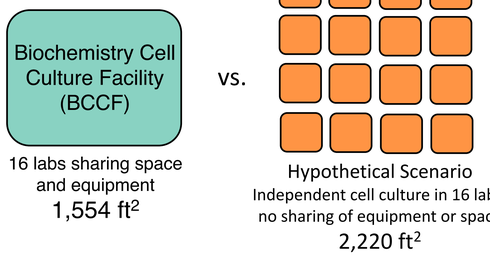
A case study detailing avoided research costs and other benefits resulting from a large shared cell culture facility at the University of Colorado Boulder

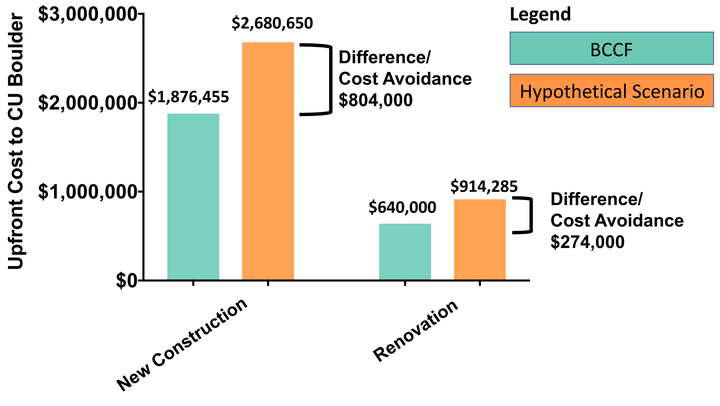
Theresa Nahreini, Christina Greever, and Kathryn Ramirez-Aguilar, Ph.D., University of Colorado Boulder

Abstract: A case study conducted at the University of Colorado Boulder examines a progressive approach to cell culture research that is highly efficient, resulting in substantial cost avoidance and a smaller environmental footprint. We chose to examine this core facility because it is a successful, long-lived example of space and equipment sharing by many labs and the equipment utilized is relatively inexpensive compared to other types of core facilities. The Biochemistry Cell Culture Facility (BCCF) at the University of Colorado Boulder (CU Boulder) is a shared scientific resource utilized by 16 labs from three departments. Studying the comparative costs to build and operate the shared BCCF versus a hypothetical scenario where 16 labs conduct cell culture in individualized spaces (the more common approach) allows us to understand the avoided costs for campus scientists and CU Boulder made possible through efficiencies of this shared facility. **The BCCF provides a cost avoidance of over $253,000 per year to CU Boulder with $195,000 per year of those avoided costs realized directly by scientists and the Biochemistry Division and the remaining $58,000 per year realized by building and campus management.** With scientists experiencing intense competition for research funding, efficiency and cost-saving measures are powerful tools to maximize the impact of research dollars and increase the sustainability of science while also optimizing research conditions.

Methods: To estimate whether a shared cell culture facility is more financially beneficial to CU Boulder and scientists than individual cell culture spaces, we compared the features of the BCCF with a hypothetical laboratory arrangement in the same building where 16 labs would conduct cell culture research independently without sharing space or equipment. **The BCCF occupies 30 percent less square footage than the hypothetical scenario.**



Upfront construction and renovation cost avoidance as a result of the BCCF



Upfront cost avoidance from less equipment required in BCCF

Cost of new equipment for Hypothetical Scenario **$504,000** − Cost of new equipment for BCCF **$216,000** = Difference/ Cost Avoidance based on equipment needs **$288,000**

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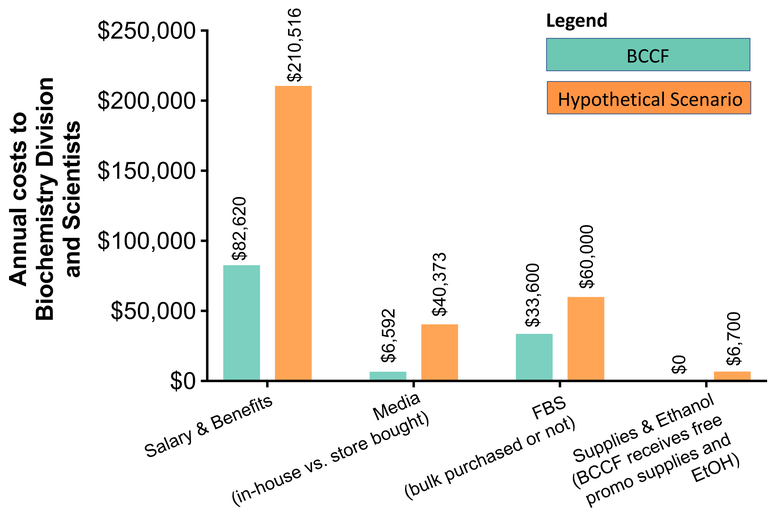
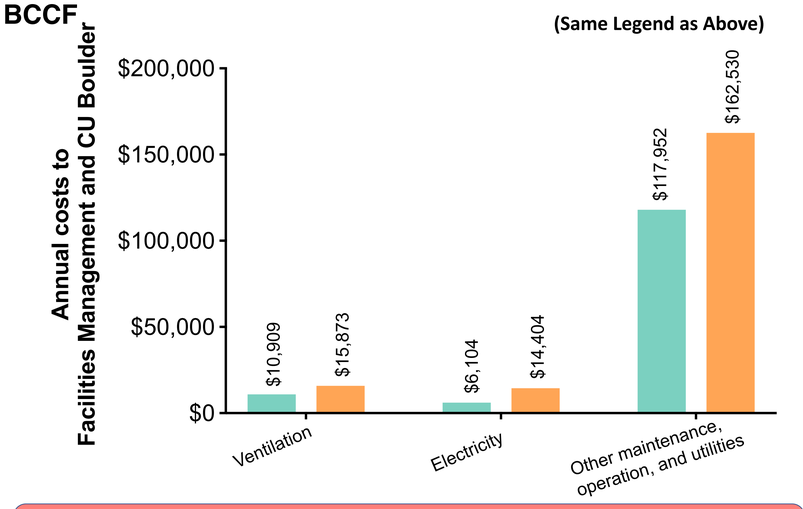
$195,000 in annual ongoing cost avoidance to the Biochemistry Division and member scientists as a result of the BCCF



$58,000 in annual ongoing cost avoidance to Facilities Management and CU Boulder administration as a result of the BCCF



Total Annual Cost Avoidance: $253,000/year

Benefits of a Facility Manager:

- Standardized training of new users
- Mycoplasma testing
- Fetal bovine serum (FBS) lot testing
- In-house media preparation
- Connections & networking
- Expertise
- Addressing equipment maintenance, repairs, & certifications
- Ordering & stocking of supplies
- Facility runs smoothly

Benefits of managed, shared research equipment:

- More efficient use of funding
- Cost avoidance
- Saves researchers time
- Attracts talent
- Promotes collaboration
- More efficient use of space & equipment
- In compliance with the Code of Federal Regulations
- Supports campus sustainability goals

Environmental benefits of shared cell culture:

- Reduced utility needs because equipment and space are shared
- Reduced ventilation needs due to less square footage required
- No over-purchasing of consumable supplies
- More efficient use of space, minimizing the need to construct new lab buildings

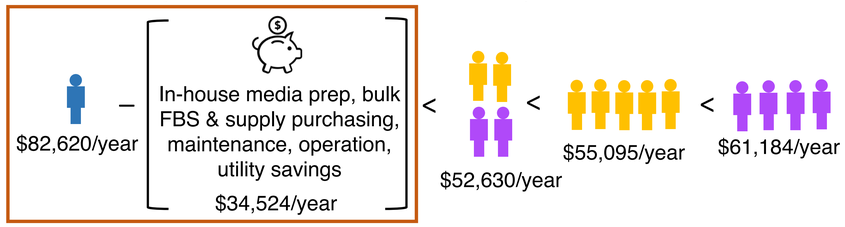
Number of university labs required for cost effective implementation of a shared cell culture facility

Based solely on salary, benefits, and time, it becomes more cost effective to pay for a full time Facility Manager to run a shared facility if 6-8 labs are doing cell culture independently. If some of the cost savings from bulk purchasing of FBS and in-house media prep are also included, 5-6 labs are all that are needed to make a shared facility more affordable than individualized cell culture. The final cost analysis shown below includes everything mentioned above plus some of the lab space maintenance, operations, and utility cost avoidance from having a shared facility. In this instance, only 4-5 labs would need to come together in a shared facility to make it more cost effective to pay a Facility Manager.

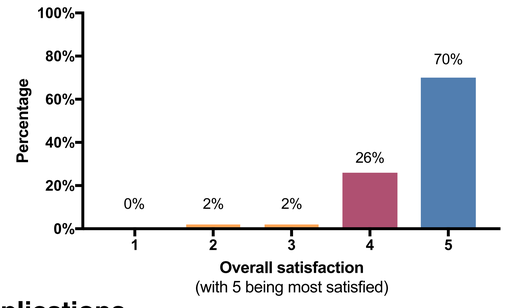
BCCF Facility Manager serving 16 labs
Salary & Benefits: $82,620/year – 40 hours per week for cell culture

Postdoctoral Researcher serving a single lab
Salary & Benefits: $65,088/year – 9.4 hours per week for cell culture

Graduate Student serving a single lab
Salary & Benefits: $46,889/year – 9.4 hours per week for cell culture

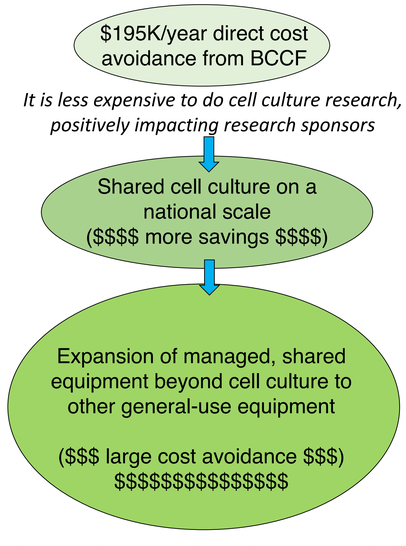


Overall user satisfaction with the BCCF (43 of 70 users surveyed)



Broader Implications

Managed, shared equipment saves research funding and promotes efficiency in four ways: **1)** keeps scientists' time focused on research rather than the logistics of maintaining equipment and other associated tasks, **2)** avoids the need to purchase and support duplicate pieces of equipment (with space, utilities, service contracts and repairs), **3)** enables volume purchasing of materials and supplies at reduced rates, **4)** avoids the accumulation of abandoned equipment in individual labs which can be a product of a lab's research changing direction. **All of this lowers the cost of doing research, reduces a campus's need to construct more lab buildings (huge savings), and has the potential to spread funding among more scientists if adopted at a national level (see visual at right).**



Case study can be viewed at: www.colorado.edu/ecenter/greenlabs/case-study-biochemistry-cell-culture-facility