Cost Effectiveness Analysis of New York State's Medicaid Graduate Medical Education (GME) Residency Training Program

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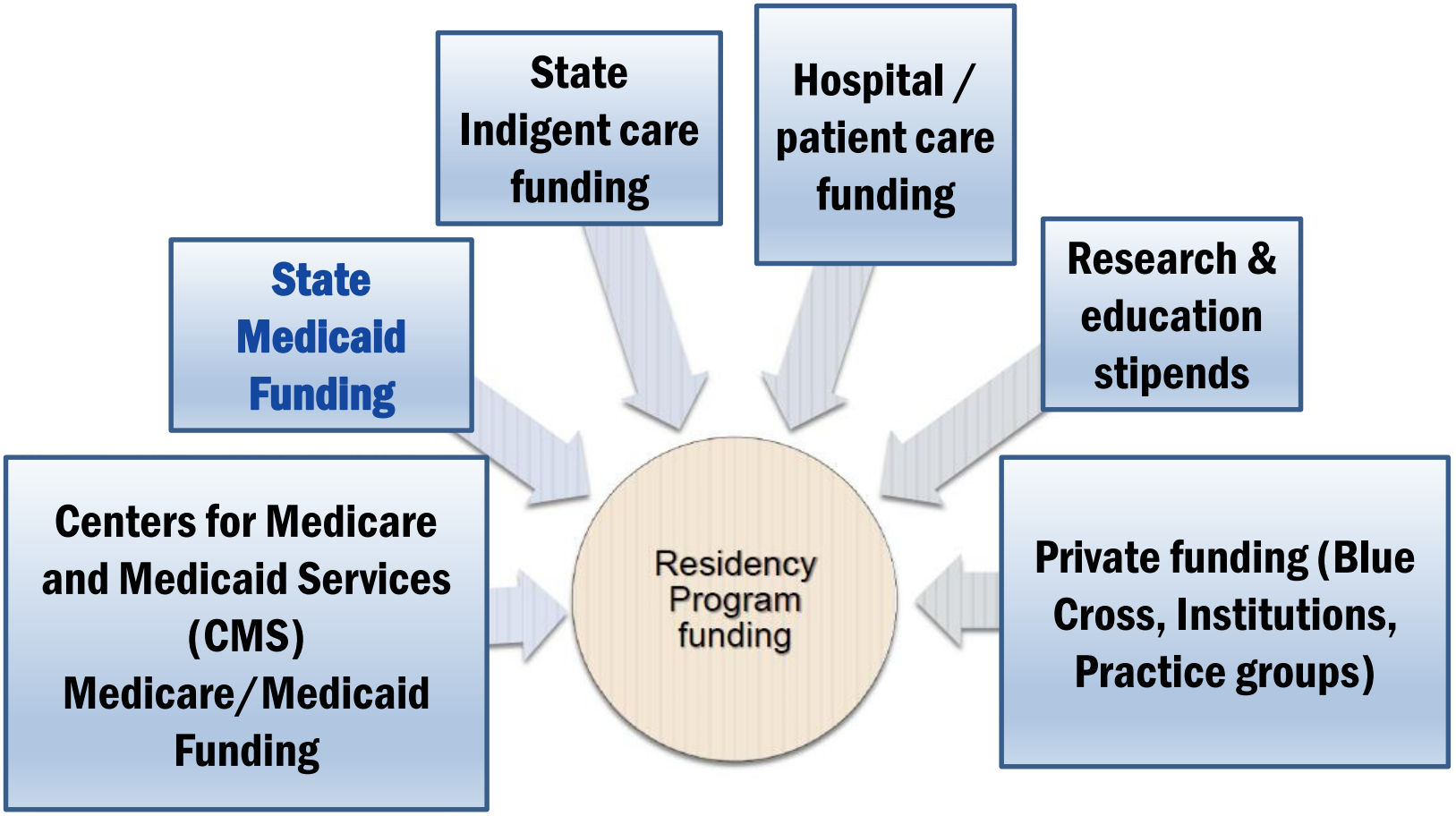
History of GME funding

- 1965 – Social Security Act, Medicare, Medicaid & Graduate Medical Education funding.
- 1980's – Reform of GME payments
  - Direct costs (DME or Direct GME)
  - Indirect costs (IME)
- 1994 – GME funding limited to the **time of training** for Initial Residency Period (IRP) per resident.
  - More time is reimbursed as 50% DME
- 1997 – "Cap" applied to the Intern & Resident per Bed (IRB) ratio
- 2003 – Medicare Prescription Drug, Improvement and Modernization Act (MMA) passed to allow slots increases
- 2010 – ACA impacted on slots in nonprovider settings and redistributions

Funding Sources of GME



Medicare GME Funding

- Residency Training - resident physicians graduated from medical school typically spent 3-7 years in GME training before self-practice

Top 10 State Medicare Graduate Medical Education Cap and Payments by Cap per 100,000 population in 2012, AMMC

State	Resident Cap per 100,000 population	Resident cap	Medicare GME payments	Medicare GME payment per population	Medicare GME average payment resident
1. NY	77.13	14,945.91	$2,008,212,352	$103.63	$139,126
2. MA	66.08	4,326.75	$559,342,464	$85.43	$131,456
3. RI	61.48	647.12	$85,505,264	$81.23	$133,615
4. PA	54.48	6,919.73	$906,942,080	$71.40	$133,879
5. MI	53.05	5,242.82	$738,040,256	$74.67	$141,126
6. CT	49.65	1,774.65	$266,880,096	$74.67	$155,135
7. OH	42.62	4,917.05	$557,152,512	$48.29	$115,074
8. VT	40.28	252.02	$30,480,536	$48.71	$120,945
9. LA	38.48	1,744.31	$92,605,816	$20.43	$63,811
10. IL	38.46	4,935.30	$501,300,640	$39.07	$103,944

Medicaid GME Funding

- Governmental GME funding sources in US, 2012 (IOM)
  - Medicare - $9.7 billion
  - Medicaid – $3.9 billion
  - Veterans Health Administration - $1.5 billion
  - HRSA - $0.5 billion

- Medicaid GME – state level decision
  - Opt-in – jointly funded by state and federal through matching
  - 42 states plus DC chose to cover Medicaid GME spending as of 2012 (AAMC)
  - A trend of decline in the number of participating states
  - Medicaid GME spending increased by over $1.5 billion since 1998

New York State Medicaid GME

- New York - #1 residents producer in the US
  - Over 16,000 (15% of US total) residents are under training in NY
  - More than 5,000 residents finish training annually

- NYS GME Spending - $3.8 billion in 2012 (AAMC)
  - Medicare - $2 billion (20% of US total)
  - Medicaid - $1.82 billion (47% of US total)
    - $0.91 billion from the state with 50% federal matching
  - NY GME average payment per resident annually

    $231,700/resident
    - $139,126/resident (Medicare)
    - $92,574/resident (Medicaid)

Research Questions

Goal 1:

Is current NYS GME Medicaid funding appropriate?

Goal 2:

Should NYS continue funding Medicaid GME at the current level or reduce funding and hire other providers as substitution using that fund?

Goal 3:

If the answer for goal 2 is the latter, to what extent should we change NYS Medicaid GME funding?

Methods

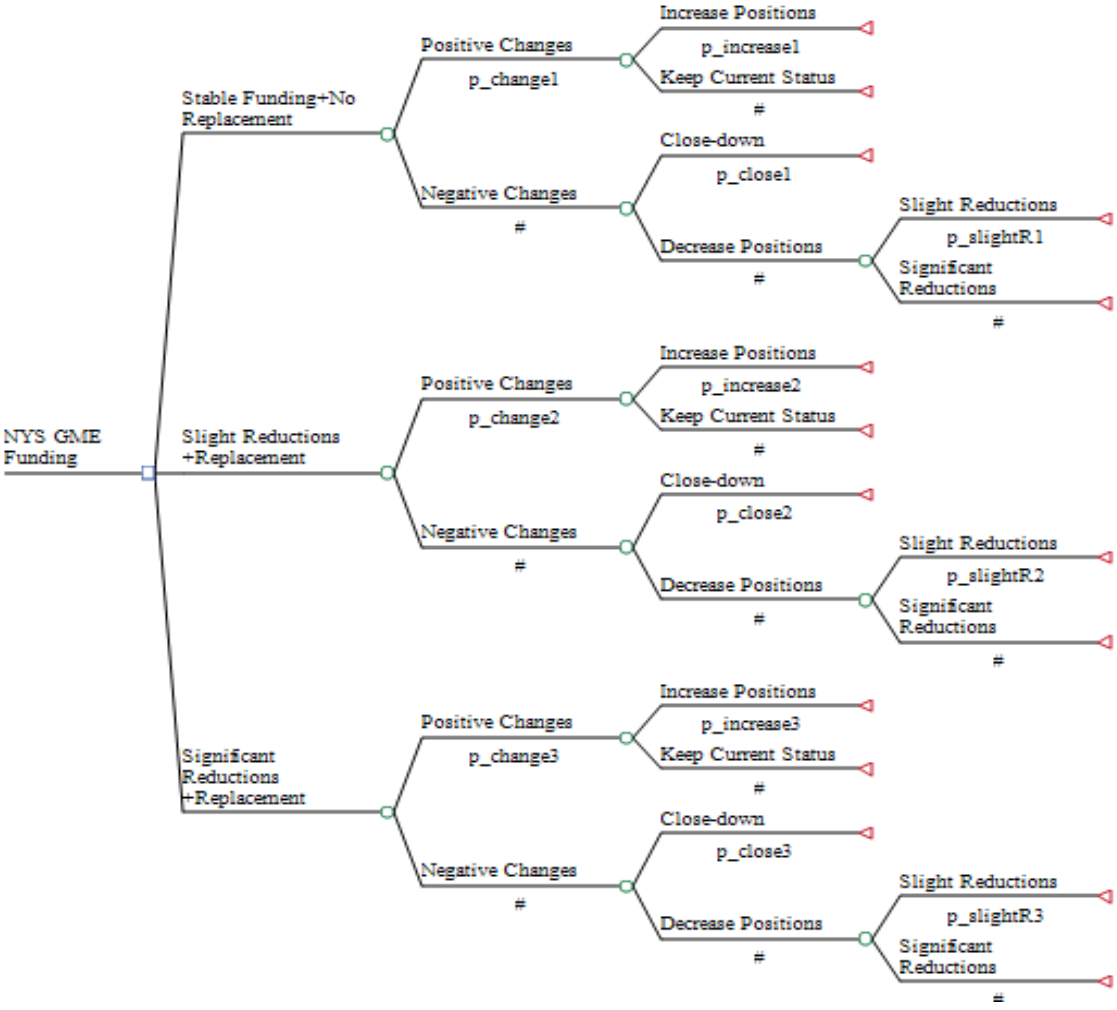
- Type: Cost Effectiveness Analysis – Markov Model
- Perspective: NYS Government/Societal
- Alternative:
  - Replacing residents with physicians using funding from potential Medicaid GME cuts.
- Time: all monetary terms in 2012's numbers
- Target population: Primary Care Residents (38% of total NYS residents)
- Software: TreeAge Pro 2016 (v16.1.1.0) – Decision-tree with sensitivity analysis
- Literature Review
  - None similar economic analysis has been conducted before
    - Complexity of GME payment structure
    - Difficulties to obtain financial data at the record level
  - CHWS & HANYS Surveys/Professional Opinions
  - Qualitative/Quantitative Data (AAMC, ACGME, RAND, CHWS, IOM)

Economic Evaluation Model Building

- Key article from ACGME in 2011
  - "*The Potential Impact of Reduction in Federal GME Funding in the US**"
  - ACGME surveyed 680 GME Designated Institutional Officials on how future federal funding would affect their institutions' programs and positions.
- Three different funding scenarios were presented:
  - funding to remain stable at 2011 levels (a trend of 5% increase)
  - funding to be reduced by 33%
  - funding to be reduced by 50%
- Potential Reactions from GME DIOs/programs:
  - Increase positions
  - keep current status
  - slightly decrease positions
  - significantly decrease positions
  - close all positions

*Nasca TJ, Miller RS, Holt KD. The Potential Impact of Reduction in Federal GME Funding in the United States: A Study of the Estimates of Designated Institutional Officials. *Journal of Graduate Medical Education*. 2011;3(4):585-590. doi:10.4300/JGME-03-04-33.

Decision-tree Model



Model Parameters on Costs

- Costs for GME Primary Care funding:
  - Residents' compensations (Salary & fringe benefits)
  - Attending Physicians compensations (as a ratio of residents)
  - GME administration
- Costs of replacing residents with physicians:
  - Physicians compensations (Salary & fringe benefits)
  - Recruitment
  - Administration
- All costs were weighted for Medicaid GME
- # of residents data from combined estimates from AAMC, ACGME, CHWS
- Salary information data was from CHWS

Model Parameters on Effectiveness

- No QALY was available to measure effectiveness
  - Difficulty to find quality-adjusted life year (QALY) information in literatures for residents/physicians performance on the society
- Measure of effectiveness:
  - Relative Value Units (RVUs) was used
    - Common measure of value used in Medicare/Medicaid reimbursement formula for physician services
    - A GME service payment formula contains three RVUs, one is for physician work
    - RVU value: residents - 7, attending physicians - 8 for and physicians – 10 (RAND)
  - the willingness to pay (current cost: $275,000/PC resident)
    - A ratio of average NY GME spending to the RVUs of residents/physicians
    - $39,286 per RVU

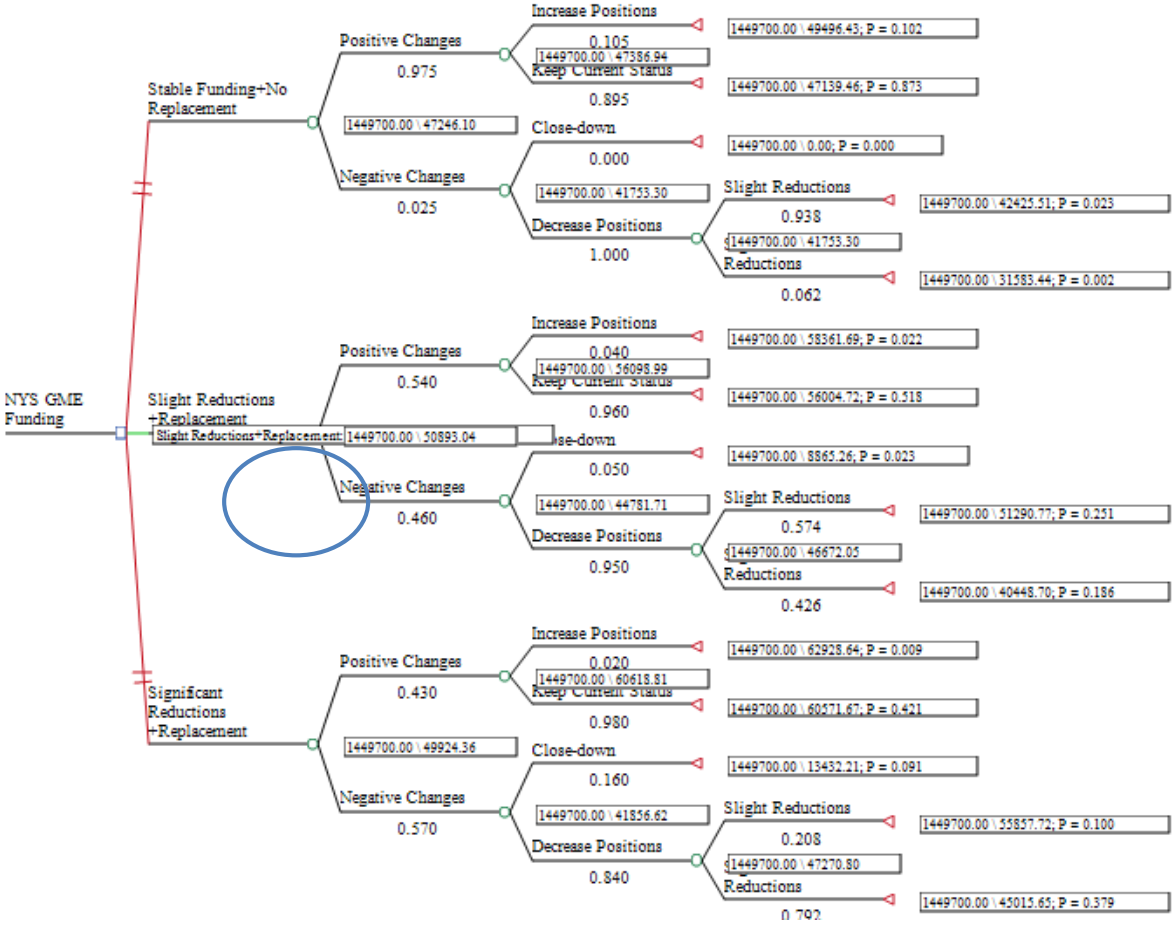
RAND Corporation. (2013). Does it cost more to train residents or to replace them? A look at the costs and benefits of operating graduate medical education programs. Retrieved from http://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR324/RAND_RR324.pdf.

Parameter Estimates for Model Building

Name	Description	Show i...	Root Definition
atten_num	Number of Attending Physicians	☑	atten_res_ratio*pres_num
atten_productivity	Productivity of Attending Physicians	☑	8
atten_res_ratio	Attending Physicians to Residents Ratio	☑	10%
avg_phy_salary	Average Post-Residency Physician Salary	☑	172.872
close_percent	Percent of programs when closed down	☑	0
fbr	Fringe Beneits Rate	☑	30%
medicaid_funds	NY State Medicaid Funding	☑	1815000
medicare_funds	NY federal Medicare Funding	☑	2000000
p_change1	Probability of Positive Changes in Scenario 1	☑	0.975
p_change2	Probability of Positive Changes in Scenario 2	☑	0.54
p_change3	Probability of Positive Changes in Scenario 3	☑	0.43
p_close1	Probability of Close-down in Scenario 1	☑	0
p_close2	Probability of Close-down in Scenario 2	☑	0.05
p_close3	Probability of Close-down in Scenario 3	☑	0.16
p_increase1	Probability of Increase Positions in Scenario 1	☑	0.105
p_increase2	Probability of Increase Positions in Scenario 2	☑	0.04
p_increase3	Probability of Increase Positions in Scenario 3	☑	0.02
p_slightR1	Probability of Slight Reductions in Scenario 1	☑	0.938
p_slightR2	Probability of Slight Reductions in Scenario 2	☑	0.574
p_slightR3	Probability of Slight Reductions in Scenario 3	☑	0.208
percent_primary	Percent of Pirmary Care Residents	☑	38%
phy_productivity	Post-residency Physician Productivity/RVU	☑	10
phy_r_cost	Cost of hiring new physician	☑	32
pres_num	Number of Primary Care Residents	☑	res_num*percent_primary
pres_productivity	Primary Care Residents Productivity/RVU	☑	7
res_num	Number of total NY Residents	☑	15904
sig_red_funds_percent	Significant Funding Cut	☑	50%
sig_red_percent	Retention Rate after Significant Reductions	☑	67%
slight_red_funds_percent	Slight Funding Cut	☑	33%
slight_red_percent	Retention Rate after Slight Reductions	☑	90%
stable_percent	Retention Rate after Stable Funding	☑	105%

Result of Initial Parameters

- Slight reductions with replacements is the preferred strategy with the lowest cost-effectiveness ratio - $28,485 / RVU



Sensitivity Analysis

- Sensitivity analysis – to test the model's generalization capacity and assess the impact of variable changes on the result
- One-way Sensitivity analysis
  - PC residents' RVU ranging from 4 to 9
  - Preferred strategy:
    - "Significant reductions with replacements" - RVU < 5.5
    - "Slight reductions with replacements" – 5.5 < RVU < 9
- Two-way Sensitivity analysis
  - Attending physicians' RVU ranging from 6 to 10
  - Ratio to residents ranging from 5% to 20%
  - Preferred strategy:
    - "Slight reductions with replacements" in all ranges

Results

- Slight Reduction with Replacements is the optimal strategy in the analysis
- Stable funding is a better strategy than the significant reduction with replacement option
- Significant reduction is the dominated strategy and should not be kept
- Major sensitivity analysis generated similar result

Limitations

- Assumptions for model building may be challenged
  - Oversimplified costs/productivity components
  - ACGME Medicare GME survey may not be suitable for NYS GME programs
  - RVUs and other parameters vary by researches
  - Trend over time was not taken into consideration
- Different perspective matters
- Lack of financial data operating GME programs, since GME costs/revenues are incorporated in entities' daily activities
- Lack of consideration of long-term benefits gained from training and keeping residents within NY
- Lack of consideration of feasibility to hire physicians from other states

Conclusion

- No similar economic analysis has been conducted given the complexity of GME funding, especially Medicaid GME funding
  - The analysis provides a societal perspective to view the GME funding issue

- It is not an easy decision for state government to decide whether to keep GME residency programs or to replace with post-residency physician

- The state government, health professions, GME institutions must work with the society to assure that we are able to fulfill society' expectation on physician workforce to prepare the next generation of physicians to serve the American people.

Questions?