DEPARTMENT OF BIOSTATISTICS
VANDERBILT UNIVERSITY

Statistical Analysis Report:

Determining the Barriers to Healthcare Access and Utilization Among Single Mothers in Rural Kenya

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1 Introduction

In Malindi, Kenya, there is a great deal of stigma surrounding single motherhood. As a result, single mothers are often discriminated against, shunned, or even ostracized from their communities. This creates a huge burden on these women and their children, leading to stress and a decreased quality of life in general. Two years ago, Jim and Laura Reppart, representatives from the Caris Foundation in Malindi, began a project to empower forty-one single mothers by linking them to skilled labor training, offering a support system, and providing them with access to health care. Through this program, women learn leadership skills and general health education. By providing single mothers with opportunities for personal growth, they are able to rise above societal stigma to improve the quality of their own lives as well as the lives of their children. The Caris Foundation is looking to expand the program from forty-one single mothers to two hundred by next year.

The greatest challenge for expanding this program will be the delivery of health care to all of these single mothers and their children. For the first group of forty-one women, The Caris Foundation paid Malindi District hospital to provide health care services. The problem with this system is that the women must travel from their home villages to Malindi for treatment. Variables such as distance to the clinic, access to safe transportation, cost of travel, and lost work time are all obstacles that impact clinic visitation rates.

Previous research has shown that barriers to care affect clinic visitation rates. One study in rural western Kenya found that for every 1 km increase in distance from a clinic, the rate of clinic visitation for mothers and their children decreased by 34% (Feikin et al. 2008). A study in Coastal Kenya reported that 50.8% of rural adults were likely to lose one income day as compared to 27.9% of adults in urban areas ($P<0.001$) (Chuma et al. 2007). If this data holds true for single mothers near Malindi, then there is a clear need for close, community-based care.

1.1 Research Aims

1.1.1 To summarize demographics, barriers to care and health characteristics by program participation.

1.1.2 To identify predictors of care for sickness sought at Malindi district hospital.

1.1.3 To identify predictors of hospital delivery.

1.1.4 To identify predictors of perceived barriers to care.

2 Methods

2.1 Participants

Over one hundred women gave consent to participate in survey interviews. Forty-one women were from the pilot program and 60 from the expansion program. Two interviews were not completed due to time constraints.

2.2 Data Sources and Measurements

The study contains 101 patient interviews. The structure of the survey includes questions about basic demographics (age, sex, marriage status, occupation), health care usage (where do you go for medical care, how often, etc) and barriers that exist to accessing care (how far do you travel, how much does it cost, etc). This survey was administered in Swahili (native language). Edits were made to the survey following input from the field workers. The Vanderbilt RedCAP database is a password-protected database that was used to store survey data.

2.3 Outcomes

The primary outcome will be pilot versus expansion groups. Secondary outcomes are barriers to care and the location of medical care for any sickness in the past year or for any labor and delivery.

2.4 Statistical Methods

1. To summarize demographics, barriers to care and health characteristics by program participation.
Descriptive statistics will be used to summarize patient characteristics by program participation for each module of the questionnaire: demographics, barriers to care, medications, pregnancies, maternal and child health, WHO-QoL.

2. To identify predictors of care for sickness sought at Malindi district hospital.
Multivariable logistic regression models will be used to assess the relationship between care for sickness sought at Malindi district hospital with known and hypothesized barriers to care. Specifically, group, distance to nearest clinic, number of children, type of sickness, and severity of sickness are predictors of interest. Missing values of predictors will be accounted for using single imputation techniques. The unit of analysis is the sickness (up to 8 per women), so the Huber-White method to adjust the variance-covariance matrix for correlated responses will be utilized to account for correlation between each sickness.

3. To identify predictors of hospital delivery.
Multivariable logistic regression models will be used to assess the relationship between hospital delivery with known and hypothesized barriers to care. Specifically, group, distance to nearest clinic, maternal education, number of children, and complications are predictors of interest. Missing values of predictors were accounted for using single imputation. The unit of analysis is the labor and delivery (up to 13 per women), so the Huber-White method to adjust the variance-covariance matrix for correlated responses will be utilized to account for correlation between each labor and delivery.

4. To identify predictors of perceived barriers to care.
Multivariable proportional odds models will be used to assess the relationship between perceived barriers to care with group, age, maternal education, and number of children. Missing values of predictors were accounted for using single imputation; all predictors had less than 6% missing.

R-software 2.13.1 (www.r-project.org) will be used for data analyses.

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3 Results

Table 1: Summary of Respondent Characteristics by Program Participation

	Pilot (n=41)	Expansion (n=60)	Combined (n=101)
Which TTG is this SM in?, n(%)			
Tumaini	2 (5%)	12 (20%)	14 (14%)
Jipe Moyo Kijiwetanga	9 (22%)	1 (2%)	10 (10%)
Mahenzo	3 (7%)	9 (15%)	12 (12%)
Upendo Barani	6 (15%)	2 (3%)	8 (8%)
Al Razak	1 (2%)	10 (17%)	11 (11%)
Mwangaza	1 (2%)	10 (17%)	11 (11%)
None	19 (46%)	0 (0%)	19 (19%)
Upendo Sabaki	0 (0%)	8 (13%)	8 (8%)
Vitendo	0 (0%)	8 (13%)	8 (8%)
Age of single mother[a]	22 (20, 25)	27 (21, 38)	25 (21, 31)
Missing age of single mother, n(%)	4 (10%)	2 (3%)	6 (6%)
Number of years of primary school	5 (2.5, 7)	4 (0, 7)	5 (1, 7)
Missing number of years of primary school, n(%)	2 (5%)	4 (7%)	6 (6%)
Number of years of secondary school	0 (0, 0)	0 (0, 0)	0 (0, 0)
Missing number of years of secondary school, n(%)	2 (5%)	4 (7%)	6 (6%)
Employment, n(%)			
Missing[b]	6 (15%)	1 (2%)	7 (7%)
Full time	2 (6%)	3 (5%)	5 (5%)
Casual laborer	4 (11%)	6 (10%)	10 (11%)
No work	9 (26%)	11 (19%)	20 (21%)
Self-employed	20 (57%)	39 (66%)	59 (63%)
Monthly income	2000 (500, 3000)	2000 (100, 3000)	2000 (275, 3000)
Missing monthly income, n(%)	14 (34%)	7 (12%)	21 (21%)
Type of home, n(%)			
Missing	2 (5%)	0 (0%)	2 (2%)
Family Homestead	30 (77%)	46 (77%)	76 (77%)
Rented House	9 (23%)	14 (23%)	23 (23%)
Roof, n(%)			
Missing	0 (0%)	2 (3%)	2 (2%)
Makuti	26 (63%)	28 (48%)	54 (55%)
Mabati	15 (37%)	30 (52%)	45 (45%)
Water source, n(%)			
Missing	0 (0%)	2 (3%)	2 (2%)
In house	3 (7%)	5 (9%)	8 (8%)
Public tap	24 (59%)	35 (60%)	59 (60%)
River/stream	2 (5%)	1 (2%)	3 (3%)
Well water	12 (29%)	17 (29%)	29 (29%)
Latrine type, n(%)			
Missing	3 (7%)	1 (2%)	4 (4%)
Indoor	5 (13%)	4 (7%)	9 (9%)
Outdoor	16 (42%)	17 (29%)	33 (34%)
None	17 (45%)	38 (64%)	55 (57%)
Age of oldest child	6 (4, 8)	10 (4.5, 18)	7 (4, 11)
Missing age of oldest child, n(%)	1 (2%)	7 (12%)	8 (8%)
Number of children at home	3 (2, 5.2)	3 (1, 5)	3 (1.5, 5)
Missing number of children at home, n(%)	1 (2%)	1 (2%)	2 (2%)
Number of adults at home	2 (1, 5)	2 (1, 3)	2 (1, 4)
Missing number of adults at home, n(%)	5 (12%)	11 (18%)	16 (16%)

[a] Continuous variables are reported as medians (interquartile range).

[b] Percentages are computed using the number of respondents with a non-missing value.

Table 2: Summary of Healthcare Needs by Program Participation

	Pilot (n=41)	Expansion (n=60)	Combined (n=101)
How many times have you been pregnant in your life?[a]	2 (1, 3)	3 (2, 5)	3 (2, 4)
How many times were you sick or injured in the past year?	1.5 (0, 3)	1 (0, 2)	1 (0, 3)
Missing how many times were you sick or injured in the past year?, n(%)	1 (2%)	3 (5%)	4 (4%)
Where do you most often take your children when they are sick?, n(%)			
Missing[b]	0 (0%)	7 (12%)	7 (7%)
Malindi District Hospital	29 (71%)	26 (49%)	55 (59%)
Private Hospital	0 (0%)	3 (6%)	3 (3%)
Government Dispensary	9 (22%)	20 (38%)	29 (31%)
Private Clinic	2 (5%)	3 (6%)	5 (5%)
Chemist	1 (2%)	1 (2%)	2 (2%)
Where do you most often go for health services (type)?, n(%)			
Missing	0 (0%)	3 (5%)	3 (3%)
Public hospital	33 (80%)	33 (58%)	66 (67%)
Private hospital	1 (2%)	1 (2%)	2 (2%)
Government dispensary	6 (15%)	17 (30%)	23 (23%)
Private clinic	1 (2%)	5 (9%)	6 (6%)
Other	0 (0%)	1 (2%)	1 (1%)
Where do you go first when you are sick?, n(%)			
Public hospital	11 (27%)	16 (27%)	27 (27%)
Private hospital	1 (2%)	1 (2%)	2 (2%)
Government dispensary	10 (24%)	26 (43%)	36 (36%)
Private clinic	2 (5%)	6 (10%)	8 (8%)
Chemist	3 (7%)	3 (5%)	6 (6%)
Other	14 (34%)	8 (13%)	22 (22%)
What type of health care facility is this?, n(%)			
Public hospital	2 (5%)	2 (3%)	4 (4%)
Private hospital	1 (2%)	4 (7%)	5 (5%)
Government dispensary	22 (54%)	51 (85%)	73 (72%)
Private clinic	15 (37%)	3 (5%)	18 (18%)
Other	1 (2%)	0 (0%)	1 (1%)
How far is this hospital/clinic from your home?, n(%)			
0-5km	37 (90%)	57 (95%)	94 (93%)
6-10km	4 (10%)	3 (5%)	7 (7%)
Is this hospital or clinic able to satisfy all of your health needs?, n(%)			
Missing	5 (12%)	0 (0%)	5 (5%)
Yes	24 (67%)	33 (55%)	57 (59%)
No	12 (33%)	27 (45%)	39 (41%)

[a] Continuous variables are reported as medians (interquartile range).
[b] Percentages are computed using the number of respondents with a non-missing value.

Table 3: Summary of Transportion and Costs by Program Participation

	Pilot (n=41)	Expansion (n=60)	Combined (n=101)
How far do you travel on average for health care services?, n(%)			
Missing[b]	1 (2%)	1 (2%)	2 (2%)
0-5km	24 (60%)	43 (73%)	67 (68%)
6-10km	12 (30%)	12 (20%)	24 (24%)
11-15km	3 (8%)	2 (3%)	5 (5%)
>15km	1 (2%)	2 (3%)	3 (3%)
How often travel on foot?, n(%)			
Missing	1 (2%)	2 (3%)	3 (3%)
Never	5 (12%)	8 (14%)	13 (13%)
Rarely	2 (5%)	2 (3%)	4 (4%)
Sometimes	9 (22%)	7 (12%)	16 (16%)
Often	6 (15%)	8 (14%)	14 (14%)
Always	18 (45%)	33 (57%)	51 (52%)
How often travel by tuk tuk?, n(%)			
Missing	1 (2%)	5 (8%)	6 (6%)
Never	18 (45%)	34 (62%)	52 (55%)
Rarely	11 (28%)	10 (18%)	21 (22%)
Sometimes	8 (20%)	9 (16%)	17 (18%)
Often	1 (2%)	1 (2%)	2 (2%)
Always	2 (5%)	1 (2%)	3 (3%)
How often travel by piki piki?, n(%)			
Missing	0 (0%)	5 (8%)	5 (5%)
Never	8 (20%)	24 (44%)	32 (33%)
Rarely	2 (5%)	2 (4%)	4 (4%)
Sometimes	14 (34%)	9 (16%)	23 (24%)
Often	5 (12%)	12 (22%)	17 (18%)
Always	12 (29%)	8 (15%)	20 (21%)
How often travel by boda boda?, n(%)			
Missing	1 (2%)	5 (8%)	6 (6%)
Never	21 (52%)	42 (76%)	63 (66%)
Rarely	8 (20%)	2 (4%)	10 (11%)
Sometimes	8 (20%)	7 (13%)	15 (16%)
Often	1 (2%)	4 (7%)	5 (5%)
Always	2 (5%)	0 (0%)	2 (2%)
How often travel by matatu?, n(%)			
Missing	3 (7%)	7 (12%)	10 (10%)
Never	27 (71%)	42 (79%)	69 (76%)
Rarely	2 (5%)	0 (0%)	2 (2%)
Sometimes	3 (8%)	1 (2%)	4 (4%)
Often	2 (5%)	3 (6%)	5 (5%)
Always	4 (11%)	7 (13%)	11 (12%)
How much does tuk tuk cost you?[a]	200 (100, 300)	150 (100, 200)	200 (100, 212.5)
Missing how much does tuk tuk cost you?, n(%)	17 (41%)	32 (53%)	49 (49%)
How much does piki piki cost you?	100 (100, 200)	100 (100, 200)	100 (100, 200)
Missing how much does piki piki cost you?, n(%)	7 (17%)	27 (45%)	34 (34%)
How much does boda boda cost you?	80 (40, 100)	60 (55, 80)	60 (50, 85)
Missing how much does boda boda cost you?, n(%)	24 (59%)	45 (75%)	69 (68%)
How much does matatu cost you?	80 (80, 80)	100 (90, 100)	80 (80, 100)
Missing how much does matatu cost you?, n(%)	30 (73%)	49 (82%)	79 (78%)

[a] Continuous variables are reported as medians (interquartile range).

[b] Percentages are computed using the number of respondents with a non-missing value.

Table 4: Summary of Barriers to Medication by Program Participation

	Pilot (n=41)	Expansion (n=60)	Combined (n=101)
How often does hospital provide medications you need?, n(%)			
Missing	0 (0%)	2 (3%)	2 (2%)
Rarely	0 (0%)	3 (5%)	3 (3%)
Sometimes	5 (12%)	9 (16%)	14 (14%)
Often	24 (59%)	33 (57%)	57 (58%)
Always	12 (29%)	13 (22%)	25 (25%)
If hospital does not have medications, how likely are you to get them on your own?, n(%)			
Missing	1 (2%)	3 (5%)	4 (4%)
Never	0 (0%)	4 (7%)	4 (4%)
Rarely	0 (0%)	10 (18%)	10 (10%)
Sometimes	3 (8%)	20 (35%)	23 (24%)
Often	5 (12%)	14 (25%)	19 (20%)
Always	32 (80%)	9 (16%)	41 (42%)
Cost of medication prevents you?, n(%)			
Missing	34 (83%)	10 (17%)	44 (44%)
Rarely	0 (0%)	4 (8%)	4 (7%)
Sometimes	0 (0%)	7 (14%)	7 (12%)
Often	2 (29%)	12 (24%)	14 (25%)
Always	5 (71%)	27 (54%)	32 (56%)
Distance to chemist prevents you?, n(%)			
Missing	36 (88%)	13 (22%)	49 (49%)
Never	3 (60%)	15 (32%)	18 (35%)
Rarely	0 (0%)	4 (9%)	4 (8%)
Sometimes	1 (20%)	8 (17%)	9 (17%)
Often	0 (0%)	11 (23%)	11 (21%)
Always	1 (20%)	9 (19%)	10 (19%)
Cost of transportation prevents you?, n(%)			
Missing	36 (88%)	10 (17%)	46 (46%)
Never	3 (60%)	14 (28%)	17 (31%)
Rarely	0 (0%)	3 (6%)	3 (5%)
Sometimes	1 (20%)	14 (28%)	15 (27%)
Often	1 (20%)	11 (22%)	12 (22%)
Always	0 (0%)	8 (16%)	8 (15%)

[a] Continuous variables are reported as medians (interquartile range).
[b] Percentages are computed using the number of respondents with a non-missing value.

Table 5: Summary of Barriers to Care by Program Participation

	Pilot (n=41)	Expansion (n=60)	Combined (n=101)	P-value[c]
How often cost of transportation prevents you?, n(%)				<0.001
Never	19 (46%)	10 (17%)	29 (29%)	
Rarely	6 (15%)	6 (10%)	12 (12%)	
Sometimes	13 (32%)	18 (30%)	31 (31%)	
Often	3 (7%)	15 (25%)	18 (18%)	
Always	0 (0%)	11 (18%)	11 (11%)	
How often distance to facility prevents you?, n(%)				0.006
Missing	0 (0%)	1 (2%)	1 (1%)	
Never	19 (46%)	15 (25%)	34 (34%)	
Rarely	6 (15%)	12 (20%)	18 (18%)	
Sometimes	13 (32%)	11 (19%)	24 (24%)	
Often	2 (5%)	10 (17%)	12 (12%)	
Always	1 (2%)	11 (19%)	12 (12%)	
How often lost time for work prevents you?, n(%)				0.247
Missing	2 (5%)	2 (3%)	4 (4%)	
Never	35 (90%)	47 (81%)	82 (85%)	
Rarely	1 (3%)	4 (7%)	5 (5%)	
Sometimes	3 (8%)	5 (9%)	8 (8%)	
Often	0 (0%)	1 (2%)	1 (1%)	
Always	0 (0%)	1 (2%)	1 (1%)	
How often does lost time for chores prevent you?, n(%)				0.940
Missing	0 (0%)	3 (5%)	3 (3%)	
Never	39 (95%)	54 (95%)	93 (95%)	
Rarely	1 (2%)	2 (4%)	3 (3%)	
Sometimes	1 (2%)	1 (2%)	2 (2%)	
How often does childcare prevent you?, n(%)				0.014
Missing	0 (0%)	2 (3%)	2 (2%)	
Never	41 (100%)	50 (86%)	91 (92%)	
Rarely	0 (0%)	3 (5%)	3 (3%)	
Sometimes	0 (0%)	5 (9%)	5 (5%)	
How often hospital fees prevent you?, n(%)				<0.001
Missing	0 (0%)	1 (2%)	1 (1%)	
Never	18 (44%)	9 (15%)	27 (27%)	
Rarely	5 (12%)	6 (10%)	11 (11%)	
Sometimes	8 (20%)	10 (17%)	18 (18%)	
Often	4 (10%)	12 (20%)	16 (16%)	
Always	6 (15%)	22 (37%)	28 (28%)	
How often fear of doctors prevents you?, n(%)				0.843
Missing	13 (32%)	11 (18%)	24 (24%)	
Never	26 (93%)	46 (94%)	72 (94%)	
Often	0 (0%)	1 (2%)	1 (1%)	
Always	2 (7%)	2 (4%)	4 (5%)	

[a] Continuous variables are reported as medians (interquartile range).

[b] Percentages are computed using the number of respondents with a non-missing value.

[b] To compare the distribution of likert scale response for participants by program participation, we use a Wilcoxon rank sum test.

Table 6: Proportional Odds Models: Barriers to Care

	OR (95% CI)	P-value
How often cost of transportation prevents you?		
Pilot	0.26 (0.11 to 0.59)	0.001
Age		0.013
20 years (ref)	1	
25 years	1.30 (0.84 to 2.00)	
30 years	1.31 (1.00 to 1.71)	
Maternal Education (per year)	1.81 (0.93 to 3.51)	0.081
Children at home (per 1 child)	1.31 (0.98 to 1.75)	0.067
How often distance to facility prevents you?		
Pilot	0.53 (0.24 to 1.17)	0.115
Age		0.022
20 years (ref)	1	
25 years	1.13 (0.74 to 1.72)	
30 years	1.20 (0.92 to 1.56)	
Maternal Education (per year)	1.45 (0.73 to 2.85)	0.287
Children at home (per 1 child)	1.09 (0.82 to 1.44)	0.550
How often lost time for work prevents you?		
Pilot	0.49 (0.13 to 1.82)	0.286
Age		0.165
20 years (ref)	1	
25 years	2.36 (0.93 to 5.99)	
30 years	1.53 (0.89 to 2.63)	
Maternal Education (per year)	0.84 (0.28 to 2.50)	0.751
Children at home (per 1 child)	0.78 (0.46 to 1.34)	0.374
How often does lost time for chores prevent you?		
Pilot	1.05 (0.13 to 8.23)	0.965
Age		0.544
20 years (ref)	1	
25 years	2.12 (0.43 to 10.50)	
30 years	1.38 (0.54 to 3.53)	
Maternal Education (per year)	0.29 (0.05 to 1.74)	0.177
Children at home (per 1 child)	1.09 (0.55 to 2.16)	0.796
How often does childcare prevent you?		
Pilot	0.00 (0.00 to 2.958699e+16)	0.714
Age		0.093
20 years (ref)	1	
25 years	91.09 (1.51 to 5.488270e+03)	
30 years	4.34 (0.84 to 2.235000e+01)	
Maternal Education (per year)	5.04 (0.59 to 4.286000e+01)	0.139
Children at home (per 1 child)	1.93 (0.89 to 4.150000e+00)	0.095
How often hospital fees prevent you?		
Pilot	0.22 (0.10 to 0.49)	<0.001
Age		0.609
20 years (ref)	1	
25 years	1.11 (0.76 to 1.62)	
30 years	1.03 (0.82 to 1.30)	
Maternal Education (per year)	0.80 (0.42 to 1.54)	0.510
Children at home (per 1 child)	0.70 (0.50 to 0.96)	0.026
How often fear of doctors prevents you?		
Pilot	1.86 (0.22 to 15.85)	0.570
Age		0.326
20 years (ref)	1	
25 years	4.42 (0.62 to 31.25)	
30 years	2.46 (0.75 to 8.03)	
Maternal Education (per year)	0.87 (0.16 to 4.85)	0.878
Children at home (per 1 child)	0.70 (0.23 to 2.10)	0.525

[a] For some models, there is evidence that age ($p<0.05$) is nonlinear with the proportional log-odds of increased barrier; thus age is modeled using a restricted cubic spline with 3 knots.

Table 7: Health Outcomes by Program Participation

	Pilot (n=69)	Expansion (n=76)	Combined (n=145)
What type of sickness/injury?, n(%)			
Missing[b]	1 (1%)	1 (1%)	2 (1%)
Stomach problem	17 (25%)	25 (33%)	42 (29%)
Respiratory problem	8 (12%)	13 (17%)	21 (15%)
Fever	10 (15%)	13 (17%)	23 (16%)
Malaria	16 (24%)	12 (16%)	28 (20%)
Injury	2 (3%)	1 (1%)	3 (2%)
Other (specify)	15 (22%)	11 (15%)	26 (18%)
How severe?, n(%)			
Missing	0 (0%)	6 (8%)	6 (4%)
Not severe	0 (0%)	1 (1%)	1 (1%)
Mild	6 (9%)	5 (7%)	11 (8%)
Moderate	17 (25%)	13 (19%)	30 (22%)
Severe	42 (61%)	43 (61%)	85 (61%)
Life threatening	4 (6%)	8 (11%)	12 (9%)
Did you seek medical care?, n(%)			
Missing	0 (0%)	2 (3%)	2 (1%)
Yes	57 (83%)	61 (82%)	118 (83%)
No	12 (17%)	13 (18%)	25 (17%)
If you did seek care, where?, n(%)			
Missing	12 (17%)	15 (20%)	27 (19%)
Malindi District Hospital	29 (51%)	37 (61%)	66 (56%)
Private Hospital	4 (7%)	1 (2%)	5 (4%)
Government Dispensary	12 (21%)	18 (30%)	30 (25%)
Private Clinic	9 (16%)	4 (7%)	13 (11%)
Chemist	2 (4%)	0 (0%)	2 (2%)
Traditional Healer/Herbalist	1 (2%)	0 (0%)	1 (1%)
Other (specify)	0 (0%)	1 (2%)	1 (1%)

[b] Percentages are computed using the number of sicknesses with a non-missing value.

Table 8: Health Outcomes by Malindi Hospital Use

	Not Malindi (n=52)	Malindi (n=66)	Combined (n=118)
Was this SM in the pilot program?, n(%)			
Yes	28 (54%)	29 (44%)	57 (48%)
No	24 (46%)	37 (56%)	61 (52%)
What type of sickness/injury?, n(%)			
Stomach problem	15 (29%)	19 (29%)	34 (29%)
Respiratory problem	7 (13%)	7 (11%)	14 (12%)
Fever	14 (27%)	7 (11%)	21 (18%)
Malaria	6 (12%)	17 (26%)	23 (19%)
Other (specify)	10 (19%)	16 (24%)	26 (22%)
How severe?, n(%)			
Missing	5 (10%)	0 (0%)	5 (4%)
Not severe	0 (0%)	1 (2%)	1 (1%)
Mild	1 (2%)	4 (6%)	5 (4%)
Moderate	15 (32%)	9 (14%)	24 (21%)
Severe	29 (62%)	42 (64%)	71 (63%)
Life threatening	2 (4%)	10 (15%)	12 (11%)
Number of children at home[a]	3 (2, 5)	3.5 (2, 5)	3 (2, 5)
How far do you travel on average for health care services?, n(%)			
0-5km	23 (44%)	45 (68%)	68 (58%)
6-10km	14 (27%)	18 (27%)	32 (27%)
11-15km	8 (15%)	2 (3%)	10 (8%)
>15km	7 (13%)	1 (2%)	8 (7%)

[a] Continuous variables are reported as medians (interquartile range).
[b] Percentages are computed using the number of sicknesses with a non-missing value.
[c] This table includes only those patients who reported seeking ANY medical care.

Table 9: Logistic Regression Model: Malindi District Hospital Use (with Severity)

	OR (95% CI)	P-value
Pilot	0.77 (0.27 to 2.18)	0.617
Children at home (per 1 child)	1.11 (0.75 to 1.62)	0.604
Distance travel for health servies		0.034
0-5 km (ref)	1	
6-10 km	1.00 (0.30 to 3.32)	
>10 km	0.10 (0.02 to 0.60)	
Severity		0.856
Mild/Moderate (ref)	1	
Severe/Life threatening	1.11 (0.36 to 3.47)	

[a] There is no evidence that number of children is nonlinear with the log-odds of hospital usage (p=0.95).

[b] There are 113 observations in this model. Not severe (1) is recategorized as mild.

Table 10: Logistic Regression Model: Malindi District Hospital Use (with Type)

	OR (95% CI)	P-value
Pilot	0.80 (0.25 to 2.58)	0.715
Children at home (per 1 child)	1.14 (0.75 to 1.72)	0.541
Distance travel for health servies		0.043
0-5 km (ref)	1	
6-10 km	0.82 (0.20 to 3.26)	
>10 km	0.10 (0.02 to 0.62)	
Sickness		0.168
Malaria (ref)	1	
Stomach	0.46 (0.11 to 1.94)	
Respiratory	0.45 (0.07 to 2.83)	
Fever	0.20 (0.04 to 0.93)	
Other	0.82 (0.17 to 3.93)	

[a] There is no evidence that number of children is nonlinear with the log-odds of hospital usage (p=0.90).

[b] There are 118 observations in this model. Injury (3) is recategorized as other.

Table 11: Pregnancy Outcomes by Program Participation

	Pilot (n=103)	Expansion (n=224)	Combined (n=327)
What was the pregnancy result?, n(%)			
Missing[b]	0 (0%)	11 (5%)	11 (3%)
Elective abortion	1 (1%)	0 (0%)	1 (<1%)
Miscarriage	4 (4%)	14 (7%)	18 (6%)
Premature birth	10 (10%)	37 (17%)	47 (15%)
Full term birth	86 (83%)	157 (74%)	243 (77%)
Other	2 (2%)	5 (2%)	7 (2%)
If delivery, where?, n(%)			
Missing	7 (7%)	21 (9%)	28 (9%)
Home	65 (68%)	133 (66%)	198 (66%)
Hospital	31 (32%)	70 (34%)	101 (34%)
If at home, who assisted?, n(%)			
Missing	39 (38%)	93 (42%)	132 (40%)
Family member	20 (31%)	64 (49%)	84 (43%)
Local midwife	42 (66%)	53 (40%)	95 (49%)
Nurse	0 (0%)	8 (6%)	8 (4%)
Other	2 (3%)	6 (5%)	8 (4%)
If at home, did you go to the hospital after delivery?, n(%)			
Missing	39 (38%)	105 (47%)	144 (44%)
Yes	34 (53%)	72 (61%)	106 (58%)
No	30 (47%)	47 (39%)	77 (42%)
What type of birth did you have?, n(%)			
Missing	8 (8%)	27 (12%)	35 (11%)
Natural	92 (97%)	194 (98%)	286 (98%)
Caesarian	3 (3%)	2 (1%)	5 (2%)
Other	0 (0%)	1 (1%)	1 (<1%)
Were there any complications?, n(%)			
Missing	8 (8%)	35 (16%)	43 (13%)
Yes	9 (9%)	25 (13%)	34 (12%)
No	86 (91%)	164 (87%)	250 (88%)

[b] Percentages are computed using the number of pregnancies with a non-missing value.

Table 12: Pregnancy Outcomes by Labor and Delivery Location

	Home (n=198)	Hospital (n=101)	Combined (n=299)
Was this SM in the pilot program?, n(%)			
Yes	65 (33%)	31 (31%)	96 (31%)
No	133 (67%)	70 (69%)	203 (69%)
What was the pregnancy result?, n(%)			
Missing[b]	2 (1%)	5 (5%)	7 (2%)
Elective abortion	0 (0%)	0 (0%)	0 (<1%)
Miscarriage	1 (1%)	1 (1%)	2 (6%)
Premature birth	30 (15%)	17 (18%)	47 (15%)
Full term birth	161 (82%)	77 (80%)	238 (77%)
Other	4 (2%)	1 (1%)	5 (2%)
If at home, who assisted?, n(%)			
Missing	3 (2%)	101 (100%)	104 (35%)
Family member	84 (43%)	0 (0%)	84 (43%)
Local midwife	95 (49%)	0 (0%)	95 (49%)
Nurse	8 (4%)	0 (0%)	8 (4%)
Other	8 (4%)	0 (0%)	8 (4%)
If at home, did you go to the hospital after delivery?, n(%)			
Missing	15 (8%)	101 (100%)	116 (39%)
Yes	106 (58%)	0 (0%)	106 (58%)
No	77 (42%)	0 (0%)	77 (42%)
What type of birth did you have?, n(%)			
Missing	6 (3%)	5 (5%)	11 (4%)
Natural	192 (100%)	90 (94%)	282 (98%)
Caesarian	0 (0%)	5 (5%)	5 (2%)
Other	0 (0%)	1 (1%)	1 (<1%)
Were there any complications?, n(%)			
Missing	12 (6%)	8 (8%)	20 (7%)
Yes	10 (5%)	23 (25%)	33 (12%)
No	176 (95%)	70 (75%)	246 (88%)
Number of years of school[a]	2.5 (0, 6)	3 (0, 7)	3 (0, 6)
Missing number of years of school, n(%)	4 (2%)	3 (3%)	7 (2%)
Number of children at home	4 (2, 7)	2 (1, 6)	3 (2, 6)
How far do you travel on average for health care services?, n(%)			
0-5km	130 (66%)	61 (62%)	191 (65%)
6-10km	53 (27%)	26 (27%)	79 (25%)
11-15km	10 (5%)	10 (10%)	20 (7%)
>15km	4 (2%)	1 (1%)	5 (2%)

[a] Continuous variables are reported as medians (interquartile range).
[b] Percentages are computed using the number of pregnancies with a non-missing value.
[c] This table includes only those patients who reported delivery in hospital or home.

Table 13: Logistic Regression Model: Labor and Delivery in Hospital

	OR (95% CI)	P-value
Pilot	0.92 (0.45 to 1.91)	0.832
Maternal Education		<0.001
2 years (ref)	1	
4 years	1.10 (0.75 to 1.61)	
8 years	1.90 (1.21 to 2.99)	
Children at home		0.015
2 children	3.09 (1.08 to 8.80)	
6 children (ref)	1	
10 children	4.71 (1.71 to 12.96)	
Distance travel for health servies		0.378
0-5 km (ref)	1	
6-10 km	0.81 (0.36 to 1.80)	
>10 km	2.14 (0.62 to 7.37)	
Birth complications	5.51 (1.75 to 17.37)	0.004

[a] There is evidence that maternal education (p=0.07) and number of children (p=0.01) are nonlinear with the log-odds of hospital delivery.
[b] There are 270 observations in this model.

Figure 1: Predicted Log Odds: Labor and Delivery in Hospital by Maternal Education

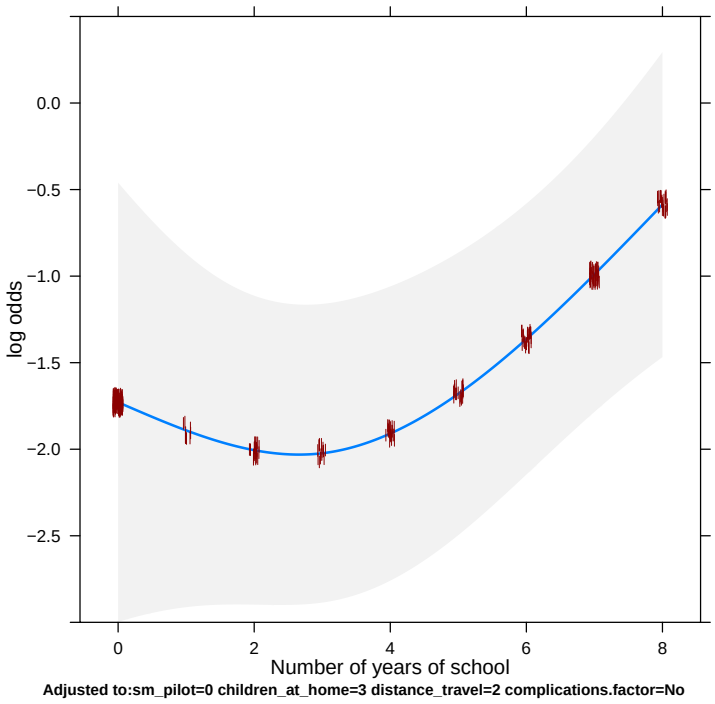

Figure 2: Predicted Log Odds: Labor and Delivery in Hospital by Number of Children at Home

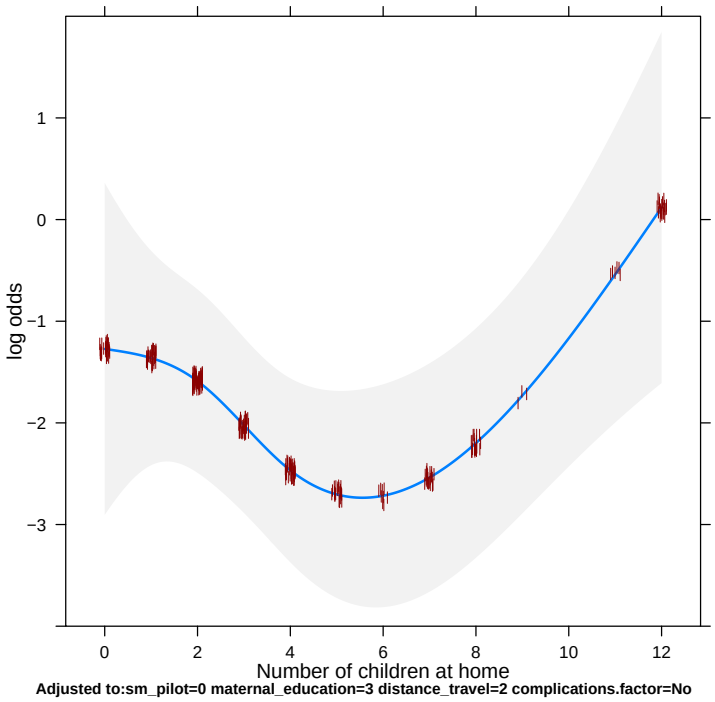

Table 14: Logistic Regression Model: Malindi District Hospital is destination for children when they are sick

	OR (95% CI)	P-value
Pilot	4.54 (1.65 to 12.52)	0.003
Age (per 5 years)	1.46 (1.12 to 1.90)	0.005
Maternal Education (per year)	1.51 (0.67 to 3.41)	0.320
Children at home (per 1 child)	0.70 (0.46 to 1.06)	0.089
Distance travel for health servies		0.322
0-5 km (ref)	1	
6-10 km	2.38 (0.75 to 7.55)	
>10 km	0.94 (0.18 to 4.94)	

[a] There is no compeling evidence that age, education, and number of children is nonlinear with the log-odds of hospital usage.
[b] There are 94 observations in this model.

Table 15: Logistic Regression Model: Public Hospital is destination for self when sick

	OR (95% CI)	P-value
Pilot	4.95 (1.62 to 15.08)	0.005
Age (per 5 years)	1.23 (0.98 to 1.53)	0.074
Maternal Education (per year)	1.84 (0.76 to 4.41)	0.174
Children at home (per 1 child)	0.71 (0.48 to 1.05)	0.085
Distance travel for health servies		0.086
0-5 km (ref)	1	
6-10 km	1.85 (0.55 to 6.21)	
>10 km	0.23 (0.05 to 1.16)	

[a] There is no compeling evidence that age, education, and number of children is nonlinear with the log-odds of hospital usage.
[b] There are 98 observations in this model.