The Complications of Building a Cost Estimate for a National, Multiphase Survey

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AARSD Workshop 2019, Washington, DC

November 4th, 2019

United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
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Overview

- Background
  - Survey Cost
  - Example Case (NTPS)
- Data Sources
- Methodology
- Example Use Case – Analysis
- Next Steps

Survey Cost - Importance

- Cost plays a major role in decision making and planning for a survey
- Accuracy is especially important when discussing cost because a survey's budget is a finite resource

Survey Cost – Current Literature

- Groves, Robert. Survey Errors and Survey Costs. Hoboken, NJ. Wiley and Sons. 2004.
- Wagner, J. (2019). "Estimation of Survey Cost Parameters Using Paradata." Survey Practice 12(1): 1-10.
- Internal estimates at the bureau

Survey Cost - Adaptive Design

- Cost can be used as a metric to asses the success and feasibility of implementing an innovative data collection feature

- Cost estimates can be used to build priors, which can function as a part of a decision-making framework for an upcoming survey cycle

Example Case – Background

National Teacher and Principal Survey (NTPS)

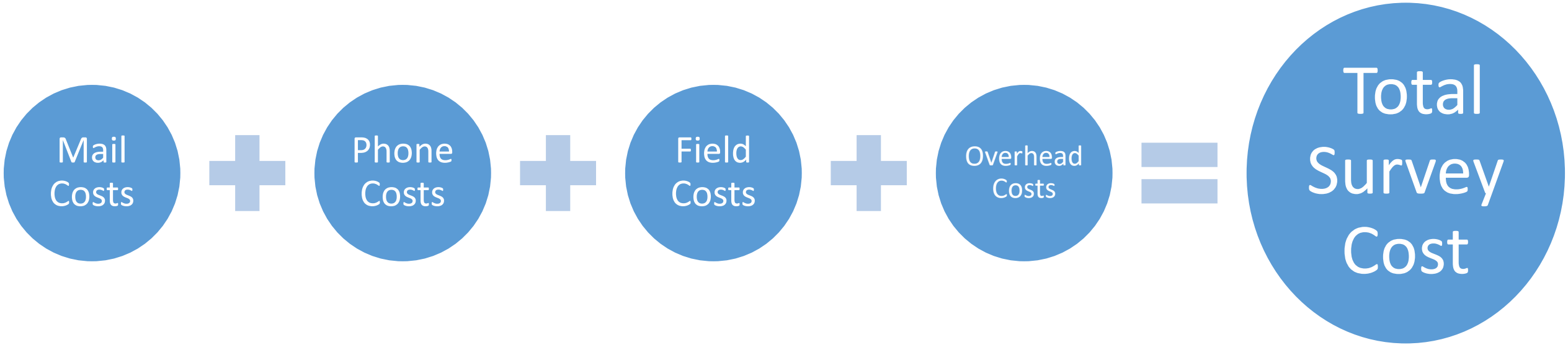
National Teacher and Principal Survey (NTPS)

- National cross sectional survey of public and private schools
- Sponsor: National Center for Education Statistics (NCES)
- Multi-level survey
  - School and principal questionnaires (school level)
  - Teacher listing form - TLF (school level)
  - Teacher questionnaires (teacher level)
- Data collection period goes from August through June
- Survey cycle is every two or three years

NTPS – Data Collection Features

- School Level and Teacher Level Operations
- Public vs Private (and Amish)
- Priority vs Nonpriority
- USPS vs FedEx
- Web vs Paper
- Telephone Operations
- Field Operations
- Teacher Incentives Experiment*

What goes into a survey's total cost?



Data Sources

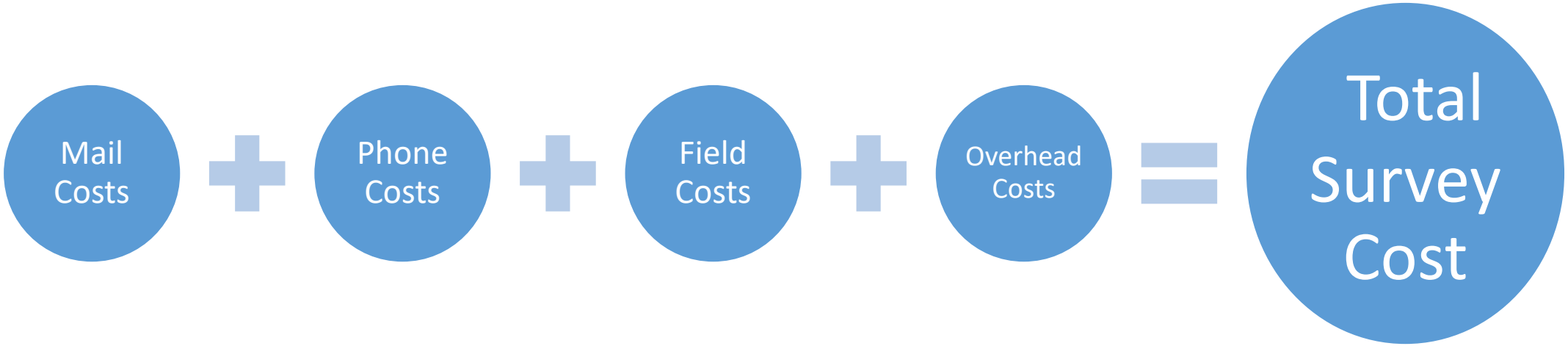
What do we have?

Data Sources

- Financial Management Reports (FMRs)
- CENDocs
- Data collection documentation
- Raw data files
- Subject matter experts

Methodology

How can we use our data sources to breakdown a survey's total cost?



Methodology – Mailout Costs

Mailout Costs - Breakdown		
Item	**Do we include it?**	**Source(s)**
Envelope	✓	NPC
Letter	✓	NPC/CENDocs
Questionnaire	✓	NPC/CENDocs
Postage	✓	NPC
Incentive	✓	Documentation/NPC
Mailout Assembly Labor	✗	?
Return Processing Labor	✓/✗	NPC FMR/?

Methodology – Mailout Costs

- Mailout Assembly Labor
  - The FMR for NPC's Document Services Branch (DSB) details how much money was spent on mailout package assembly labor each month
  - Currently, we have no clear way of knowing which package types were being prepared at what time
- Return Processing Labor
  - The FMR for NPC's Data Capture Branch (DCB) details how much money was spent on return processing labor each month
  - While we also have no clear way of knowing which package types are being received at what time, there is less variability with return packages than with mailout packages

Methodology – Telephone Costs

- Telephone costs are any charges a survey accrues for telephone operations

$$cost\ per\ minute = \frac{total\ cost\ of\ all\ telephone\ operations}{total\ number\ of\ phone\ minutes\ applied}$$

$$cost\ per\ call = \frac{total\ cost\ of\ telephone\ operation}{total\ number\ of\ calls\ made}$$

Methodology – Field Costs

- Field costs are any charges a survey accrues for field operations

$$cost\ per\ visit = \frac{total\ cost\ of\ all\ field\ operations}{total\ number\ of\ field\ visits\ made}$$

$$cost\ per\ field = \frac{total\ cost\ of\ field\ operation}{total\ number\ of\ cases\ sent\ to\ field\ operation}$$

Methodology – Overhead Costs

- Overhead costs are all of the charges on the FMRs that do not apply to direct labor or materials
- Typically overhead costs are fixed and applied to everyone, so they can be omitted from a cost analysis
- Examples of overhead cost include
  - Head Quarters staff
  - Instrument development
  - Incentive-specific overhead costs*

Example Use Case

National Teacher and Principal Survey (NTPS)

NTPS - Teacher Incentives Experiment

- Motivation: Increase overall teachers response rates

Teacher Incentives Experiment – Treatment Groups	
Teacher Sampling Group	Treatment Group
Early	Teacher Incentive
	No Incentive
Late	Teacher Incentive Only
	School Coordinator (SC) Incentive Only
	Teacher and SC Incentives
	No Incentives

NTPS – Teacher Response Rates

- Teacher Incentives are significantly effective at increasing teacher response rates

Public School - Response Rates			
Early School Response TLFs		Late School Response TLFs	
Teacher Incentive	88.6%	**Teacher and SC Incentives**	77.4%
		Teacher Incentive Only	76.7%
No Incentive	84.6%*	**SC Incentive Only**	73.0%[1,2]
		No Incentive	73.7%[1,2]

* denotes a statistically significant difference from the Teacher Incentive group and the respective column's baseline group with α = .10 level
[1] denotes a statistically significant difference from the Teacher, SC Incentive group and the respective column's baseline group with α = .10 level
[2] denotes a statistically significant difference from the Teacher Incentive Only group and the respective column's baseline group with α = .10 level

NTPS – Cost of a Teacher Case

What is included?

- Mailout costs
- Field operation costs
- Telephone operation costs

What is NOT included

- Fixed overhead costs
- Incentive-specific overhead costs*
- Mailout assembly labor costs*

NTPS – Teacher, cost-per-case formula

$$cost\ per\ case = \ teacher\ mail\ costs$$

$$+teacher\ phone\ costs$$

$$+teacher\ field\ costs$$

$$+\frac{school\ data\ collection\ costs}{number\ of\ teachers\ sampled\ from\ school}$$

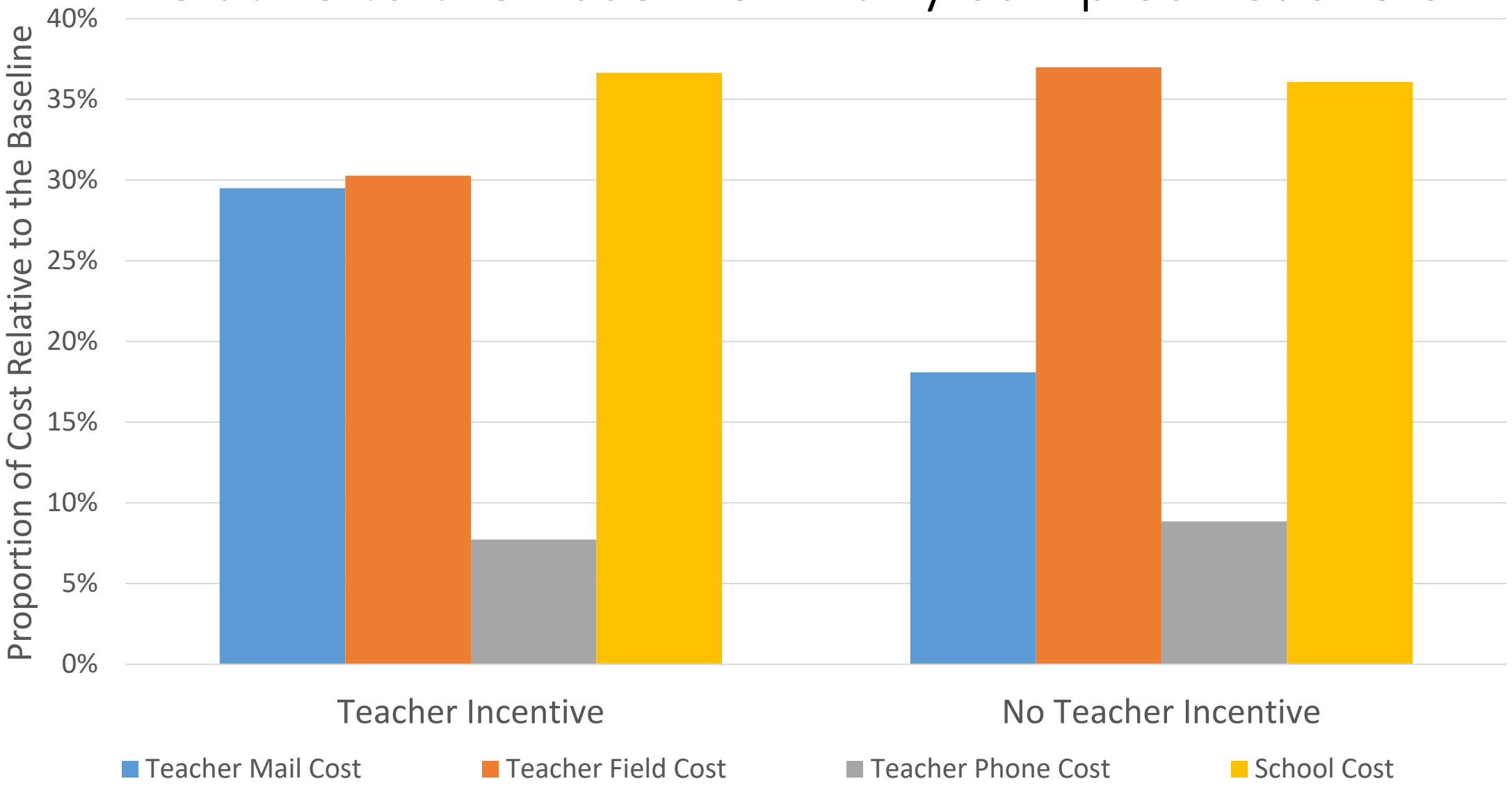
NTPS – Teacher, percent change in cost-per-case

- The teacher incentive creates a significant cost debt
- While the overall average cost of the cases who received the cash incentive is greater, the 4.13% difference in cost is less than the initial $5 incentive amount itself

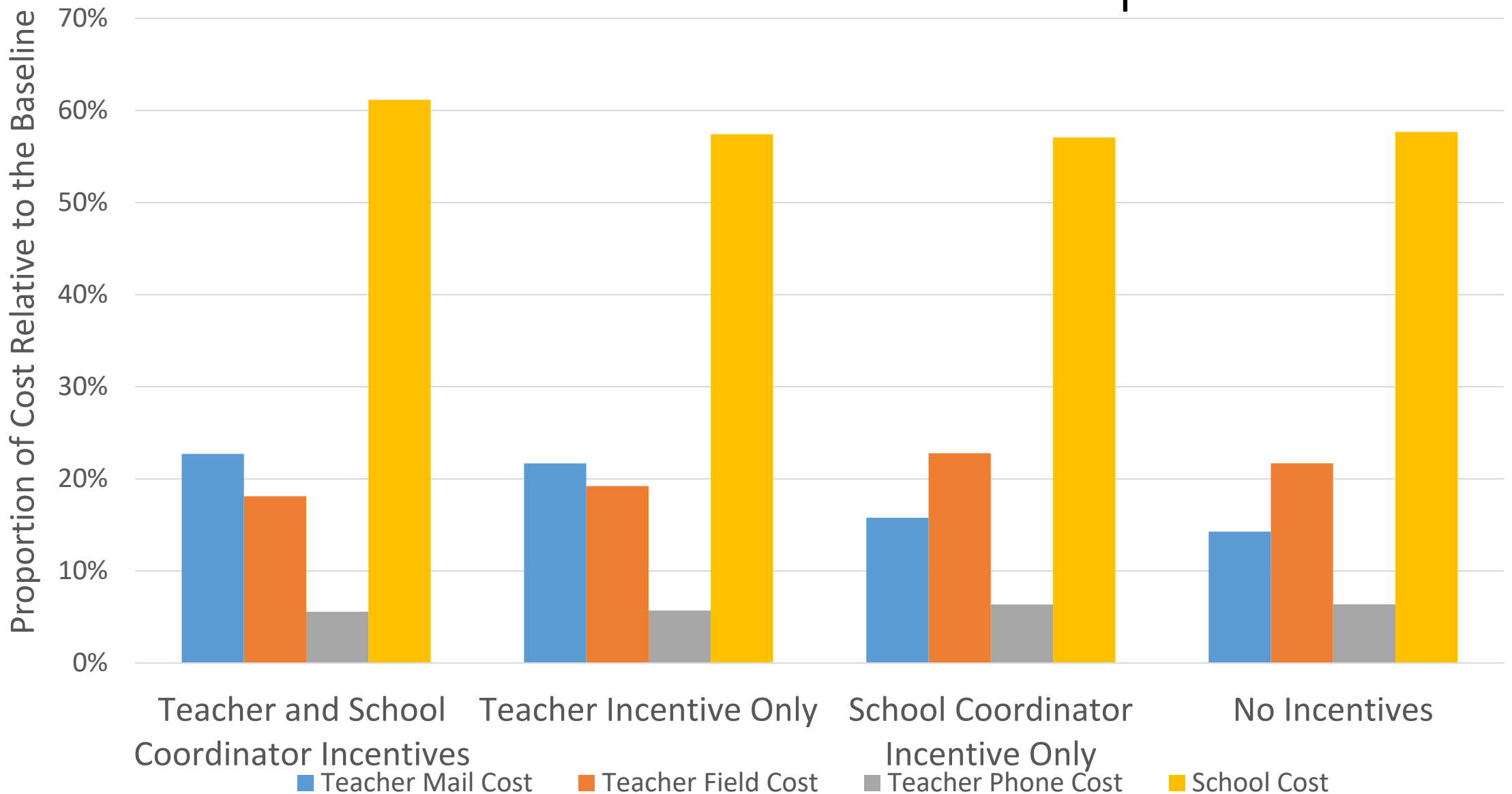
Public School - cost-per-case			
Early School Response TLFs		Late School Response TLFs	
Teacher Incentive	4.13%*	Teacher and SC Incentives	7.55%*
		Teacher Incentive Only	4.00%*
No Incentive	0%	SC Incentive Only	1.98%
		No Incentive	0%

* denotes a statistically significant difference from the respective column's baseline group with α = .10 level

Proportions of Costs of Operations Relative to the Baseline – Early Sampled Teachers



Proportions of Costs of Operations Relative to the Baseline – Late Sampled Teachers



NTPS –Conclusions/Limitations

Conclusions

- The NTPS 2017-18 teacher incentives experiment was successful in increasing teacher response rates in public schools, but it did so at a slightly higher cost-per-case
- Certain operations carry higher portions of a case's cost

Limitations

- Unable to parse-out incentive-specific overhead
- Limited CATI and CAPI data

Next Steps

How can we used what we learned to inform…

…the next data collection cycle of NTPS?

…data collection for other surveys?

Next Steps – NTPS 2020-21 Data Collection

- In the 2020-21 NTPS the teacher incentives will be implemented on a larger scale
- The 2020-21 NTPS will test two different nonmonetary incentives
  - Teacher-level: tote bag incentive
  - School-level: popcorn tin incentive

Next Steps - General

- Continue to work closely with subject matter experts
- Expand this process to fit more surveys

Thank You!

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