Optimizing smart subsidies to drive toward 100% market-led rural sanitation coverage in Cambodia

Evidence from a randomized control trial.

iDE

Australian Aid

CAUSAL DESIGN

Chris Nicoletti & Alicia May   April 2015 – April 2017

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Presentation overview

What we'll be discussing today

The issues we're facing and the big questions we're trying to answer

The study we designed to answer those questions

Our results, and what they tell us about targeted subsidies

How iDE intends on scaling up the use of smart subsidies in our Sanitation Marketing program in Cambodia.

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Sanitation Marketing

The Basics of SanMark

We work through the private sector to build markets

We design products to context

We train businesses to produce and distribute products

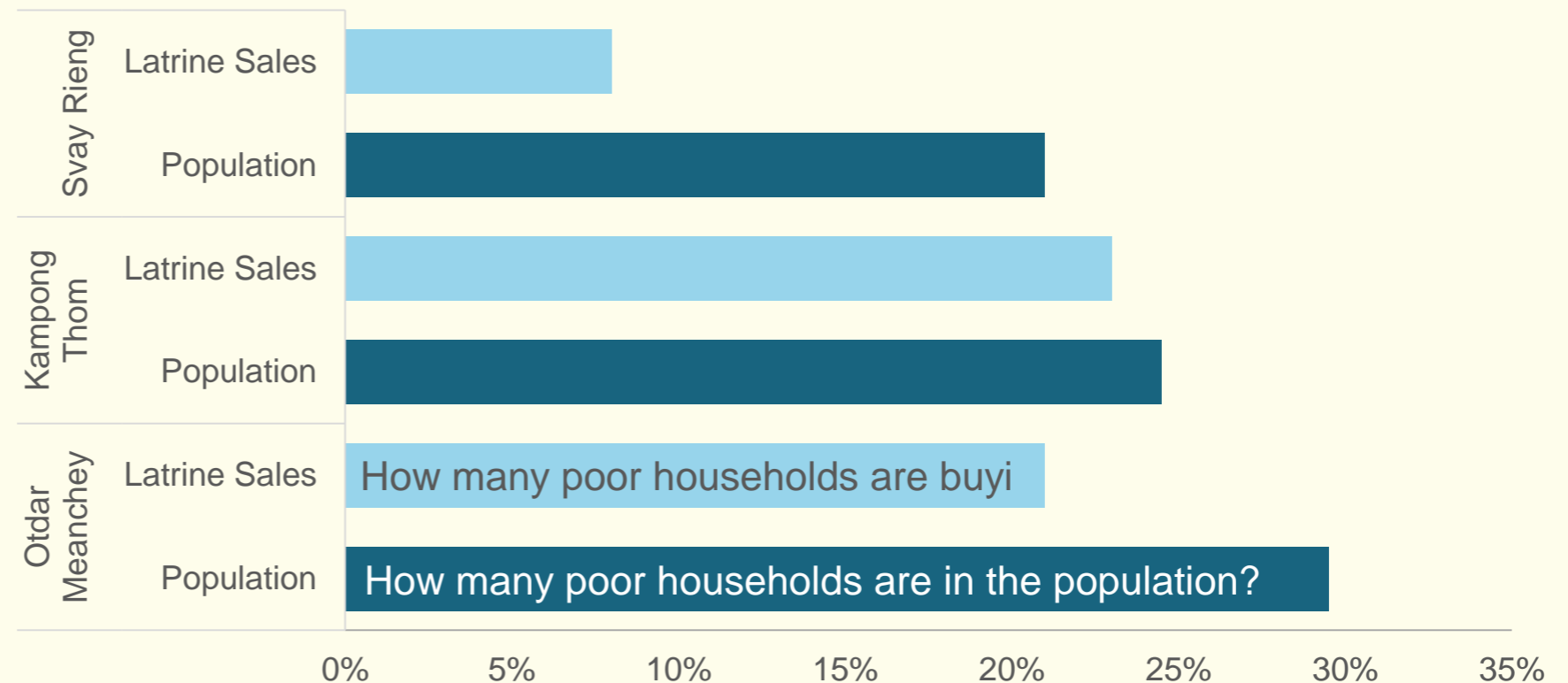We recruit and train independent sales agents who are paid by suppliers

We have a fairly "hands-on" approach to sales and order management as well as supply chain management.
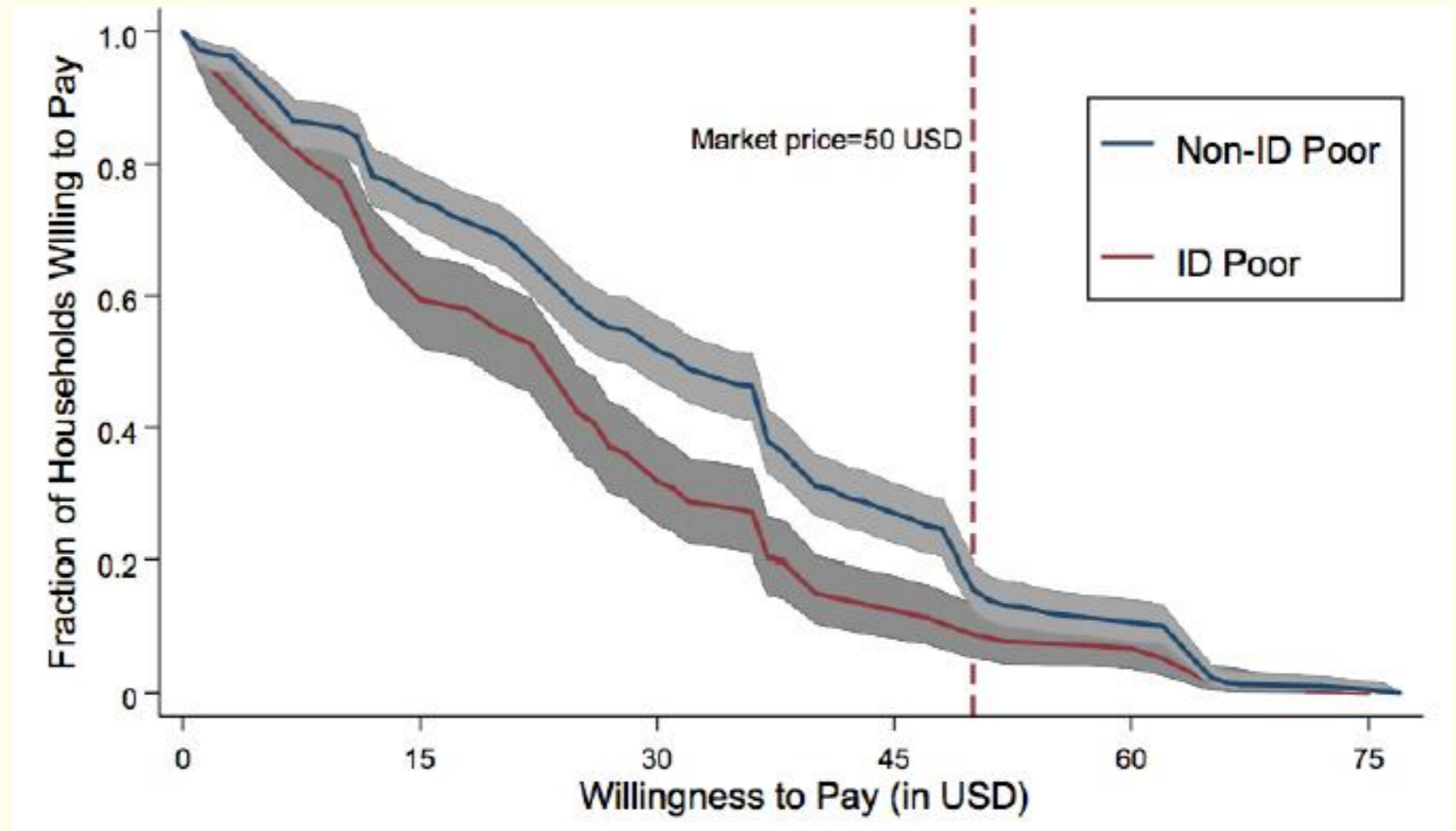
The issues we're facing

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The issues we're facing

Poor HHs' share in latrine sales and in province population

|		
Svay Rieng	Latrine Sales	
	Population	
Kampong Thom	Latrine Sales	
	Population	
Otdar Meanchey	Latrine Sales	How many poor households are buyi
	Population	How many poor households are in the population?

0% 5% 10% 15% 20% 25% 30% 35%

A market-based approach does not inherently establish incentives to reach the poor.

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Price Point (USD)

The issues we're facing

Prior market research suggests that relatively few poor households can afford latrines at market price…

Price Point (USD)
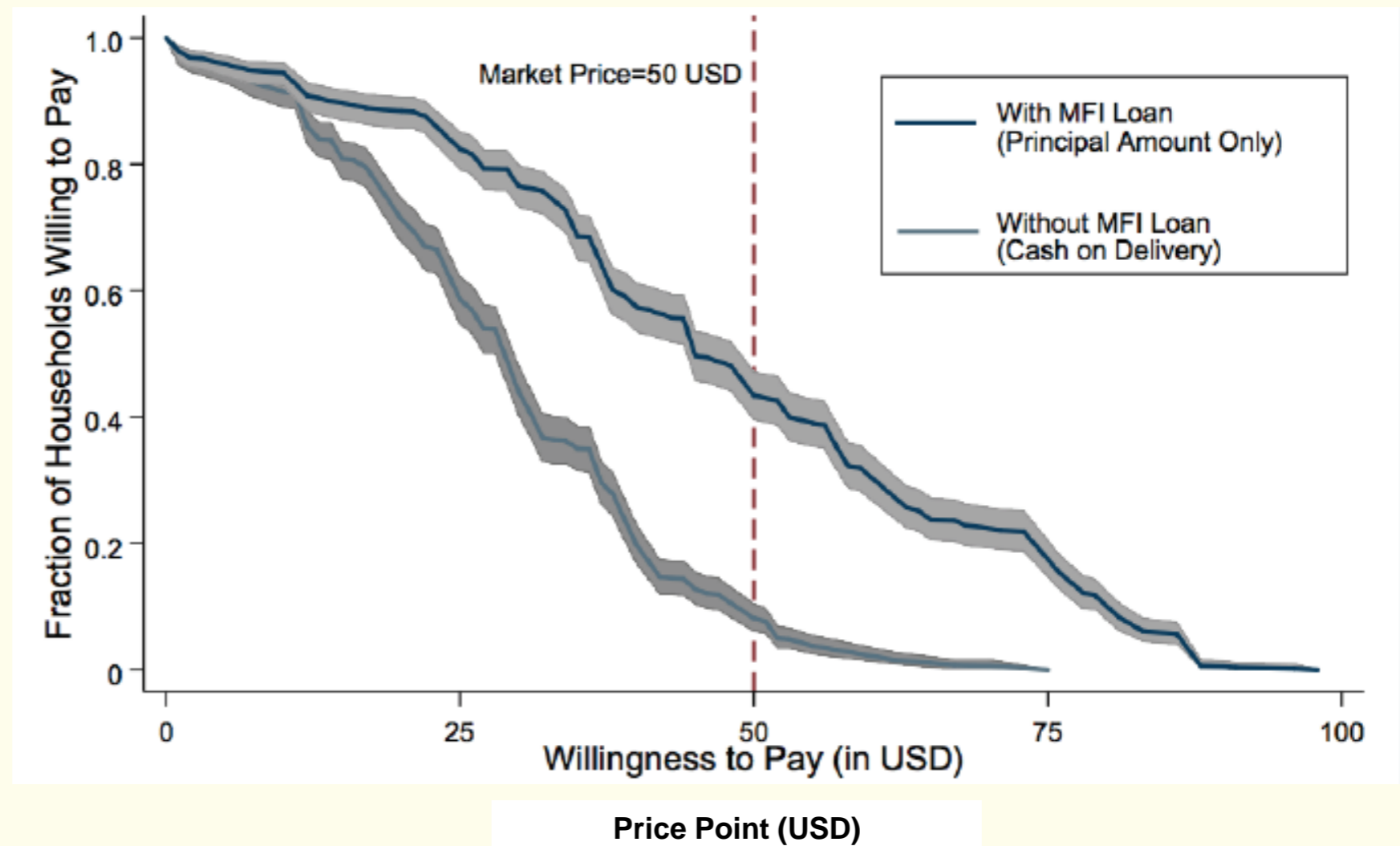
The issues we're facing

…and that financing can only take us so far, especially given operational complexities surrounding finance.

Given these issues, we want to know:

1. Do targeted, partial latrine subsidies increase latrine sales to poor households?

2. Do targeted, partial latrine subsidies affect latrine sales to non-poor households?

3. Are targeted subsidies or sanitation financing options—or a combination of the two—the most cost-effective means of increasing latrine sales to poor households?

Study design and mechanics

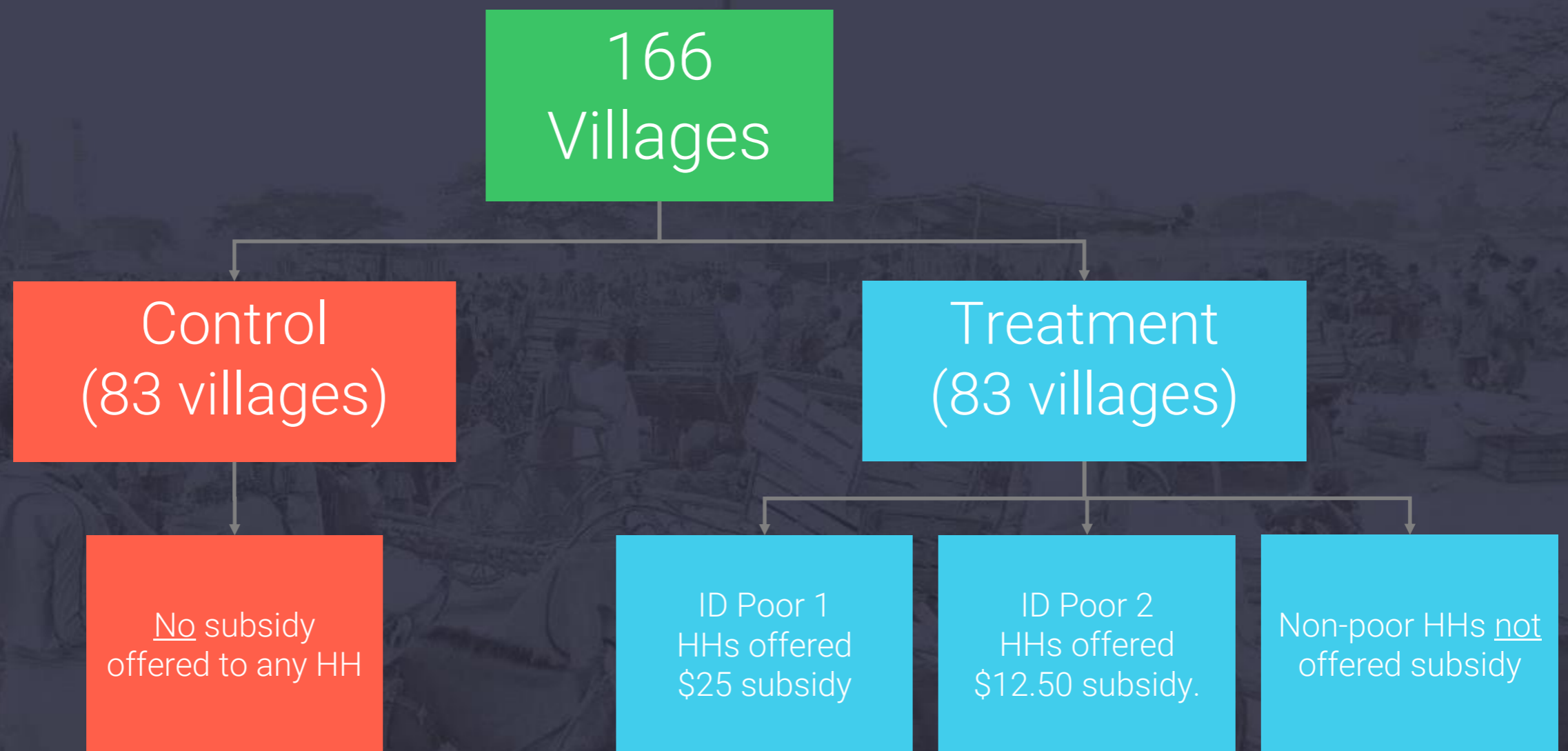## Study mechanics: targeting the subsidy

Cambodia's "ID Poor" system allows
us to accurately target subsidies.

- The national government works with local government to categorize households as ID Poor 1, ID Poor 2, and Non-poor

- ID Poor households have identification cards that iDE was able to verify with local officials and the national database.

- Sales agents took photos of ID cards and uploaded directly to our management information system on Salesforce using TaroWorks.
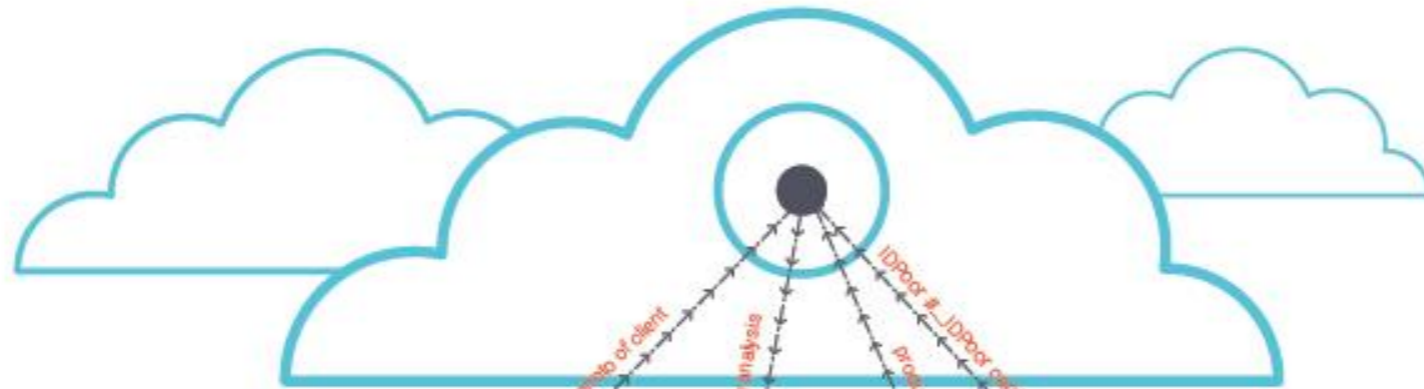
Subsidy Amounts

- ID Poor 1 HHs → $25 USD discount on a $56 USD market price = 44%

- ID Poor 2 HHs → $12.50 USD discount on a $56 USD market price = 22%

RCT study design

166 Villages

Control (83 villages)

Treatment (83 villages)

No subsidy offered to any HH

ID Poor 1 HHs offered $25 subsidy

ID Poor 2 HHs offered $12.50 subsidy.

Non-poor HHs not offered subsidy

All HHs can pay with cash or apply for MFI loan

Data Sources – iDE's Cloud-based Order Management System

Data Sources – Data visualization and ongoing performance monitoring
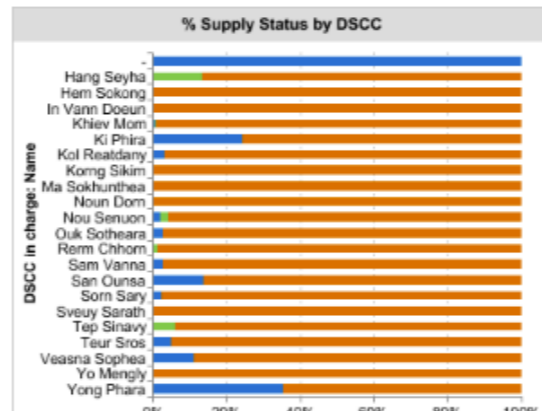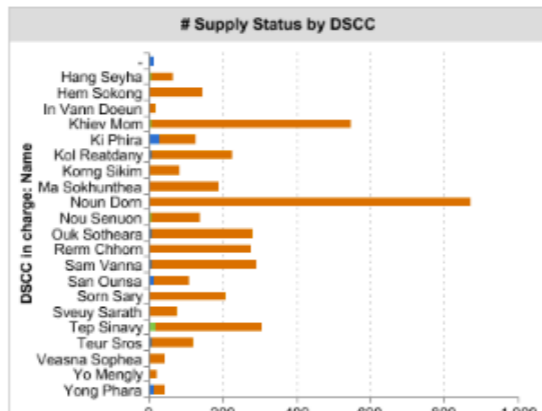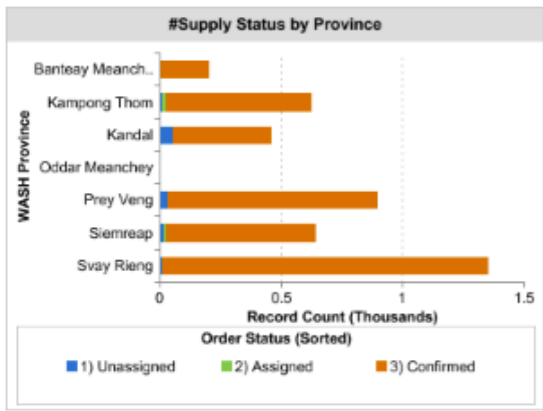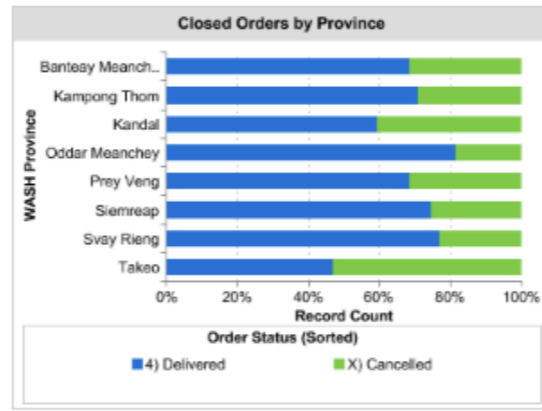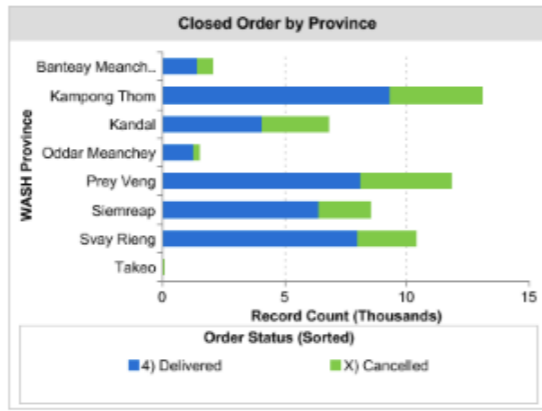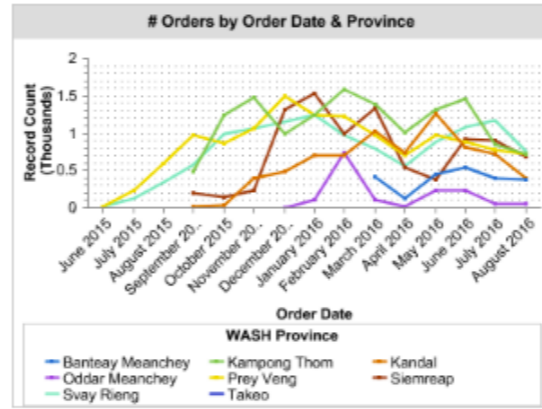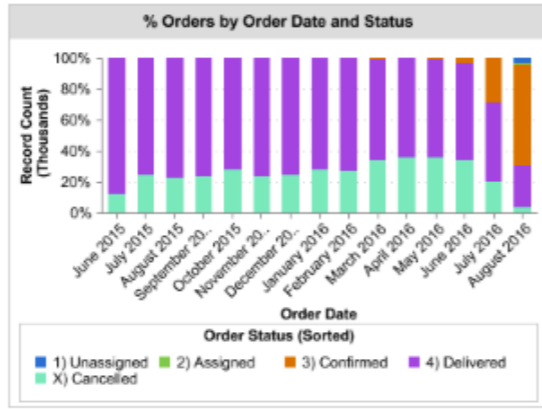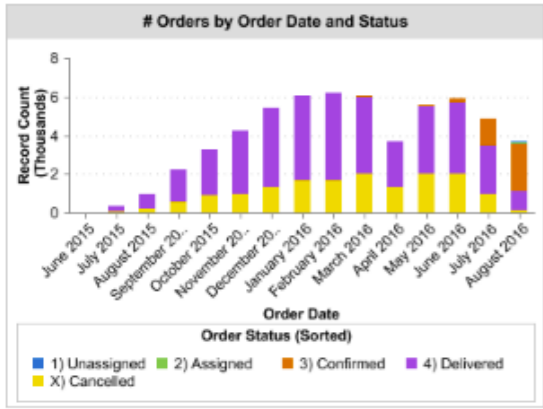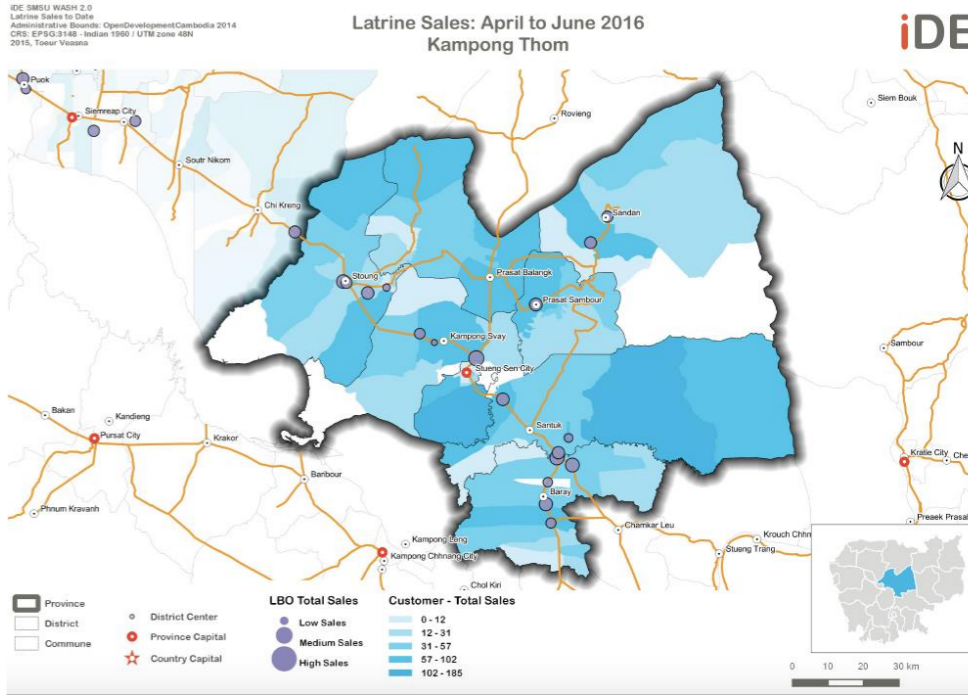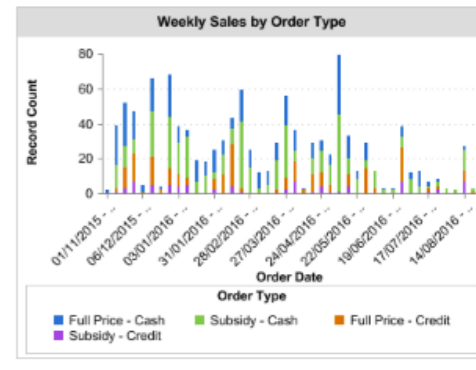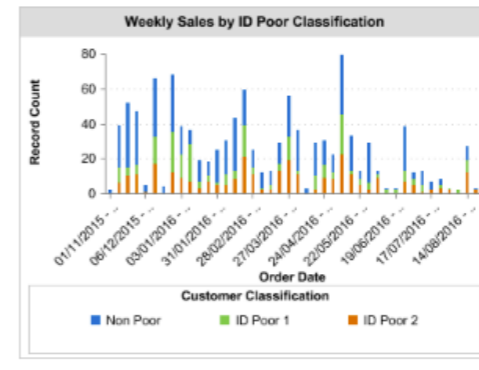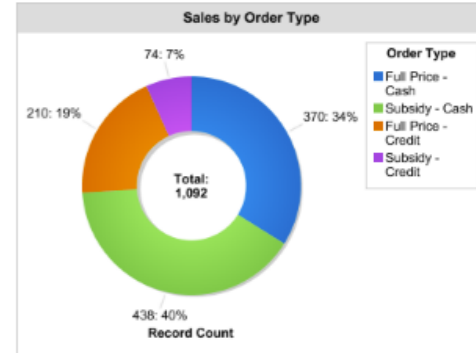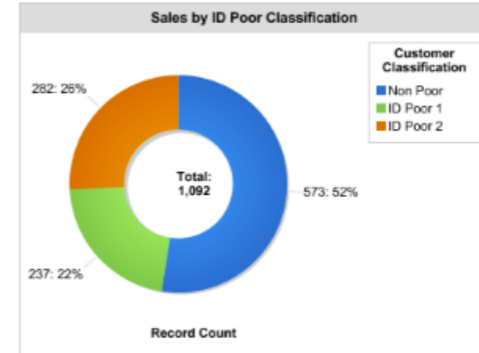
Results and insights

We want to know:

1. Do targeted, partial latrine subsidies increase latrine sales to poor households?

2. Do targeted, partial latrine subsidies affect latrine sales to non-poor households?

3. Are targeted subsidies or sanitation financing options—or a combination of the two—the most cost-effective means of increasing latrine sales to poor households?

Results: Absolute sales figures

Total toilet sales by payment type and experimental group

Far greater sales to poor households when subsidies are offered.

Treatment (subsidies)

Poor: Cash 356, Financing 39

Non-poor: Cash 255, Financing 101

Control (no subsidies)

Poor: Cash 39, Financing 36

Non-poor: Cash 223, Financing 121

■ Cash ■ Financing

Results: Absolute sales figures

Total toilet sales by payment type and experimental group

Little impact of subsidies on sales to non-poor Households.

39	101	36	121
356	255	39	223

Poor | Non-poor | | Poor | Non-poor

Treatment (subsidies) | Control (no subsidies)

■ Cash ■ Financing
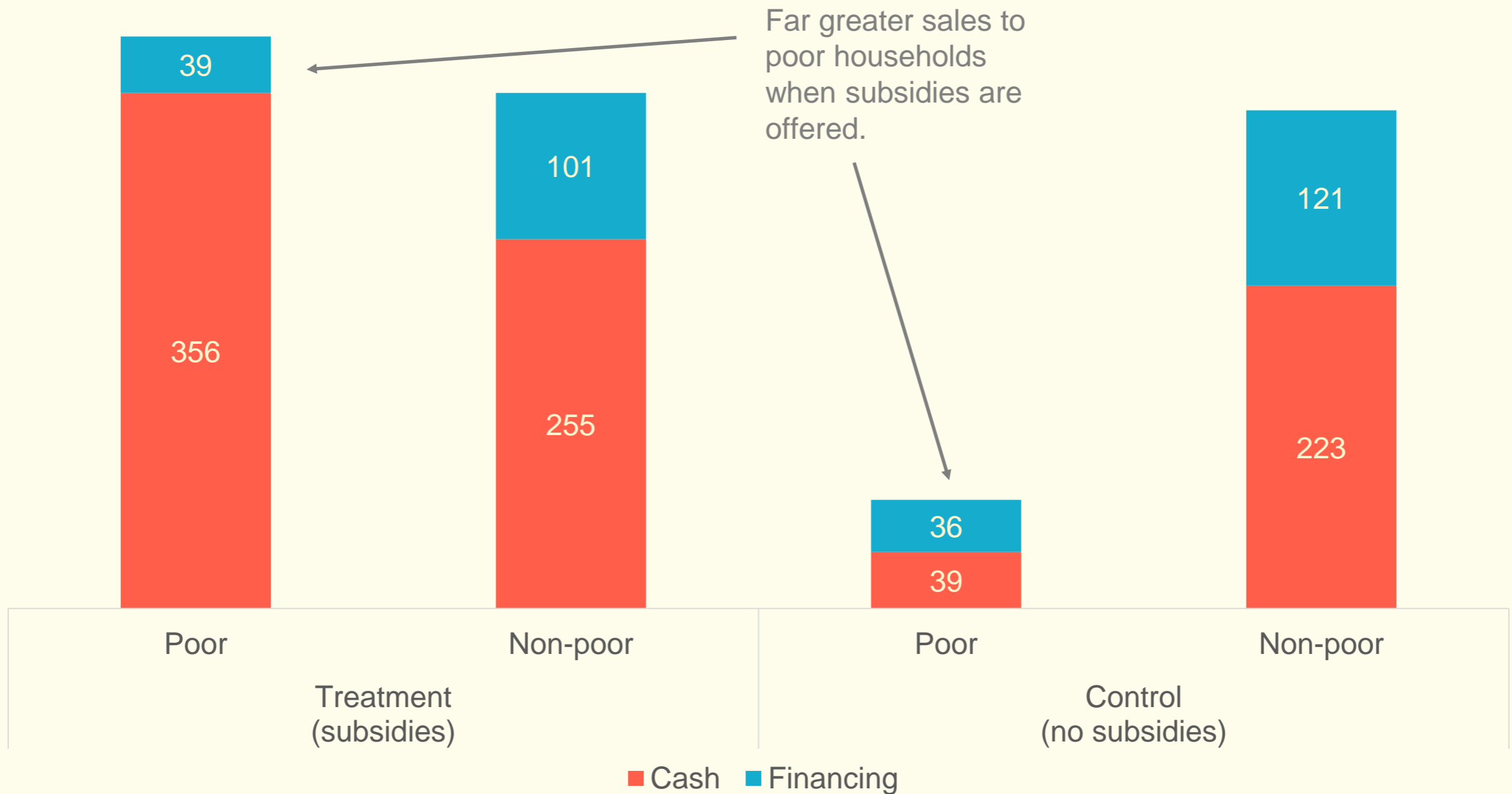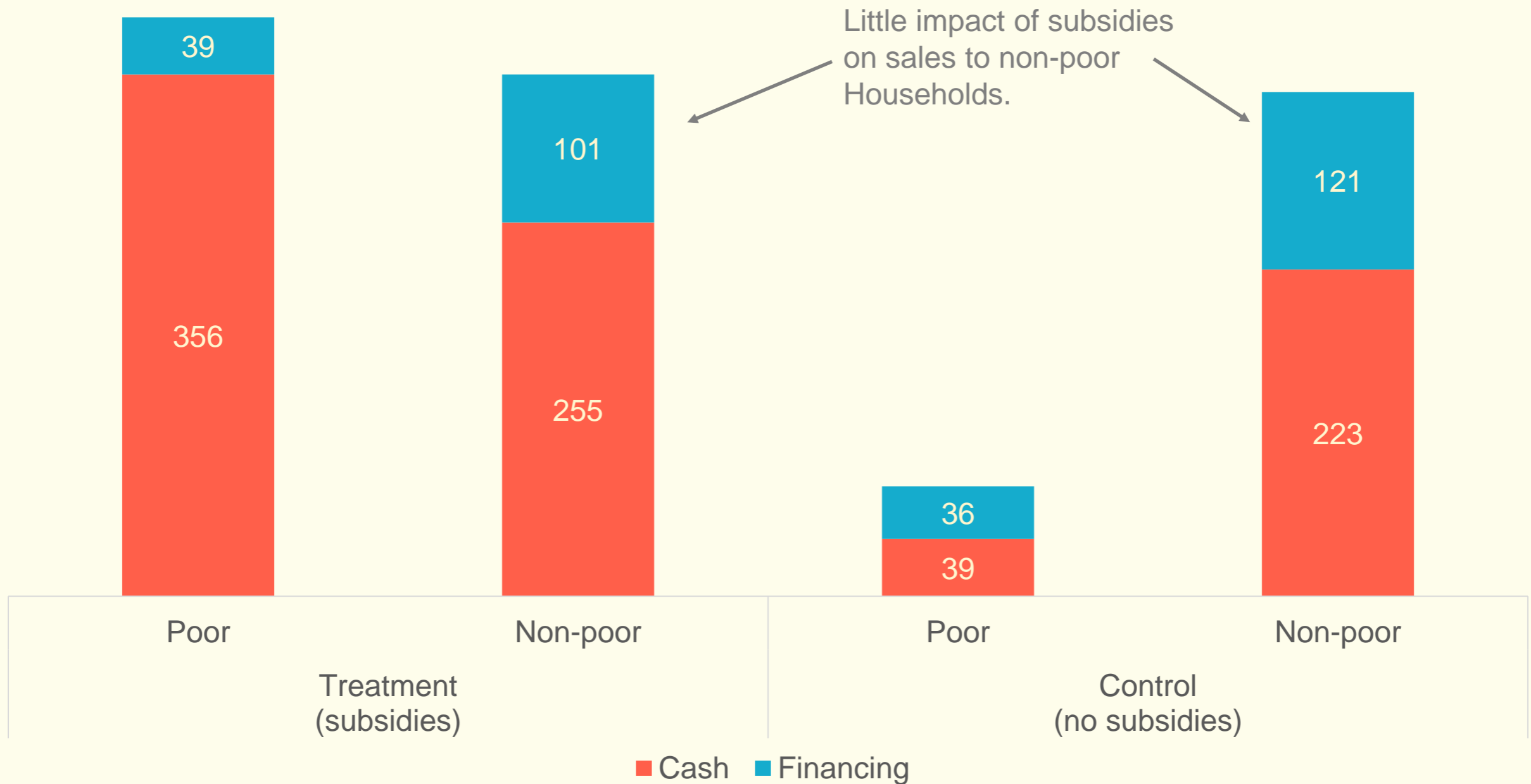
Results: Village-level treatment effects analysis

Outcome: Uptake rate among 'valid' households[1]				
Coverage change treatment effects model[2]				
	Non-poor	IDP 1	IDP 2	All HHs
Treatment (subsidy offer to IDP HHs)	-0.00159	0.169***	0.147***	0.143**
	(0.0403)	(0.0586)	(0.0499)	(0.0621)
Constant	0.283***	0.0838	0.0841	0.216
	(0.0957)	(0.274)	(0.115)	(0.242)
Observations	143	140	142	150
R-squared	0.232	0.206	0.290	0.181
Robust standard errors in parentheses. [*** p<0.01, ** p<0.05, * p<0.1] [1]Valid households are those households that do not have improved sanitation, as measured by latrine census [2]This table shows only truncated model results, and does not include control variables				

Interpretations

Uptake increases by 16.9 and 14.7 percentage points among IDP 1 and IDP 2 households, respectively, when they are offered targeted subsidies.

Offering partial subsidy to IDP households has no statistically significant effect on the likelihood of non-poor households purchasing.

Overall uptake increases by 14.3 percentage points in villages where subsidies are offered, when compared with control villages.

We want to know:

3. Are targeted subsidies or sanitation financing options—or a combination of the two—the most cost-effective means of increasing latrine sales to poor households?

Results: Cost-effectiveness analysis

Cost-Effectiveness Ratio =

Total Fixed Costs + (Marginal Costs * Number of Latrines Sold)

Number of Latrines Sold

Marginal Costs

Control: sales agent commissions and loan processing costs

Treatment: subsidy amount, sales agent commissions, and loan processing costs

Results: Cost-effectiveness analysis

Pilot
- Control: $254
- Treatment: $153

Program-Wide (Scale)
- Control: $66
- Treatment: $39

■ Costs per latrine (fixed)   ■ Costs per latrine (marginal)

X-axis: $0, $50, $100, $150, $200, $250, $300, $350, $400
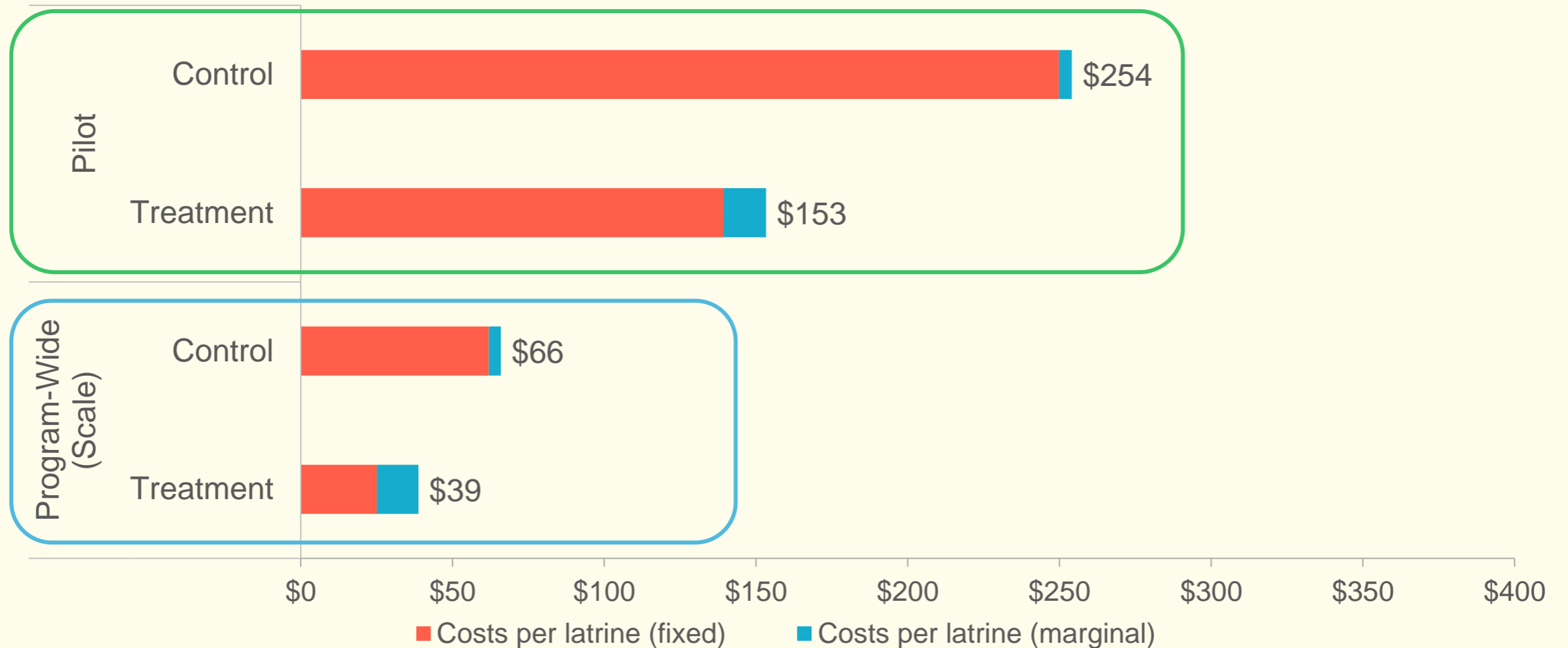
Takeaways

Higher sales in the pilot Treatment group "spread" fixed costs across a greater number of latrines, resulting in a higher cost-effectiveness ratio

If we project calculations out to a scaled version of the program, smart subsidies still look like a cost-effective way to drive increases in sanitation coverage

Future Plans and Takeaways

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Conclusions

Challenges & Limitations

- The study took place in a province with high coverage rates – how would results differ in different circumstances?

- High turnover of Sales Agents, requiring considerable training and oversite.

- MFI reluctance, combined with increased indebtedness resulted in very few sanitation loans.

- The ID Poor system is by no means a worldwide standard – how do we target in the absence of such systems?

- The study design may have impacted sales agent motivation to sell in control villages.

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Conclusions

Scale Up Plans

- No longer pursuing formal sanitation finance.

- Instalment plans offered to customers by suppliers.

- Government of Cambodia adopted the recommended subsidy guidelines → coverage must be 60% before subsidy can be offered.

- Smart subsidy will be fully integrated into the existing sanitation marketing program under SMSU 3.0.

- Continue to share findings in hopes of influencing others in the sector – in Cambodia, but also in other contexts.

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Takeaways

- This study provides promising evidence that targeted subsidies can increase sanitation coverage among poor households and overall.

- It also shows that well-targeted subsidies need not have market distortion effects.

- Targeted subsidies may provide a cost-effective complement to financing.

Conclusions

Thank you very much!

iDE would like to thank all of the project partners that helped with this research, as well as our peers at SNV, WaterSHED and East Meets West for sharing your findings with us and being so open to collaboration.

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Table 12. Outcome: Latrine Orders (village level)

	Non-poor	ID Poor 1	ID Poor 2	All HHs
Treatment	0.659	2.235***	2.624***	5.518***
	(1.197)	(0.484)	(0.536)	(1.712)
Total households	0.00636	0.00553**	0.00431**	0.0162**
	(0.00474)	(0.00232)	(0.00192)	(0.00686)
"Valid" latrine customers	41.99***	3.010	7.754***	52.75***
	(7.111)	(2.791)	(2.632)	(9.936)
Village ID Poor 1 and 2	-13.96*	9.109***	5.689*	0.843
	(7.535)	(3.439)	(2.939)	(10.54)
District fixed effects				
District: Lvea Aem	-1.747	0.849	0.378	-0.519
	(2.450)	(1.037)	(1.398)	(3.829)
District: Mukh Kampul	3.194*	-0.0728	0.769	3.890
	(1.889)	(0.578)	(0.810)	(2.560)
Prior subsidies	2.107*	-0.0687	-0.327	1.712
	(1.138)	(0.454)	(0.459)	(1.566)
Prior free latrine	2.598	-0.161	-0.421	2.017
	(2.088)	(0.478)	(0.504)	(2.645)
Prior negative latrine experience	-1.835	-0.898*	-0.848	-3.581*
	(1.432)	(0.472)	(0.587)	(1.931)
Month of sale	-0.0295	-0.0907	0.0746	-0.0455
	(0.373)	(0.145)	(0.230)	(0.545)
ST fixed effects (See Appendix)				
Constant	-5.212*	-5.068***	-4.052***	-14.33***
	(2.730)	(1.690)	(1.259)	(4.113)
Observations	150	150	150	150
R-squared	0.540	0.368	0.419	0.538

Table 13. Outcome: Latrine Deliveries (village level)

	Non-poor	ID Poor 1	ID Poor 2	All HHs
Treatment	0.116	2.094***	1.989***	4.199***
	(0.857)	(0.423)	(0.391)	(1.275)
Total households	0.00347	0.00414**	0.00243*	0.0100**
	(0.00339)	(0.00192)	(0.00135)	(0.00504)
"Valid" latrine customers	24.14***	1.770	4.998***	30.90***
	(4.998)	(2.354)	(1.864)	(7.225)
Village ID Poor 1 and 2	-10.13*	6.994**	4.815**	1.678
	(5.566)	(3.205)	(2.110)	(8.403)
District fixed effects				
District: Lvea Aem	-1.431	0.705	1.094	0.369
	(1.559)	(0.899)	(0.964)	(2.572)
District: Mukh Kampul	2.931**	-0.0754	1.161*	4.016*
	(1.415)	(0.535)	(0.680)	(2.042)
Prior subsidies	1.671**	0.0423	0.183	1.896
	(0.802)	(0.404)	(0.336)	(1.163)
Prior free latrine	2.360	-0.151	-0.242	1.967
	(1.475)	(0.440)	(0.364)	(1.916)
Prior negative latrine experience	-0.834	-0.718*	-0.532	-2.084
	(0.994)	(0.426)	(0.386)	(1.395)
Month of sale	-0.150	-0.0704	0.0138	-0.206
	(0.255)	(0.124)	(0.144)	(0.371)
ST fixed effects (See Appendix)				
Constant	-3.375	-4.331***	-3.479***	-11.18***
	(2.148)	(1.441)	(1.042)	(3.515)
Observations	150	150	150	150
R-squared	0.509	0.359	0.434	0.510

Table 14. Outcome: Uptake Rate Among "Valid" Customers

VARIABLES	Non-poor	ID Poor 1	ID Poor 2	All HHs
Treatment	-0.00159	0.169***	0.147***	0.143**
	(0.0403)	(0.0586)	(0.0499)	(0.0621)
Total households	-0.000189*	-8.89e-05	-0.000190	-0.000264
	(0.000104)	(0.000207)	(0.000143)	(0.000262)
"Valid" latrine customers	-0.178	-0.146	-0.212	-0.478**
	(0.126)	(0.197)	(0.178)	(0.239)
Village ID Poor 1 and 2	-0.140	0.271	0.240	0.449
	(0.209)	(0.660)	(0.281)	(0.651)
District fixed effects				
District: Lvea Aem	-0.00531	0.0377	0.0976	-0.0527
	(0.0417)	(0.0930)	(0.0963)	(0.0790)
District: Mukh Kampul	0.0657	-0.0907	0.111	-0.00355
	(0.0579)	(0.0983)	(0.102)	(0.0788)
Prior subsidies	0.0475	0.111*	-0.0427	0.124*
	(0.0319)	(0.0623)	(0.0578)	(0.0654)
Prior free latrine	0.0828	0.0218	-0.0410	-0.00563
	(0.0759)	(0.0689)	(0.0425)	(0.0715)
Prior negative latrine experience	-0.0841**	-0.0914*	-0.0245	-0.119**
	(0.0372)	(0.0547)	(0.0398)	(0.0516)
Month of sale	-0.0199**	-0.0210	-0.0185	-0.0128
	(0.00780)	(0.0201)	(0.0165)	(0.0147)
ST fixed effects (See Appendix)				
Constant	0.283***	0.0838	0.0841	0.216
	(0.0957)	(0.274)	(0.115)	(0.242)
Observations	143	140	142	150
R-squared	0.232	0.206	0.290	0.181

Table 15. Outcome: Total Coverage Rate

	Non-poor	ID Poor 1	ID Poor 2	All HHs
Treatment	-0.00202	0.0650***	0.0413***	0.00759**
	(0.00344)	(0.0132)	(0.00928)	(0.00365)
Total households	-3.44e-05**	-1.71e-05	-3.13e-05	-2.95e-05**
	(1.38e-05)	(3.93e-05)	(3.05e-05)	(1.31e-05)
"Valid" latrine customers	0.0806***	0.113**	0.121***	0.0805***
	(0.0184)	(0.0569)	(0.0398)	(0.0192)
Village ID Poor 1 and 2	-0.0215	-0.0648	-0.00524	-0.00165
	(0.0258)	(0.0941)	(0.0578)	(0.0266)
District fixed effects				
District: Lvea Aem	-0.00142	0.0117	0.00936	0.00426
	(0.00660)	(0.0361)	(0.0229)	(0.00696)
District: Mukh Kampul	0.0112**	-0.00165	0.0247	0.0132**
	(0.00545)	(0.0218)	(0.0152)	(0.00577)
Prior subsidies	0.00620*	0.00207	0.00252	0.00650*
	(0.00328)	(0.0125)	(0.00978)	(0.00353)
Prior free latrine	0.0144*	-0.000336	-0.00381	0.00906
	(0.00752)	(0.0128)	(0.0111)	(0.00569)
Prior negative latrine experience	-0.00619	-0.0234*	-0.0120	-0.00859**
	(0.00406)	(0.0129)	(0.0115)	(0.00394)
Month of sale	-0.00170*	0.00219	-0.00102	-0.00163
	(0.000960)	(0.00583)	(0.00415)	(0.00117)
ST fixed effects (See Appendix)				
Constant	0.00896	-0.0184	-0.00631	0.000920
	(0.00890)	(0.0349)	(0.0213)	(0.0102)
Observations	147	148	149	150
R-squared	0.463	0.319	0.343	0.462

Cost-Effectiveness

Cambodia SanMark - Cumulative Latrine Sales vs Cost per Unit Sold