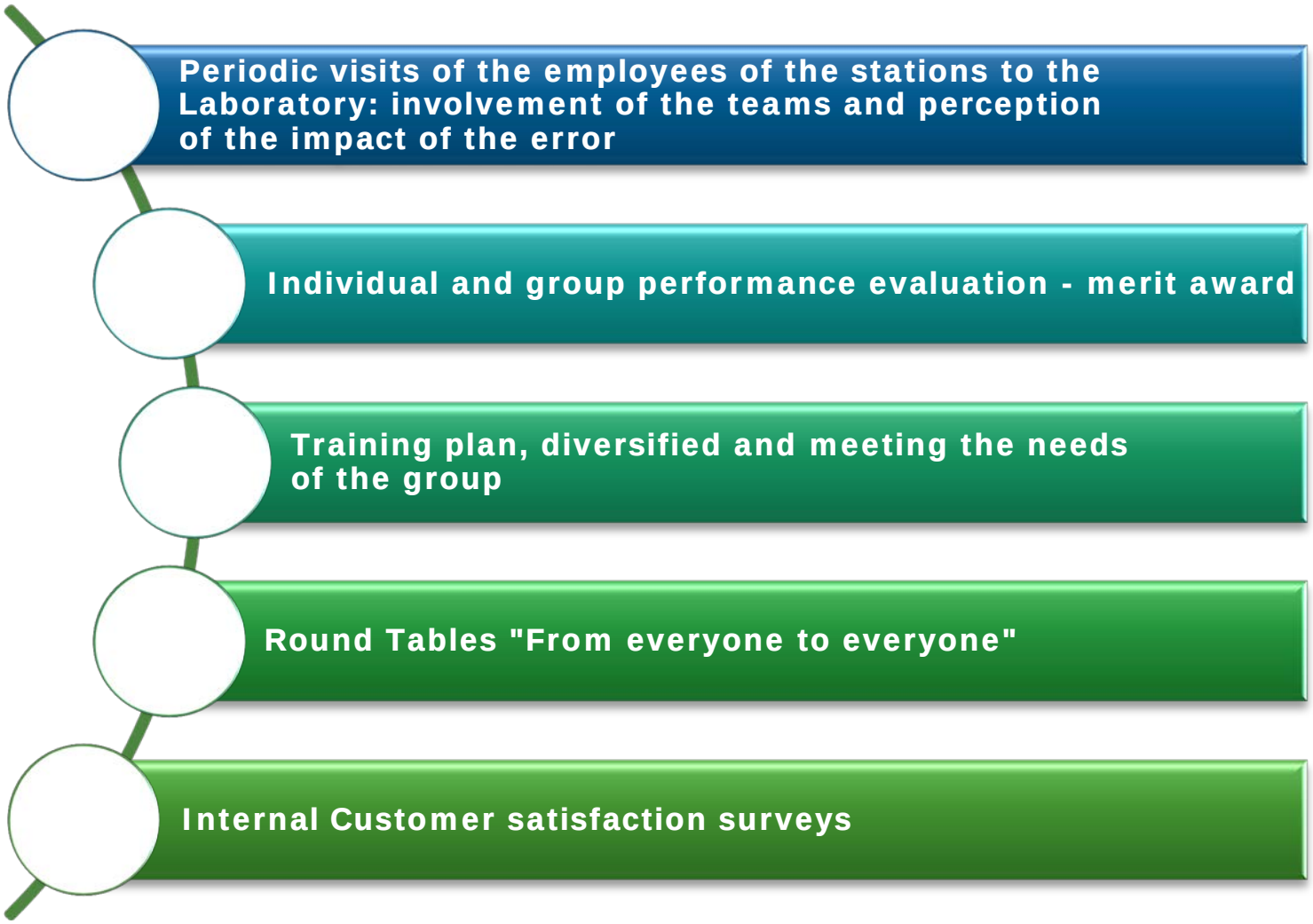
GERMANO DE SOUSA
CENTRO DE MEDICINA LABORATORIAL
Neoplasias Hematológicas
DIAGNÓSTICO E A AVALIAÇÃO DO PROGNÓSTICO
mielodisplásicas (SMD)
oplasias Mieloproliferativas (NMP)
Tumores Sólidos
ONCOGENÉTICA E OMICS
Cancro Colo-Rectal
ONCOGENÉTICA E ONCOGENÓMICA
Cancro da Mama e Ová
ONCOGENÉTICA E ONCOGENÓMICA

LESSONS LEARNED - TRAINING ACADEMY



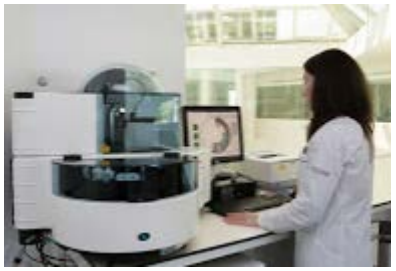
- The transmission of knowledge is a milestone in GS organization
- From the knowledge acquired, to the forefront of knowledge, effective communication with the team
- Motivation strategies to achieve strategic and operational objectives

LESSONS LEARNED - TRAINING ACADEMY



LESSONS LEARNED – MILESTONES & PRIORITIES

- Redesign core lab - leaner and more flexible
  - Requires substantial leadership and financial investment
- Rapid Process Improvement Workshops in all sections
- Facility design for lean
- Frontline point improvements
- Integration of quality, auditing, corrective action
- Cultural Change to *Lean Six Sigma* Thinking
  - Listening to people - ideas-to-improvements work
  - Involvement of people in Lean work, learn by doing
  - Focus on what really matters - the customer
    - 5S
    - Standardization
    - “Check-Act” after you “Plan-Do”
  - Continuously achieve ISO 9001 concept



THE CHANGE BEGINS WHEN SOMEONE SEES THE NEXT STEP

Scientific academy

- Consolidate education
- Increase the scientific publications of our work
- Increase as partnerships with educational institutions (colleges and institutes) - transmission of knowledge

Sustainable culture

- Consolidate new laboratory in North Country
- Full-automation of hematology in Flexlab
- Increase new equipment in Flexlab

ANTICIPATING THE FUTURE ON THE SHOULDERS OF THE PAST

City by the sea, with waves that break against the walls, admirable and where history whispers.
The western part of the city is surmounted by superimposed arches resting on marble columns. By nature, the city is beautiful.

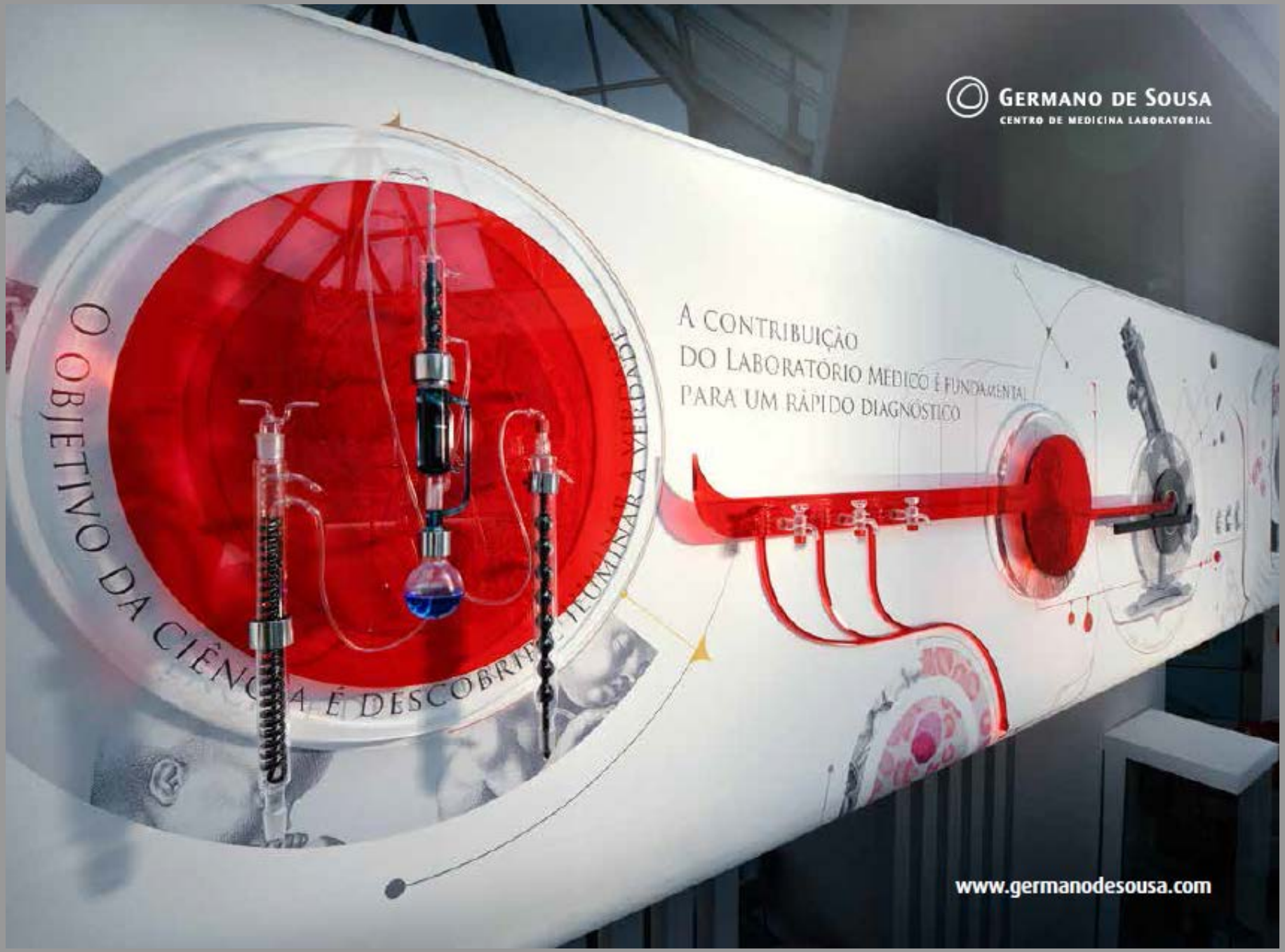
You're welcome

Group 100% Medical
100% Family
100% Portuguese

QUESTIONS?

THANK YOU!

Contact Info: Rita Ribeiro, Bioch, MSc
rribeiro@cm-lab.com
Ritacristina.ribeiro@gmail.com
www.germanodesousa.com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