

CLINICAL & DIAGNOSTIC LABORATORIES

*Operational Efficiency and Performance
Improvement Through Design Innovation*

Achieving higher volumes, shortened turnaround time, and improved accuracy

The clinical laboratory is a critical component of the diagnostic process and has immediate impact on the health and safety of patients. The importance of designing labs which optimize testing capacities, speed, and accuracy cannot be understated.

Currently there are thousands of lab test types available, with hundreds that are commonly ordered. As genetic testing continues to increase exponentially, the complexity of lab requirements requires a robust specialization in Lean planning, integration, diagnostic devices and equipment and human performance.

Fortunately, BSA's design experience and deep expertise can keep pace in this time of accelerated advancement. The following are samples of emerging trends in clinical laboratory design.



LEAN PLANNING & AUTOMATION

- Process/work flow diagrams
- Adjacency optimization
- Specimen movement
- 24/7 staff utilization
- Flexible casework and MEP
- Open concept, standardized lab modules
- Integration of automation vs. manual
- Centralized shared labs, equipment and resources



ENGINEERING & INFRASTRUCTURE

- Lower cost of owning and operating
- Sustainability
- Maximize configurability
- Maintainability
- Expandability
- Biosafety levels and ISO classifications
- Redundancy for 24/7 operations



HUMAN PERFORMANCE

- Safety: chemical, biosafety levels, fire
- Staff cross-training
- Chain of custody
- Adjustable height workstations
- Natural light
- Wellness integration
- Interactive and efficient
- Sound attenuation



Data Gathering & Analysis

BSA lab planners, operational planners and Lean strategists begin with an intense data gathering period to establish both current and projected requirements.

Determining the appropriate square footage required for a department can be a complex task and should be done by evaluating several criteria:

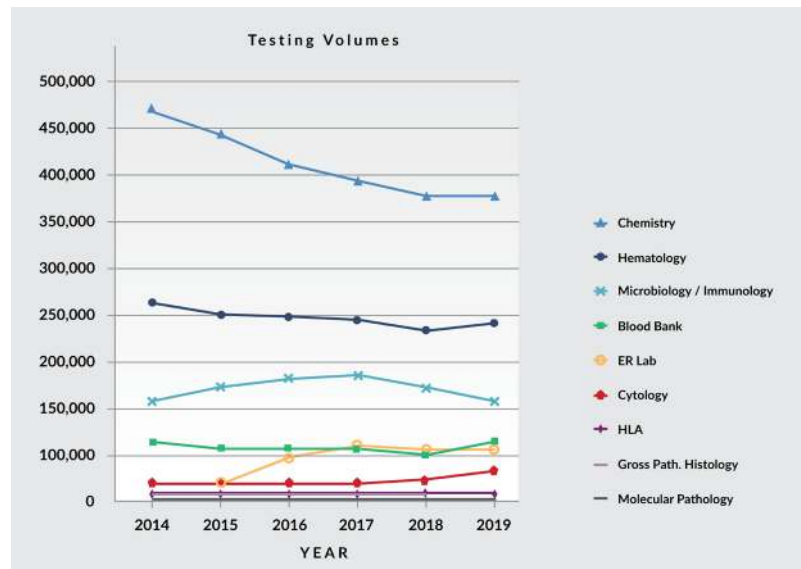
- Number of tests performed / volume capacity
- Number of FTE's and staff
- Specimen receiving, accessioning and processing
- Extent and type of manual testing
- The institution's role regionally

Lean Planning & Automation

Lean tools and strategies coupled with Six Sigma implementation processes capture and correct bottlenecks, inconsistencies and redundancies, but also optimize the workflow. These tools include:

- Specimen flow diagramming
- Process mapping
- Spaghetti mapping
- Adjacency testing
- Time and through-put charting

Description	Quantity	Approximate Dimensions		Net SF	Proposed Total NSF	Remarks	Notes
		Width	Length				
Clinical Laboratory							
Accessioning	1	28	49	1372	1372	(2) Glass Refrigerators 20 linear feet shelving	Look at combining function office accessioning
Chemistry / Toxicology	1	40	46	1840	1840	All Chemistry testing to be in (1) room	New automation line coat
Chemistry Manager Office	1	10	12	120	120		
Special Chemistry	1	30	45	1350	1350		
Urology	1	15	20	300	300		
Microbiology / Virology	1	45	50	2250	2250	Add automation. Retire antiquated equipment	
Microbiology Manager Office	1	10	12	120	120		
Blood Bank	1	30	40	1200	1200	Needs ice machine and sectioned benches	
Blood Bank Office	1	10	12	120	120		
Bone Marrow	1	12	20	240	240		
Glasswash / Autoclave	1	12	20	240	240	(1) Autoclave and (1) under counter glasswash	
Hematology / Coag / Spec. Coag / Spec. Hem	1	20	30	600	600	Incorporate (2) Coag Unit (also) to automation line	
Hemo / Coag / Toxicology Mgr Offices	3	10	12	360	360		
Phlebotomy Office	1	10	12	120	120	Includes phlebotomy cart storage	
Processing	1	37	30	1110	1110		
TB / Fungus	1	15	20	300	300		
Immunology / Cytometry	1	20	32	640	640	Requires additional bench space	
Slide Storage	1	12	15	180	180	Provide storage for (1) year of slides	
Blocked Work station PM Testing / Repair				200	200	Equipment work area, storage, work bench	
Subtotal Clinical NSF					13,182		

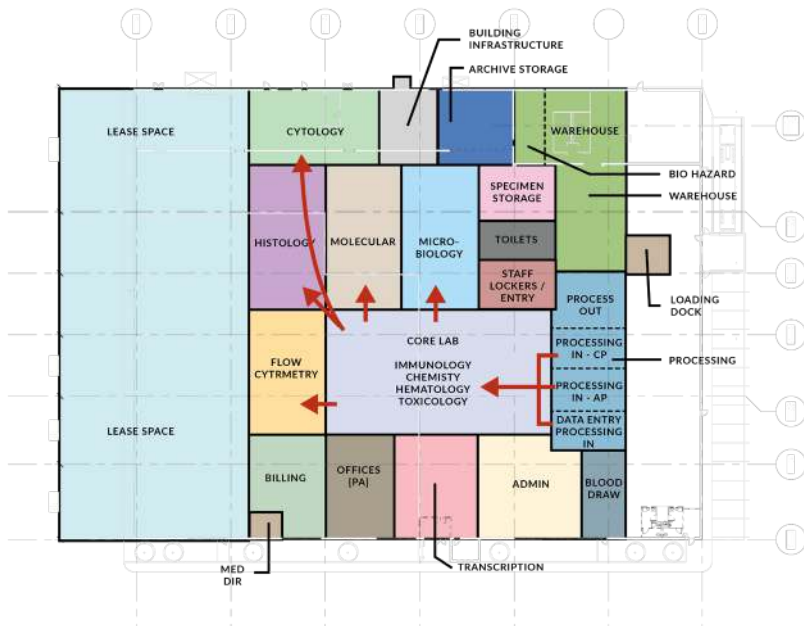


Concept Testing & Validation

This step requires in-depth knowledge of lab processes, equipment and institutional goals and commitments. As options are developed, workflow efficiencies are tested, leading to the optimal layout.

Clinical Laboratory Improvement Amendments (CLIA) regulatory standards and benchmarks from recently opened labs will validate the optimal design and help to understand the staffing and equipment needs for future testing volumes.

AT RIGHT: Clinical Plan Option One



Relevant Project Experience

INDIANA UNIVERSITY HEALTH

Clinical Laboratory Consolidation
On-site Clinical Laboratory
Special Pathogen Unit
Multiple Pathology Laboratories
Indianapolis, Indiana

COMMUNITY HEALTH NETWORK

CHE Laboratory
Indianapolis, Indiana

CHARLESTON AREA MEDICAL CENTER

EKG Blood Laboratory
Charleston, West Virginia

ST. VINCENT MEDICAL CENTER

Clinical Laboratory
Indianapolis, Indiana

CLINTON COUNTY

Laboratory and Radiology Addition
Frankfort, Indiana

MEMORIAL MEDICAL CENTER

Clinical Laboratory Building
Springfield, Illinois

MEMORIAL HOSPITAL & HEALTH CARE CENTER

Outpatient Laboratory
Laboratory Equipment Planning
Jasper, Indiana

INDIANA UNIVERSITY HEALTH TIPTON HOSPITAL

Outpatient Laboratory Expansion
Tipton, Indiana

INDIANA UNIVERSITY HEALTH BALL MEMORIAL HOSPITAL

Pathology Laboratory
Muncie, Indiana

BJC WEST COUNTY HOSPITAL

Pathology Laboratory
Creve Coeur, Missouri

COVANCE

Histology Laboratory Programming
Los Angeles, California

COVANCE

Laboratory Evaluation Study & Master Plan
Greenfield Building Renovation
Genomics Laboratory Renovation
Indianapolis, Indiana

NORTON HEALTHCARE

Clinical Laboratory Relocation
Louisville, Kentucky

SELF REGIONAL HEALTHCARE

Clinical Laboratory Relocation
Greenwood, South Carolina

PATHGROUP

Clinical Laboratory
Brentwood, Tennessee

CLINICAL PATHOLOGY LABORATORIES

Pathology Laboratory at Medical Oaks
Austin, Texas

CHILDREN'S MERCY RESEARCH INSTITUTE

Cytogenetics Laboratory
Kansas City, Missouri

MEMORIAL HEALTH SYSTEM

Taylorville Memorial Hospital
Clinical Laboratories
Springfield, Illinois

UNIVERSITY OF NEBRASKA MEDICAL CENTER

Diagnostics Laboratory Renovation
Omaha, Nebraska

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