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CLINICAL AND TRANSLATIONAL SCIENCE AWARD

ECONOMIC IMPACT OF AWARD AND SPILLOVER EFFECTS

Prepared for:
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SUMMARY

The flagship of Rochester's knowledge economy, the University of Rochester Medical Center (URMC) has been selected to be one of the first National Institutes of Health (NIH) centers of Clinical and Translational Science. Not only will the NIH grant reinforce URMC's ability to make the connection between outstanding science and improved clinical practice, it will also reinforce the contribution made by URMC to the regional economy. The Clinical and Translational Science Award (CTSA), announced in October 2006, brings \$40 million to URMC over a period of just under five years. The grant is only a catalyst for an array of transforming new investments, however, facilitating an impact on URMC and the region that extends far beyond the impact of the grant alone.

Now the region's largest and most important employer, the University of Rochester exemplifies the transformation of the Rochester economy. In this document CGR estimates the direct, indirect, and induced economic impact of the CTSA grant as well as all the other investments anticipated as a direct result of the grant funding, including the building planned to house the Clinical and Translational Sciences Institute.

CGR's analysis indicates that all the individual components of the CTSA project's immediate and catalytic impacts sum to nearly \$30 million annually once the entire venture has matured in the fifth year. Treating each of these components as a separate endeavor permits the estimation of direct plus spillover impacts totaling about \$43 million in labor income over nearly 600 jobs.

Economic Impact Summary

Assumes YEAR FIVE "steady state"

Nature of Expenditure	CTSA Grant	CTSI Bldg	Pilots	Annual Growth Existing		TOTAL
				Grants	Training	
(\$ Millions)						
Salary & fringe	\$4.53	\$4.89	\$2.90	\$3.20	\$1.13	\$16.65
Equipment	\$0.36	\$0.18	\$0.11	\$0.12	\$0.04	\$0.82
Supplies	\$0.08	\$0.81	\$0.48	\$0.53	\$0.19	\$2.08
Clinical Services	\$0.38					\$0.38
Travel	\$0.09	\$0.11	\$0.07	\$0.07	\$0.03	\$0.37
Misc higher ed expenses	\$1.35	\$0.81				\$2.16
Indirects (misc exp HC)	\$1.63	\$3.24	\$1.92			\$6.79
TOTAL	\$8.42	\$10.05	\$5.48	\$3.92	\$1.39	\$29.26

The impact of the construction phase—which sums to about \$57 million when the cost of the CTSI building plus refitting and infill construction are considered—would add labor income of an additional \$40 million and the equivalent of about 830 “person years” of full time labor (i.e. as though 830 workers were employed for a single year and earned \$40 million through the period).

Direct and Spillover Impacts Nature of Expenditure	Labor Income (\$M)				Annual Employment			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Salary & fringe	\$16.65	\$7.84	\$6.43	\$30.92	145	68	70	283
Equipment	\$0.27	\$0.14	\$0.11	\$0.51	5	2	3	10
Supplies	\$0.68	\$0.36	\$0.27	\$1.31	13	6	7	26
Clinical Services	\$0.16	\$0.08	\$0.06	\$0.30	3	2	2	6
Travel	\$0.15	\$0.06	\$0.06	\$0.26	4	1	1	7
Misc higher ed expenses	\$1.56	\$0.22	\$0.47	\$2.25	41	6	12	59
Indirects (misc exp HC)	\$4.89	\$0.71	\$1.47	\$7.07	115	5	43	164
TOTAL	\$24.35	\$9.41	\$8.85	\$42.61	326	92	138	556

The impact estimates presented in this report address the economic consequences for the State of New York. The outcome assessed here is a combination of the grant plus all the other investments anticipated, particularly the building and the increased research activity it makes possible. *

Contributing Staff

Sarah Boyce, MSPH, was a key contributor to the analysis and was co-author of this report.

* These estimates assume that these initiatives are funded with new sources of money and that funds devoted to the CTSI do not reduce economic activity in some other sector of the medical center. As it seems probable that there will be some displacement, these estimates should be viewed accordingly.

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URMC PLAYS A PIVOTAL AND EXPANDING ROLE IN ROCHESTER'S ECONOMY

The University of Rochester Medical Center (URMC) is a key economic engine in the Rochester region, as documented by CGR on numerous occasions.* With URMC as its largest component, the University of Rochester has succeeded Eastman Kodak Company as Rochester's largest employer.

In October 2006, the National Institutes of Health (NIH) announced a \$40 million, nearly five year Clinical and Translational Science Award (CTSA), placing URMC in elite company among the nation's academic medical centers. Building on URMC's previous success in harnessing the insights of its laboratories to the benefit of clinical practice, the CTSA initiative will also enhance URMC's impact on the regional and state economy. The impact estimates presented in this report address the economic consequences for the State of New York.

ESTIMATING ECONOMIC IMPACT

The CTSA generates economic impact:

- (1) through the \$40 million brought to the Rochester economy through the grant itself;
- (2) through the CTSB, or Clinical and Translational Sciences Building which will house the Clinical and Translational Sciences Institute (CTSI);
- (3) through growth of new research grants generated as a result of CTSA activities, including pilot grants;
- (4) through increased technology transfer which ultimately generates new businesses and royalty revenues for the medical center; and
- (5) through training funds that prepare future clinical researchers to generate new grant funding.

* See listing at <http://cgr.org/AreasOfImpact/EconomicAnalysis/>

With the exception of the first—whose economic impact is largely manifest through additional staffing—the economic impact of the grant is *catalytic*, not strictly causal. This presents a particular challenge for the estimate of economic impact. As a consequence, this economic impact analysis focuses not strictly on the grant but on the strategic initiatives it makes possible, including the Clinical and Translational Sciences Building.

These catalytic benefits will grow over the period of the grant. While it is likely that the grant will be renewed, CGR has selected the final year of the five year grant as the point in time at which to measure the annual economic impact.

The Current CTSA Grant

The \$40 million award will be paid out over a five year period to the URMC. The budget prepared for the application was as follows.

Total direct expenses are \$32.2 million with indirect expenses of \$7.8 million. The majority of direct expenses are for personnel costs.

Summary Budget for Entire CTSA Project Period

Direct Expenses	\$32.2
Personnel (Salary + Fringe)	\$19.5
Consultant costs	\$0.4
Equipment	\$1.7
Supplies	\$0.4
Travel	\$0.3
Patient Care - Inpatient	\$0.4
Patient Care - Outpatient	\$1.4
Other expenses	\$4.8
Consortium/Contractual	\$0.3
Stipends	\$1.6
Tuition, fees, insurance	\$1.1
Trainee travel	\$0.1
Trainee-related expenses	\$0.2
Indirect Expenses	\$7.8
Facilities & Admin	\$7.8
TOTAL Award	\$40.0

Clinical and Translational Sciences Building

The CTSB is planned as a 150,000 square foot building, with a total estimated construction cost of \$51 million (including site preparation). The building is in the process of being designed and location selection is underway. The building will provide the opportunity for the medical center to co-locate critical staff and faculty which will foster improved working relationships and will generate an increase in ideas and innovation. In addition to the intangible benefit of researcher co-location, the construction of the building itself generates an economic impact, as does the 'backfill' or the use of space vacated by those who will move into the new building.

Selected programs from the Medical Research Building Extension (MRBX) will move into the CTSB, and the space they currently occupy will be redeveloped into wetlabs, providing space for 12 new principal investigators. This will generate new revenue as shown in the table above. Further, relocation of staff from other Medical Center locations will provide space that can be used to expand patient care, research, and education programs. These additional backfill opportunities are not yet well defined, and are not included in the analysis.

Assumptions Regarding CTSB and Selected Backfill

Clinical & Translational Sciences Building Construction

Total Square Footage	150,000
Cost of construction = \$300/per square foot plus \$6.3 m in site costs	\$51,300,000

Selected Backfill

New wetlab in current MRBX space	
Total new Principal Investigators (PIs)	12
Total new support staff	84
New grants generated from new PIs	
# R01 per PI	2
Direct research revenue from 12 Pis (annually)	\$6,000,000
Indirects from 12 Pis (annually)	\$3,240,000

Construction costs as result of backfill

New General Clinical Research Center (GCRC)	\$1,000,000
Remodel of hospital wing currently hosting GCRC	\$750,000
Redevelopment of Medical Research Building Extension (MRBX) into Helen Wood Hall - patch and paint	\$3,000,000
Miscellaneous offices being vacated needing patch and paint	\$200,000
Miscellaneous offices being vacated needing patch and paint	\$500,000

Total	\$5,450,000
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Pilot Grants

Nearly 90 pilot grant awards will be made under the CTSA over the five year period. Grants will typically be \$25,000 and will provide support for gathering of pilot data, developing and validating research methodologies, and other research endeavors. Four of the core program functions under CTSA will offer pilot grants, as well as the Foundation for Healthy Living, a new foundation headquartered in Albany that has committed \$100,000 for pilot grants as an extension of the CTSA.

The Environmental Health Sciences Center (EHSC) at the URMC has a Pilot Project Funds Program that has funded twenty pilot projects between 1999 and 2005 at \$25,000 each. Eight of these projects have generated RO1 funding as a result of the work they completed under their pilot grants, or 40%. An average R01 provides \$250k in annual funding for direct costs. CGR applies this success rate to the CTSA pilot grant programs to estimate the economic impact.

We assume, therefore, that about 35 new R01 grants will be generated from the 89 pilot projects. Each R01 will generate spending of \$250,000 for a period of 4 years (the average duration for the URMC's current group of R01 grants is 4.4 years) and generate 54% indirect cost. We further assume that there will be a three year lag between spending on the pilot project and spending on the R01. By year five (the year selected for the economic impact), the total value of the R01 grants catalyzed by the CTSA grant is expected to be about \$3.6 million with \$1.9 million in

Pilot Grants Planned under CTSA	
	Total Pilots Over 5 Years
Pilot and Collaborative Translational and Clinical Studies	
8 grants/year @ \$25,000 each	40
Novel Clinical and Translational Methodologies	
2 grants/year to validate methodologies @ \$87,500 each	10
Translational Technologies and Resources	
6 grants/year @ \$25,000 each	30
Upstate Academic Consortium	
1 grant/year @ \$20,000	5
Foundation for Healthy Living	
4 grants @ \$25,000 each	4
TOTAL Pilot Grants	89

indirect cost recovery. Assuming the grant is renewed, the “steady state” from a fixed pool of pilot projects will reach \$5.3 million in year six. Indirect cost recovery in those years is expected to be about \$2.9 million.

Growth in Existing Grant Funding

The NIH budget is expected to remain flat for the near term after many years of real funding growth. An expanding pie allowed academic medical centers to increase research funding without increasing their share of total NIH receipts. When funding is flat, share growth becomes important.

An emphasis on translational research reflects Congressional pressure on NIH to make a measurable difference in the lives of the nation’s citizens. The historic success of URMC at translational science, as evidenced by the CTSA grant, is expected to allow URMC to continue to expand its translational research funding, expanding its share of the total pool of NIH funds.

Growth in Translational Science Research Grants

In 2005, translational research constituted about 10% of total research funding from all sponsor types*. For the purposes of this study, CGR assumes that this portion of total research expenditures will continue to grow at the 9.4% annual rate for FY2003 through FY2006, just under \$4 million each year.

This is arguably a very conservative assumption for three reasons. First, while the data are unavailable it seems likely that the growth rate of translational science has been greater than the average. Second, URMC’s designation as a translational center will stimulate a change in perspective among clinical and basic researchers, improving their ability to compete for more grants. Finally, the existence of the translational center will significantly improve the ability of URMC to attract private industry funding, particularly for clinical trials. While the share of industry research funding (16% in 2005) is dwarfed by the NIH share (65%), industry funds are still substantial.

Impact of New Strategic Plan

URMC is in the process of completing a new Strategic Plan. As this is not strictly driven by the CTSA grant, CGR does not include these estimates in its aggregate estimate of CTSA impact.

* This classification is only available for 2005.

However the ambition reflected in the Strategic Plan is, to some degree, reflective of the clinical and translational award.

Tentatively (the plan is still in process), URMC envisions hiring fifty new clinical and translational principal investigators over the next five to seven years. These fifty researchers can be expected to secure and maintain two R01 grants apiece. If this ambitious goal is achieved, total annual research spending stimulated by these new hires will be about \$25 million plus \$13.5 million in indirect costs.

Technology Transfer

Technology transfer involves conversion of scientific discoveries into commercial products. Data from the URMC Technology Transfer office from the last three years shows an increase in invention disclosures from 2004 to 2006, an increase in patent filings, and an increase in royalty revenues. Three to four new start-ups are formed each year as a result of technologies developed at the URMC, and 10 new patents were issued in 2006 for URMC-developed products.

A study by Milken Institute* released in September 2006 evaluated University Biotechnology Transfer and Commercialization. URMC had \$341 million in total sponsored program expenditures in FY2005, including \$258 of federally-sponsored program expenditures, compared to average research expenditures of \$225 according to the Milken data.

URMC Technology Transfer Activity 2004-2006				Rate per \$million 3 years previous
	2004	2005	2006	
Research Funding -- 3 Yr Previous (2001, 2002, 2003) (\$M)	\$126.5	\$113.1	\$145.6	
Invention Disclosures	93	92	101	0.74
Patent Filings (U.S. Provisional)	32	53	50	0.35
Issued U.S. Patents	9	7	10	0.07
Active Agreements (Licenses)				
Existing	45	50	45	
New	16	17	20	0.14
Royalty Revenue (\$M)	\$25.67	\$28.27	\$37.13	n/a
Start-up Formation	3	4	3	0.03

* DeVol, Ross and Armen Bedroussian. "Mind to Market: A Global Analysis of University Biotechnology Transfer and Commercialization." Milken Institute, September 2006.

For these reasons, CGR does not sum the increase in royalty revenue with the overall estimate of economic impact. These are important impacts but are not likely to be measurable and significant for a period of many years.

AUTM and ASTP Performance Measures	
Average Research expenditures (U.S. Universities, 2004)	\$225 M
	Performance per million \$
Invention Disclosures	0.4
Patent Applications	0.25
Patents Granted	0.09
Licenses Executed	0.11
Licensing Income	\$27,825
Startups Established	0.01

Source: Milken Institute, 2006

URMC Technology Transfer Results from CTSA	
	Total Five Year Accumulation
Research Funding (\$M) (cumulative)	\$41.4
Invention Disclosures (cumulative)	31
Patent Filings (U.S. Provisional) (cumulative)	15
Issued U.S. Patents (cumulative)	3
New Active Agreements (licenses) (cumulative)	6
Annual Royalty Revenue (thousand)	\$1,151
Start-up Formation (cumulative)	1.1

For the purposes of this study, CGR estimates that the \$41 million increase in research funding catalyzed by the CTSA will eventually drive about a million dollars in annual license revenue for URMC. Other results in terms of intellectual property output are displayed in the adjacent table.

Training Impact

The CTSA grant provides funding for eleven new K12 scholars, three in year one and two in each of the remaining years. Based on past performance of trainees with K30 grants—a similar funding program—these K12 scholars can each be expected to generate an average of about \$126,000 in R01 or other funding.

Impact of CTSI in Upstate Consortium

Another element of the CTSA that is important, although difficult to quantify, is the role of the Clinical and Translational Sciences Institute in forging a consortium among Upstate medical researchers. As an example, the CTSI will facilitate cooperation among researchers in obesity at Cornell University, the University at Buffalo and URMC. Combined resources on this important issue compare favorably with the top ten obesity centers in the nation.

In another example, Kimberly O'Brien, nutrition researcher from Cornell, will study nutrition in pregnant adolescents using volunteers from Cornell University and employing URMC's General Clinical Research Center, the only GCRC in Upstate New York. Other Upstate researchers are likely to follow her example.

As a consequence, the spillover impacts of the award will be felt across Upstate, not simply confined to URMC. Enhanced collaboration across institutions will strengthen the research programs of these institutions and improve clinical care to Upstate residents.

CONCLUSION

The Clinical and Translational Science Award plus the CTSI Building and associated investments are expected to have a transformational impact on the University of Rochester Medical

Economic Impact Summary

Assumes YEAR FIVE "steady state"

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