The 2012 Core Facility Benchmarking Study

Conducted by iLab Solutions

August 2, 2012
Table of Contents

INTRODUCTION ........................................................................................................................................... 3
DISTRIBUTION .................................................................................................................................................. 4
RESULTS OF MULTIPLE CHOICE AND QUANTITATIVE QUESTIONS .......................................................... 5
  CUSTOMER GROWTH .................................................................................................................................. 5
  CALCULATING RATES ................................................................................................................................. 5
  CHARGING AND CORE ACTIVITIES ........................................................................................................... 6
  OPERATIONAL TOOLS & UTILIZATION ..................................................................................................... 6
  FUNDING AND EXPENSES ....................................................................................................................... 10
SUMMARY OF OPEN-ENDED SURVEY RESPONSES .................................................................................. 11
ABOUT ILAB .................................................................................................................................................. 12
APPENDIX A (DETAILS OF OPEN-ENDED SURVEY RESPONSES) ............................................................. 13
APPENDIX B (COMPARISON CHARTS OF ILAB’S 2011 AND 2012 BENCHMARKING STUDIES) ................ 20
APPENDIX C (COMPARISON CHARTS OF OVERALL DATA VS. FLOW CYTOMETRY CORE SPECIFIC DATA) .... 23
APPENDIX D (COMPARISON CHARTS OF OVERALL DATA VS. MICROSCOPY CORE SPECIFIC DATA) ........... 26
Introduction

iLab Solutions conducted the annual Core Facility Benchmarking Study in the first quarter of 2012. The study was based on a survey of individuals who directly manage cores, service centers, shared facilities, and recharge centers at hospitals, universities, and independent research institutions. The goals of this study are to provide an understanding of the core facility management operations practices, trends in core growth and utilization, and the biggest challenges core managers face today.

In total, 208 individual core managers and directors from over 75 institutions, representing more than 40 different core types responded to the survey. Their responses reveal a number of strong patterns in core operations:

- The rate of growth in core usage appears to have slowed substantially from 2010; only 18% of respondents saw an increase in utilization rates from 2010 to 2011, versus 64% in the period 12 months earlier; few cores experienced a decline in either period;

- The average number of customer labs served is 24 per core FTE;

- 78% of cores charge different pricing for varying customer types (e.g., internal, external, corporate);

- Most services performed are for internal customers (79%); 9% of work is for external academic customers, 4% for external corporate customers, and 8% for those with special academic relationship;

- Of cores surveyed, 64% said they adjust their rates annually;

- On average, 48% of time reported is spent on managing the core business rather than performing services for their customers or conducting independent research;

- 56% of cores said there was no tenure for core personnel at their institution. 29% said core directors have tenure, 9% said core managers of tenure, and 8% of cores surveyed said technicians have tenure;

One hundred and forty-one respondents left an open-ended comment when asked, “What are your biggest challenges as a core manager?” The most common challenges reported are:

- Meeting customer needs and effectively communicating with the customer

- Inefficient business tools and operations

- Insufficient time with increased workload

- Maintaining budgets and obtaining funding

Additional challenges mentioned involve institutional support, recruiting customers, tracking equipment usage, equipment maintenance and upgrades, tracking publications, and recruiting quality personnel.

The following pages provide an analysis of the data collected.
Distribution

iLab distributed the survey in mid-January, 2012 to administrators and core directors at hospitals, universities and research institutes, who then were asked to share the survey URL with individual core managers and directors at their institution. During this time, iLab also listed the survey on LinkedIn and the ABRF and CAN-CC listservs, and a core facility director shared the link on the Purdue Cytometry Message Board. The survey was open for 5 weeks. All data was compiled and the averages are presented in the following pages. The conclusions presented here may not represent any single core.

In total, 208 core managers and directors responded to the survey. These individuals come from over 75 institutions throughout the US, Europe and Australia and represent more than 40 core types. Nearly 25% of respondents said they manage cores with multiple scientific foci or manage multiple cores. In these cases, the responses were only counted once for the overall survey analysis.

<table>
<thead>
<tr>
<th>Survey Response Core Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Ray Crystallography</td>
</tr>
<tr>
<td>Viral Vector</td>
</tr>
<tr>
<td>Synthetic Chemistry</td>
</tr>
<tr>
<td>Stem Cell Research</td>
</tr>
<tr>
<td>Proteomics</td>
</tr>
<tr>
<td>Pharmacokinetics &amp; ...</td>
</tr>
<tr>
<td>Peptide Synthesis</td>
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<tr>
<td>Pathology</td>
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<tr>
<td>Nuclear Magnetic Resonance</td>
</tr>
<tr>
<td>Media Prep</td>
</tr>
<tr>
<td>Imaging / Microscopy</td>
</tr>
<tr>
<td>Hybrdoida</td>
</tr>
<tr>
<td>Histology</td>
</tr>
<tr>
<td>High Throughput Screening</td>
</tr>
<tr>
<td>Genomics</td>
</tr>
<tr>
<td>Flow Cytometry / Cell Sorting</td>
</tr>
<tr>
<td>EH&amp;S / Waste Management</td>
</tr>
<tr>
<td>Clinical Research</td>
</tr>
<tr>
<td>Cell Processing</td>
</tr>
<tr>
<td>BioRepository</td>
</tr>
<tr>
<td>BioInformatics / Computational...</td>
</tr>
<tr>
<td>Antibody Development</td>
</tr>
<tr>
<td>Animal Facility</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

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1 Comparison charts of overall data vs. Flow Cytometry and Microscopy core specific data can be found in Appendix C and Appendix D.

Results of Multiple Choice and Quantitative Questions

CUSTOMER GROWTH

Customers: 60% of cores reported growth in their customer base from 2010 to 2011. On average, 24 PIs/labs are served per core facility FTE.

In terms of customer activity, most cores (76%) report that their largest customer accounts for less than 25% of their work, whereas 9% of cores said a single customer accounts for more than half of their services delivered.

Relative to last year’s survey, the percentage of cores enjoying an increase in customers was similar, although the rates of growth reported this year were lower than last year.

As reflected in the open-ended comments at the end of this report, customer communication for recruiting and meeting customer needs continues to be one of the biggest challenges core managers face today.

CALCULATING RATES

Service Rates: We asked core directors and managers what kinds of costs they consider when calculating rates. 78% of cores surveyed reported they charge different pricing for varying customer types.

- Over 90% of cores consider salaries, fringe benefits, maintenance, and depreciation in calculating internal rates.
- 100% of cores who consider carry-over deficit or surplus from the prior year said they include that number when calculating rates for internal customers.
- 78% of cores charge different rates for other kinds of customers:
  - Over 80% of cores offer a subsidized rate for cancer center, program or department membership

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3 Comparison charts for the 2011 and 2012 Benchmarking Studies can be viewed in Appendix B.
4 In the US, depreciation excluded from calculations for equipment purchased with federal funding.
o 83% of cores consider Facilities and Administrative costs when setting external rates
o 100% of cores with corporate customers reported that they add a private industry surcharge when considering corporate customer rates.

Rate Change Frequency: 64% of cores said they modify their service rates annually, 5% said semi-annually, and 18% indicated “other”, which was explained in open-ended comments with responses such as 3 yrs, 5 yrs, and as needed. 13% of respondents said they have never changed their rates.

CHARGING & CORE ACTIVITIES

Customer Type: Cores most commonly serve customers internal to their institution. On average, internal customers represented 79% of the work performed in 2011. Services for external academic customers or those with special academic relationships accounted for 17%, and 4% for corporate customers.

Time Spent: Core managers reported that in 2011 the majority of their time was spent on conducting services for customers (52 hrs per month) and conducting independent research (36 hrs per month). This reflects a 38% increase in average hours spent on independent research as compared to 2010. Additionally, there is a 7% decrease in average hours spent on conducting services for customers.

Although, the majority of time continues to be on research related activities, cores indicated that nearly half of their time (48%) is spent on managing the core business, including managing budgets, tracking and managing requests, conducting billing, and reporting.

In Appendix A of this report, core managers cite having enough time to balance all the aspects of running a core as one of their biggest challenges.

OPERATIONAL TOOLS & UTILIZATION

Business Tools: As demonstrated in the following charts, the spreadsheet is the most common method that cores use to manage business operations, such as tracking equipment usage, billing and invoicing, tracking workflow, creating usage reports, and managing the budget. In regards to soliciting customer
feedback, in 2011 there was a 14% increase in the use of surveys; although, ad hoc solicitation is still the top method used by cores.

Marketing the Core: Cores tend to use multiple marketing channels for generating new customers. The two most prominent marketing tools are word of mouth (85%) and having a core website (83%). Other significant ways cores market their services include email distribution lists (45%), on-site posters or flyers (42%), and conferences (33%).

Receiving Customer Requests: On average, cores received 77% of their service requests or reservations by email. Other important methods include in-person conversations (54%), phone (49%), and website e-form (47%).
Equipment Recharge: For equipment based cores, 54% said they base recharge on actual equipment usage. 9% said they charge for only scheduled time on equipment, and 37% said recharge is based on a combination of actual and scheduled usage.

Manually entering and calculating data for instrument usage tracking and billing are cited as some cores biggest challenges as reflected in the open-ended response section at the end of this report.

Utilization Rate: A majority of respondents (73%) reported no change in utilization rate from 2010 to 2011, and a much lower (18%) reported an increase of change in utilization rate. This dramatically differs from 2009 to 2010, where 28% of respondents reported no change in utilization and 64% reported an increase.

Equipment Repairs: 68% of cores surveyed use service contracts for equipment maintenance and repairs. 17% said they use an external vendor on a per-service basis, and 15% said they have dedicated internal technical staff that maintain and repair the core equipment.

In Appendix A of this report, core managers cited equipment maintenance and upgrades as well as overall core operations as some of their biggest challenges in running their cores.
Tracking Published Research: The most commonly reported method of tracking publications is manually combing PubMed and other publications at 31%. The second most common method is surveying PI’s at 24%. 6% of cores reported they use a customer-built system by their institution. Another 6% say they rely on their institution to track publications for them. Finally, 33% of respondents said their cores do not track research publications at this time.

Process Satisfaction: 54% of respondents reported being satisfied or very satisfied with their cores processes and tools. This is nearly equivalent to the sentiment from the previous year’s benchmarking survey, which found 53% of cores were satisfied or very satisfied. Very few cores expressed dissatisfaction with the tools they use to manage the core business.
FUNDING & EXPENSES

Costs: When considering total expenses\(^5\) in 2011, labor was reported as the highest cost to cores averaging 53%. The average cost of equipment was reported as 10%, 19% for maintenance, 16% for consumables, and 2% for administration tools.

Income: In 2011 the bulk of core income came from customer revenue averaging at 48% of total revenue. The secondary prominent revenue source is institutional support (such as subsidies) averaging at 33%, followed by various grants and other funding.

As noted in Appendix A of this report, finding funding support and managing budget continues to be a stress-point for core managers.

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\(^5\) Capital expenses are not included in this data.
Summary of Open-Ended Survey Responses

When looking at the BMS 2012 data, there are significant trends reflected in core facilities today. 60% of cores continue to see a growth in number of customers in 2011; although, utilization and the rate of growth appears to have slowed from 2010. As the number of customers continues to climb, so does the time spent on administrative tasks, such as managing customer details, determining rate calculations and usage variances, managing additional labor, conducting billing and invoicing, purchasing more equipment, and lining up service contracts. In fact, core managers reported that nearly half of their time was spent on managing the core business rather than research.

Based on the open-ended comments at the end of this report, core managers and directors are under intense pressure to increase revenue and perform state-of-the-art research all while trying to maintain the complex operations of a core. They are unable to easily track facility costs to charge users appropriate rates. They have minimal access to research reporting options. They have limited time with a significant workload, and there is a disconnect between core managers and administrators where more communication is needed for appropriate facility upgrades. These inefficiencies affect potential revenue, critical customer service, and the quality of research.

To better explore the biggest challenges core managers and directors face today, we asked an open-ended question of which nearly 70% of respondents left a comment. The challenges reported range from effectively communicating with the customer to inefficient tools and operations to managing budget to maintaining equipment and recruiting and maintaining quality personnel.

The open-ended survey responses can be found in Appendix A of this report.
About iLab

iLab Solutions is a leader in providing web-based management services to academic research institutions, with customers that include leading NIH-funded universities, research hospitals, and independent institutes. iLab leverages a scientific advisory team comprised of active PIs with research backgrounds from Brigham & Women’s Hospital, Dana-Farber Cancer Institute, EMBL, Harvard, Huntsman Cancer Institute, Mt. Sinai School of Medicine, Stanford University, University of Melbourne, and Yale University. The iLab leadership team includes executives with experience from Dana-Farber Cancer Institute, Deloitte, Facebook, Genentech, Intel, McKinsey, Microsoft, and SAIC.

With vast experience and a broad customer base, iLab is a stable partner for research institutions. iLab enjoys a rapidly growing customer base with greater than 100% year-on-year growth. iLab has extensive experience providing enterprise-level solutions at major research institutions. These solutions include integrations with institutional financial systems (e.g., SAP, Oracle, PeopleSoft, Lawson, Banner, IFAS, etc.) and identity management systems (e.g., Active Directory, Shibboleth, etc.). iLab’s dedicated implementation team and established implementation processes result in high adoption and fully trained personnel for effective use of the system.

In order to ensure stability, security, scalability, and responsiveness, iLab conducts all software development, application maintenance, deployment, and user support internally. This internally resourced approach results in a close relationship between iLab and our customers and ensures iLab can rapidly address customer needs.

iLab offers a suite of web-based tools for academic research management. The functionality includes core facility service request management, enhanced sample management, equipment reservation and usage tracking, billing and invoicing, reporting, and lab requisitioning and spend tracking tools. The system also allows each user a consolidated view of their recent activity in the system as well as the ability to search across all equipment, services and cores in the system.
Appendix A (Details of Open-Ended Survey Responses)\(^6\)

Q1. What are your biggest challenges?

**Recruiting Customers:**
- Having enough funded PI’s to use the equipment
- Getting researchers to utilize the facility
- Increase usage internally and externally
- Attracting new customers
- Expanding customer base
- Let more people know what we service and how well we can do for them
- Provide a service that is cost effective for the customer
- Marketing

**Customer Needs and Communication:**
- Meeting Customer’s needs
- For the moment, it is to maintain a good service despite the huge increase of demands
- Keep the overall quality in data generation from users
- Maintaining one-on-one knowledge of the experiments
- Investigator expectations
- Managing very diverse user base
- Managing expectations providing state-of-the-art research on a fee for service basis, doesn’t leave room to go beyond standard analysis
- To balance biosafety with user needs
- To make people plan ahead instead of trying to squeeze in a sort in a full schedule
- Teaching people that they need to bring controls to have a good sort or analysis
- Keeping investigators happy with pricing and service availability

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\(^6\) A majority of open-ended responses are included in Appendix A. Some responses were combined to eliminate repetition.
Q1. What are your biggest challenges? (cont.)

- Improving users knowledge of flow cytometry
- Customer training, people scheduling adequate sorting time
- Keeping customer happy with our services
- Communicating any information to customers whether it be instrument maintenance, new reagents, policy changes, bio safety information...
- Getting customers to pay
- Explaining the rate costs to investigators who think costs should be lower
- Balancing service delivery with managerial responsibilities
- Unrealistic client expectations, clients not providing necessary details or planning ahead
- Informing new investigators that the core does not make money on the services offered. That each service is offered at the exact cost that it takes to perform that service down to the last dollar

Funding:
- Billing and recovery of funds
- Funding for new equipment
- Finding funding support for the core. There are a number of interested PIs and companies interested in the service, but I am negotiating and writing many of the grants and service contracts. We do not currently support these efforts fully.
- Finding projects to use the core that have sufficient funding
- To find money to keep the core facility going
- Getting funding to purchase new equipment
- Funding to keep good personnel
- The funding for upgrading instrument, service contract and maintaining LIMS

Budget:
- Making enough income each year to cover my salary and expenses. The university only pays half my salary and contributes nothing towards the maintenance of the machines.
- Declining usage due to declining research funding.
Q1. What are your biggest challenges? (cont.)

- Obtaining money for replacement of instruments and determining fees that will cover expenses and core faculty without institutional help.
- Improve the quality of the results and equipment with the low budget that we have
- Making the facility self-supporting
- New equipment is too expensive
- To receive sufficient amount of school subsidy in order to maintain reasonable pay scale for core personnel including myself

Resources:
- Having enough instruments available at times needed
- Computer hang time

Usage:
- Anticipating usage and matching resources with a core that is fixed cost heavy (transgenic core)
- Tracking instrument usage
- Tracking and time billing
- Timely booking
- Calculating usage time
- Usage tracking and comparison of actual versus scheduled time
- Automating collection of usage data for billing and invoicing
- Tracking instrument usage and billing automatically (i.e. no manually entering data)
- Time usage optimization (less down time – more efficient use of the equipment)

Equipment Maintenance & Upgrades:
- Maintaining Equipment
- There is no plan in place to replace or purchase new equipment. We do not recover depreciation and [our institution] offers no university support for core facilities. I have no funding to purchase new equipment or to replace obsolete and outdated equipment.
- Applying new techniques using old equipment
Q1. What are your biggest challenges? (cont.)

- Hardware and computer repairs are often the biggest challenge and require immediate large time commitments. Instrument repairs can occupy between 0-100% of my work at any given time. Installations, maintenance and repairs have generally occupied between 20% and up to 70% of my time in a given year

- Many of the pieces of equipment covered do not have a charge-back mechanism and it is difficult to recover any costs associated with them

Time and Workload:
- It not being my only job. Not recognized as a core facility
- Balancing time for hands on work, tutorials, billing, literature research, gathering data for grant renewals
- Minimize time spent on budget, billing, and reports
- Finding time to focus on my own projects
- Freeing up time to provide better training and research, and to weather the financial “downturn”
- Having enough time as the only person in the core to help users, keep equipment running and have time to do everything
- Cope with user requests 35 sorts/week and requests for teaching (>100/year)
- Finding sufficient hours per day to cope with demand
- Have time for all customers
- Finding enough time in the day. As soon as the institution has core management software in place things will get better. The institute is currently exploring options
- Juggling administrative duties and customer service: finding time for both without increasing the work day prohibitively
- Finding enough time
- Time management due to limited staffing
- Time and process management
- Time to directly communicate with investigators
- Finding time to do real work
Q1. What are your biggest challenges? (cont.)

- Balancing core duties with my own research

Institutional Support

- Disconnect between administration driven by business and reality of academic not-for-profit core
- Inability to get permission from higher administration to make facility improvements
- Politics from those above who don’t understand how cores actually work
- Maintaining enthusiasm for the work we do. Reminding our institution of all the value that comes out from existing support. (we get a lot of “Yeah, but what have you done for us lately?”)
- Little internal support. Hard to get any new support and instrumentation like scopes. Uncertainty about future plans. Growth hampered...
- Coordinate with our financial department
- Instrumentation placed outside the core

Operations

- Updating internal account numbers to bill users when grants expire.
- Keeping track of work orders, invoices, time logs
- Variability of customer requests
- Simple electronic tools that can be integrated easily to streamlining QC tracking, billing, usage information and core records such as SOPs and training documents
- 1- Keeping up with the technologies. 2- Establishing a fair pricing structure. 3- Managing a group of 18
- Keeping up with the paperwork issues well enough to track core growth while maintaining a small core staff
- System to handle request, scheduling, reporting and billing
- Software for billing and invoicing and software for scheduling participant visit or use of equipment
- Billing, usage report generation, equipment funding
- Integrating data management and work flows with core operation work flows
- Tracking customer project completion and billing
Q1. What are your biggest challenges? (cont.)

- No good LIMS system to recruit, track and report
- Billing, data entry
- Adapting management model for laboratory cores to be non-lab cores, where personnel are our ‘tools’
- Some systems are automated, others are not and there are a few handshakes between these
- Multiple authoritative data sources, which are not integrated nor available to make is a nightmare to stay on top of core ops; need customer self-service for some of these reporting needs and institution is slow to resource this effort
- Setting rates
- Balancing the chargeback rates/budget to ensure that we are not “priced out” of business
- Keeping up with billing
- Either balancing the demand for services when demand is high or creating new business when demand is low.
- Putting out fire and then having to deal with administrative duties

Other:
- Tracking publications
- Keeping up with publications
- Too much negative pressure
- Learning the business

Q2. Is there anything else you would like us to know?

- I feel that in order to keep running costs down, that I cannot perform experiments of my own, i.e., protocol development, and that I am losing skills as a result.
- I wish billing and reporting is fully computerized for my facility. It is especially important to implement charges for the booked/unused time.
- For us, it would be interesting to know more about instrument/operator relations.
- A major issue is the lack of comprehensive plan for core facilities by my institution.
Q2. Is there anything else you would like us to know? (cont.)

- A uniform system of core facility pricing would be nice.

- I don’t have a specific budget; so, I don’t know how much I can spend on upgrading and developing. I don’t get feedback on budget; so, I don’t know if I spend too much or too little.

- My services have been for free, when customers must pay, they are reluctant to submit projects.

- We are a smaller institution but we have a fairly up to date flow core with 3 analyzers and one cell sorter. I work alone with a very part time back up so I am managing everything from training, billing, sorting and all computer training and maintenance. At the very least, it would be nice if IT were more competent when it came to data storage and knew how much to manage various types of analysis software in research institution.

- We have very little support and struggle to afford service contracts. We have to be self-sufficient in the coming years, which is a real concern.

- I think the toughest challenge is managing the tension between innovation and supporting existing work.

- Full NMR service contracts for all our equipment would cost over 150k/year, this does not include user training or application support.

- We need a tracking software tool that does not interfere with the high-end imaging software. used on a routine basis. I would like to track off a server so I could use a remote computer.

- Thank you for the opportunity to participate in this survey.

- As a disclaimer we are currently looking at your products as a LIMS/billing solution.

- We are currently investigating core facility software packages.
Appendix B (Comparison charts of iLab’s 2011 and 2012 Benchmarking Studies)

Charts with no date specified are solely reflective of the 2012 Benchmarking Study Data.
Appendix C (Comparison charts of overall data vs. Flow Cytometry Core specific data)

Change in Customer Growth

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<thead>
<tr>
<th>Overall</th>
<th>Flow Cytometry only</th>
</tr>
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<tbody>
<tr>
<td>Increase</td>
<td>18%</td>
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<tr>
<td>Decrease</td>
<td>6%</td>
</tr>
<tr>
<td>No Change</td>
<td>73%</td>
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<tr>
<td>Don't Know</td>
<td>71%</td>
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Change in Utilization Rate

<table>
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<tr>
<th>Overall</th>
<th>Flow Cytometry only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase</td>
<td>18%</td>
</tr>
<tr>
<td>Decrease</td>
<td>6%</td>
</tr>
<tr>
<td>No Change</td>
<td>73%</td>
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<tr>
<td>Don't Know</td>
<td>71%</td>
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</table>

Rate Calculation Method

<table>
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<tr>
<th>Overall</th>
<th>Flow Cytometry only</th>
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<tbody>
<tr>
<td>Internal calculation</td>
<td>59%</td>
</tr>
<tr>
<td>Competitor research</td>
<td>21%</td>
</tr>
<tr>
<td>Software tool</td>
<td>6%</td>
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<tr>
<td>External consultant</td>
<td>3%</td>
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</table>

Average Usage by Customer Type

<table>
<thead>
<tr>
<th>Overall</th>
<th>Flow Cytometry only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>79%</td>
</tr>
<tr>
<td>External academic</td>
<td>9%</td>
</tr>
<tr>
<td>Corporate</td>
<td>9%</td>
</tr>
<tr>
<td>Special academic relationship (e.g., Cancer Center)</td>
<td>8%</td>
</tr>
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Pricing Based on Customer Type?

<table>
<thead>
<tr>
<th>Overall</th>
<th>Flow Cytometry only</th>
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<tbody>
<tr>
<td>Yes</td>
<td>78%</td>
</tr>
<tr>
<td>No</td>
<td>16%</td>
</tr>
<tr>
<td>Do not charge for services</td>
<td>6%</td>
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Average Hours Spent Each Month

<table>
<thead>
<tr>
<th>Overall</th>
<th>Flow Cytometry only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Customers</td>
<td>58%</td>
</tr>
<tr>
<td>Conducting independent research</td>
<td>36%</td>
</tr>
<tr>
<td>Managing / tracking requests</td>
<td>15%</td>
</tr>
<tr>
<td>Organizing / searching inventory</td>
<td>13%</td>
</tr>
<tr>
<td>Billing / invoicing / validating grants</td>
<td>9%</td>
</tr>
<tr>
<td>Marketing / advertising</td>
<td>6%</td>
</tr>
<tr>
<td>Generating reports</td>
<td>4%</td>
</tr>
<tr>
<td>Managing budgets</td>
<td>10%</td>
</tr>
<tr>
<td>Education / training</td>
<td>16%</td>
</tr>
</tbody>
</table>
**Tools Used to Track Workflow**

- **Overall**
  - Excel: 32%
  - Simple database: 9%
  - Institutionally provided: 10%
  - Specifically endorsed: 10%
  - Manual: 17%
  - None: 15%

- **Flow Cytometry**
  - Excel: 32%
  - Simple database: 9%
  - Institutionally provided: 10%
  - Specifically endorsed: 10%
  - Manual: 17%
  - None: 15%

**Tools Used to Create Usage Reports**

- **Overall**
  - Excel: 59%
  - Simple database: 12%
  - Institutionally provided: 16%
  - Specifically endorsed: 5%
  - Manual: 3%
  - None: 8%

- **Flow Cytometry**
  - Excel: 61%
  - Simple database: 12%
  - Institutionally provided: 16%
  - Specifically endorsed: 5%
  - Manual: 3%
  - None: 8%

**Tools Used to Track Equipment Usage**

- **Overall**
  - Excel: 29%
  - Simple database: 9%
  - Institutionally provided: 16%
  - Specifically endorsed: 18%
  - Manual: 18%
  - None: 14%

- **Flow Cytometry**
  - Excel: 33%
  - Simple database: 16%
  - Institutionally provided: 18%
  - Specifically endorsed: 18%
  - Manual: 14%
  - None: 1%

**Tools Used for Billing & Invoicing**

- **Overall**
  - Excel: 33%
  - Simple database: 10%
  - Institutionally provided: 21%
  - Specifically endorsed: 20%
  - Manual: 5%
  - None: 10%

- **Flow Cytometry**
  - Excel: 38%
  - Simple database: 12%
  - Institutionally provided: 21%
  - Specifically endorsed: 20%
  - Manual: 5%
  - None: 13%

**Tools Used for Managing the Budget**

- **Overall**
  - Excel: 54%
  - Simple database: 3%
  - Institutionally provided: 25%
  - Specifically endorsed: 25%
  - Manual: 7%
  - None: 8%

- **Flow Cytometry**
  - Excel: 32%
  - Simple database: 3%
  - Institutionally provided: 24%
  - Specifically endorsed: 24%
  - Manual: 0%
  - None: 9%

**Tools Used to Track Publications**

- **Overall**
  - Custom-built system by the core: 2%
  - Custom-built system by the institution: 4%
  - Survey of PIs: 24%
  - Manually combing PubMed and common publications: 31%
  - Do not track: 33%

- **Flow Cytometry**
  - Custom-built system by the core: 3%
  - Custom-built system by the institution: 3%
  - Survey of PIs: 29%
  - Manually combing PubMed and common publications: 32%
  - Do not track: 33%
Appendix D (Comparison charts of overall data vs. Microscopy Core specific data)

Change in Customer Growth

<table>
<thead>
<tr>
<th>Overall</th>
<th>Microscopy only</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% fewer customers</td>
<td>0%</td>
</tr>
<tr>
<td>25-50% fewer customers</td>
<td>10%</td>
</tr>
<tr>
<td>0-25% fewer customers</td>
<td>27%</td>
</tr>
<tr>
<td>Same as previous year</td>
<td>11%</td>
</tr>
<tr>
<td>0-25% more customers</td>
<td>47%</td>
</tr>
<tr>
<td>25-50% more customers</td>
<td>1%</td>
</tr>
<tr>
<td>More than 50% more customers</td>
<td>3%</td>
</tr>
<tr>
<td>Did not operate last year</td>
<td>1%</td>
</tr>
</tbody>
</table>

Change in Utilization Rate

<table>
<thead>
<tr>
<th>Overall</th>
<th>Microscopy only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase</td>
<td>18%</td>
</tr>
<tr>
<td>Decrease</td>
<td>6%</td>
</tr>
<tr>
<td>No Change</td>
<td>73%</td>
</tr>
<tr>
<td>Don't Know</td>
<td>63%</td>
</tr>
</tbody>
</table>

Rate Calculation Method

<table>
<thead>
<tr>
<th>Overall</th>
<th>Microscopy only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal calculation</td>
<td>59%</td>
</tr>
<tr>
<td>Competitor research</td>
<td>63%</td>
</tr>
<tr>
<td>Software tool</td>
<td>21%</td>
</tr>
<tr>
<td>External consultant</td>
<td>24%</td>
</tr>
</tbody>
</table>

Average Usage by Customer Type

<table>
<thead>
<tr>
<th>Overall</th>
<th>Microscopy only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>79%</td>
</tr>
<tr>
<td>External academic</td>
<td>67%</td>
</tr>
<tr>
<td>Corporate</td>
<td>9%</td>
</tr>
<tr>
<td>Special academic relationship (e.g., Cancer Center)</td>
<td>5%</td>
</tr>
</tbody>
</table>

Pricing Based on Customer Type?

<table>
<thead>
<tr>
<th>Overall</th>
<th>Microscopy only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>78%</td>
</tr>
<tr>
<td>No</td>
<td>16%</td>
</tr>
<tr>
<td>Do not charge for services</td>
<td>12%</td>
</tr>
</tbody>
</table>

Average Hours Spent Each Month

<table>
<thead>
<tr>
<th>Overall</th>
<th>Microscopy only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Customers</td>
<td>52</td>
</tr>
<tr>
<td>Conducting Independent Research</td>
<td>43</td>
</tr>
<tr>
<td>Managing tracking requests</td>
<td>36</td>
</tr>
<tr>
<td>Organizing searching inventory</td>
<td>18</td>
</tr>
<tr>
<td>Billing invoicing validating grants</td>
<td>15</td>
</tr>
<tr>
<td>Marketing advertising</td>
<td>4</td>
</tr>
<tr>
<td>Generating reports</td>
<td>15</td>
</tr>
<tr>
<td>Managing budgets</td>
<td>7</td>
</tr>
<tr>
<td>Education training</td>
<td>67</td>
</tr>
<tr>
<td>Average</td>
<td>16</td>
</tr>
</tbody>
</table>

Internal | 79% |
| External | 67% |
| Academic | 9% |
| Corporate | 5% |

Increase Decrease No Change Don't Know
Common Methods for Receiving Requests

- **Email**: 31% (Overall), 29% (Microscopy only)
- **Website**: 19% (Overall), 19% (Microscopy only)
- **In-person**: 22% (Overall), 22% (Microscopy only)
- **Phone**: 22% (Overall), 8% (Microscopy only)
- **Paper form**: 8% (Overall), 7% (Microscopy only)
- **None**: 0% (Overall), 0% (Microscopy only)

Method Used for Soliciting Customer Feedback

- **Website**: 4% (Overall), 3% (Microscopy only)
- **Email**: 22% (Overall), 27% (Microscopy only)
- **Ad hoc (informal conversations)**: 37% (Overall), 55% (Microscopy only)
- **Comment box (pencil and paper)**: 0% (Overall), 0% (Microscopy only)
- **Survey**: 29% (Overall), 32% (Microscopy only)
- **None**: 9% (Overall), 1% (Microscopy only)

Servicing Equipment

- **External Vendor – paid for via service contract**: 68% (Overall), 76% (Microscopy only)
- **External Vendor – paid for on a per-service basis**: 17% (Overall), 18% (Microscopy only)
- **Dedicated Internal Technical Staff**: 15% (Overall), 6% (Microscopy only)

Sources of Financial Support

- **Customer revenue**: 48% (Overall), 48% (Microscopy only)
- **Institutional support**: 33% (Overall), 41% (Microscopy only)
- **Grants to your institution for core support (e.g., NCI support grants)**: 11% (Overall), 6% (Microscopy only)
- **Grants directly to your core**: 5% (Overall), 4% (Microscopy only)
- **Other (including donor funds and other sources)**: 3% (Overall), 1% (Microscopy only)

Annual Expenses

- **Labor**: 53% (Overall), 52% (Microscopy only)
- **Equipment**: 19% (Overall), 18% (Microscopy only)
- **Maintenance contracts**: 19% (Overall), 18% (Microscopy only)
- **Consumables**: 16% (Overall), 18% (Microscopy only)
- **Administration Tools**: 2% (Overall), 2% (Microscopy only)

Averages for Facility FTE and Customers Served

- **How many TOTAL FTEs does your core facility currently have including yourself?**: 6.8 (Overall), 18.1 (Microscopy only)
- **Approximately how many PI’s or independent research labs used your services in 2011?**: 64.2 (Overall), 103.2 (Microscopy only)
- **Total Labs Served per FTE**: 24 (Overall), 20 (Microscopy only)

Satisfaction with Processes and Tools

- **Very satisfied**: 12% (Overall), 27% (Microscopy only)
- **Satisfied**: 24% (Overall), 24% (Microscopy only)
- **Neither satisfied nor dissatisfied**: 30% (Overall), 27% (Microscopy only)
- **Dissatisfied**: 13% (Overall), 14% (Microscopy only)
- **Very dissatisfied**: 4% (Overall), 8% (Microscopy only)

Eligibility for Tenure

- **Core Director**: 29% (Overall), 26% (Microscopy only)
- **Core Manager**: 9% (Overall), 5% (Microscopy only)
- **Core Technician**: 8% (Overall), 5% (Microscopy only)
- **None**: 56% (Overall), 64% (Microscopy only)