



**Global Health
Research Core**

Improving Postoperative Follow-up in Rural Rwanda:

Detection and Referral for Surgical Site Infections Post-Cesarean Delivery

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Global access to surgical care

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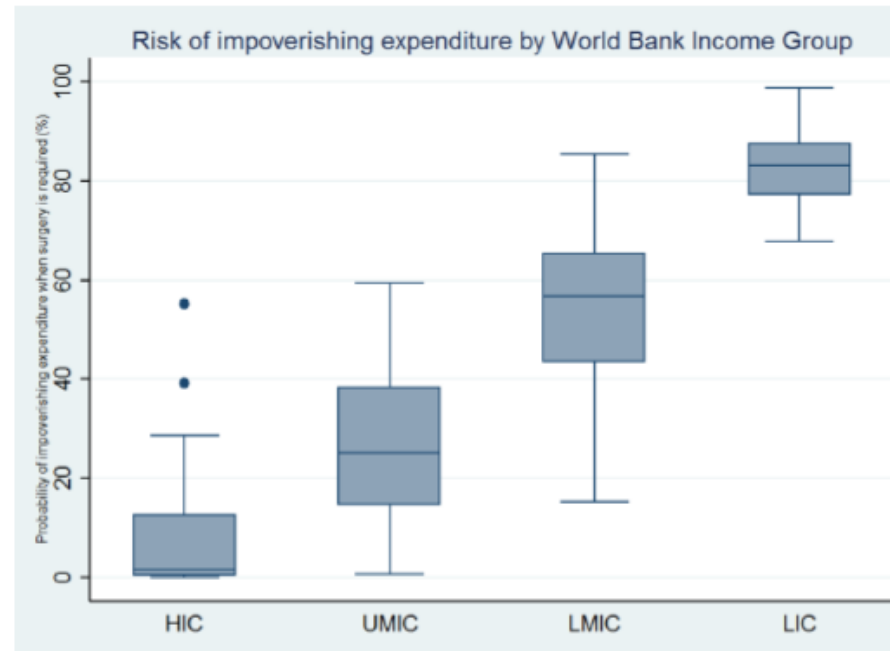
- As of 2015, an estimated 5 billion people do not have access to timely, safe, and affordable surgical and anesthesia care. (Meara 2015)
- 1/3 of the world's population, primarily the richest, received 3/4 of the 340+ million surgical procedures. (Grimes 2011)
- 3/4 of deaths due to surgical emergencies happen in low and middle income countries. (Steward 2014)



Impoverishment due to surgery

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- Proportion of population for whom paying for surgery would send below \$1.25 PPP/day.





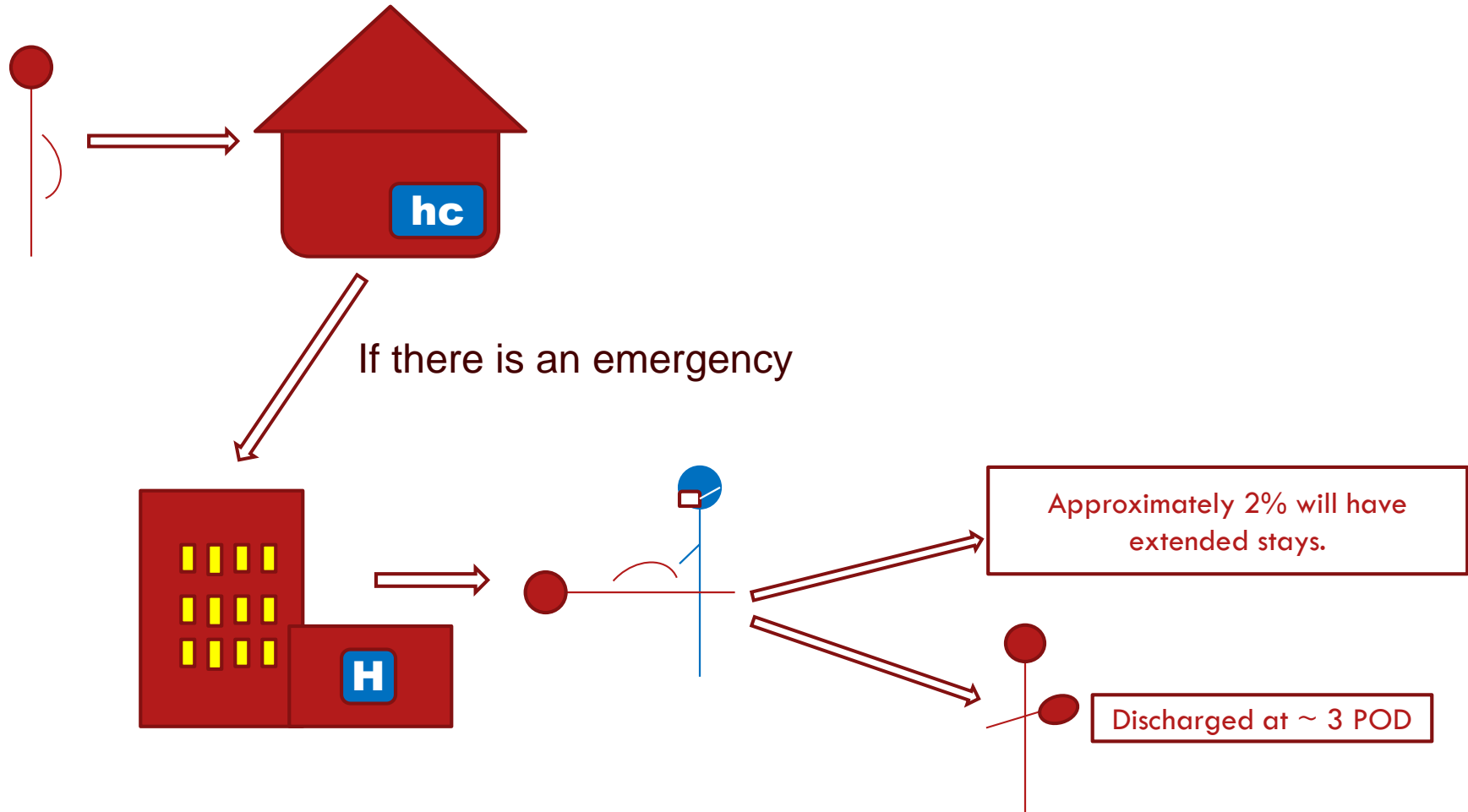
Surgical care in Rwanda

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- 80% of surgeries happen in district hospitals.
- 60% of district hospital surgeries are C-sections.
 - Primarily performed by general practitioners.
- 75-90% of the population has *mutuelle* (public insurance) which would cover 90% of all medical costs.



Cesarean deliveries in rural Rwanda





Delays for urgent cesarean deliveries

Table 2: Types of Delays

Type of Delay	<i>n</i>	%
Length of contractions (hours) (N=279)		
<12	83	29.7
12 to <24	108	38.7
24 to <36	46	16.5
≥36	42	15.1
Travel time from HC to DH (minutes) (N=356)		
HC attached to the DH	91	25.6
30 to <60	159	44.7
60 to <90	45	12.6
≥90	61	17.1
Time from admission to surgery (hours) (N=370)		
≤5	178	48.1
>5 to ≤10	55	14.9
>10 to ≤15	37	10.0
>15	100	27.0
Decision to delivery interval (minutes) (N=338)		
<30	50	14.8
≥30	288	85.2

HC: Health Center.
DH: District Hospital.

9% of neonates died or had low APGAR

	Unadjusted			Adjusted		
	OR	p-value	95% CI	OR	p-value	95% CI
Length of contractions (hours)[†]						
<12	ref	-	-	ref	-	-
12 to <24	0.65	0.42	[0.23, 1.87]	0.81	0.71	[0.26, 2.50]
24 to <36	0.43	0.29	[0.09, 2.10]	0.54	0.38	[0.10, 2.92]
≥36	0.99	0.98	[0.27, 3.49]	1.20	0.80	[0.31, 4.65]
Travel time from HC to DH (minutes)[‡]						
HC attached to the DH	ref	-	-	ref	-	-
30 to <60	3.28	0.07	[0.93, 11.59]	3.02	0.09	[0.84, 10.84]
60 to <90	4.51	0.04	[1.07, 18.98]	4.31	0.05	[1.02, 18.29]
≥90	5.75	0.01	[1.51, 21.87]	5.12	0.02	[1.30, 20.21]
Time from admission to surgery (hours)^{††}						
≤5	ref	-	-	ref	-	-
>5 to ≤10	1.85	0.22	[0.70, 4.90]	3.00	0.08	[0.89, 10.08]
>10 to ≤15	0.73	0.68	[0.16, 3.36]	1.12	0.89	[0.20, 6.15]
>15	0.81	0.68	[0.30, 2.20]	0.50	0.35	[0.12, 2.10]
Decision to incision interval (minutes)^{††}						
<30	ref	-	-	ref	-	-
≥30	0.48	0.09	[0.20, 1.13]	0.32	0.04	[0.11, 0.96]



mHealth-CHW intervention study

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Prospective study in Kirehe District, started in March 2017

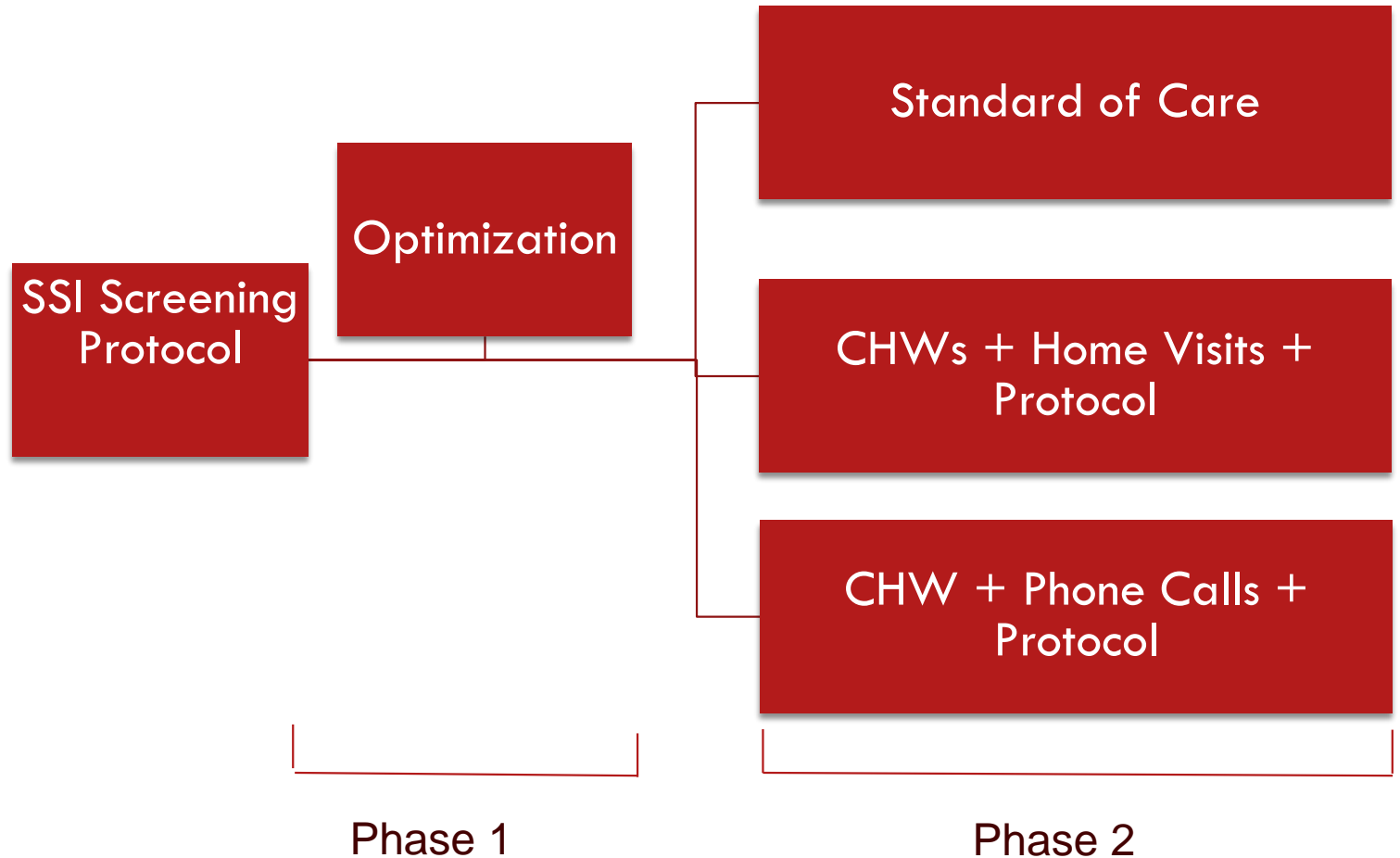
- What happens to c-section patients after discharge?
- Can we better link those with complications, specifically Surgical Site Infections (SSIs), to care?
 - Utilizing community health workers (CHWs)

Aims:

1. Optimize a *screening protocol* that can be implemented by CHWs to identify SSI
2. Evaluate the impact of two CHW-mHealth interventions on a patient with a SSI returning to care



Two phases





Methods – Phase 1

Prospective cohort study (Mar-Oct 2017)
at Kirehe District Hospital

Included:

- Women who underwent CS
- At least 18 yo

Excluded:

- Non-residents of Kirehe
- Mahama refugee camp residents



Patients assessed at 10 Postoperative Days (+/- 3 PODs):

- CHW-administered 9 questions related to SSIs
- GP-administered 9 questions related to SSIs
- GP SSI diagnosis – **Gold standard**

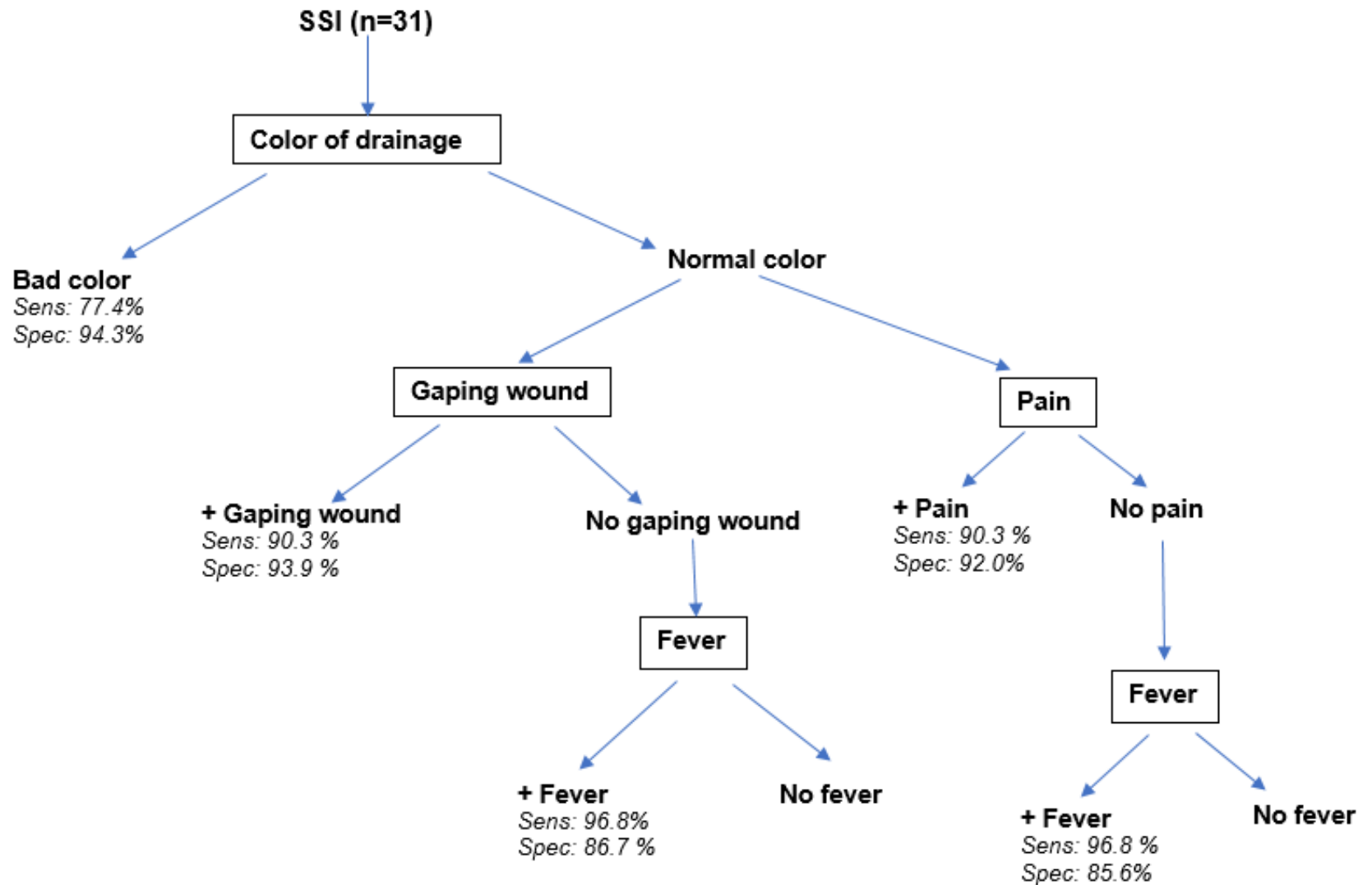


Results

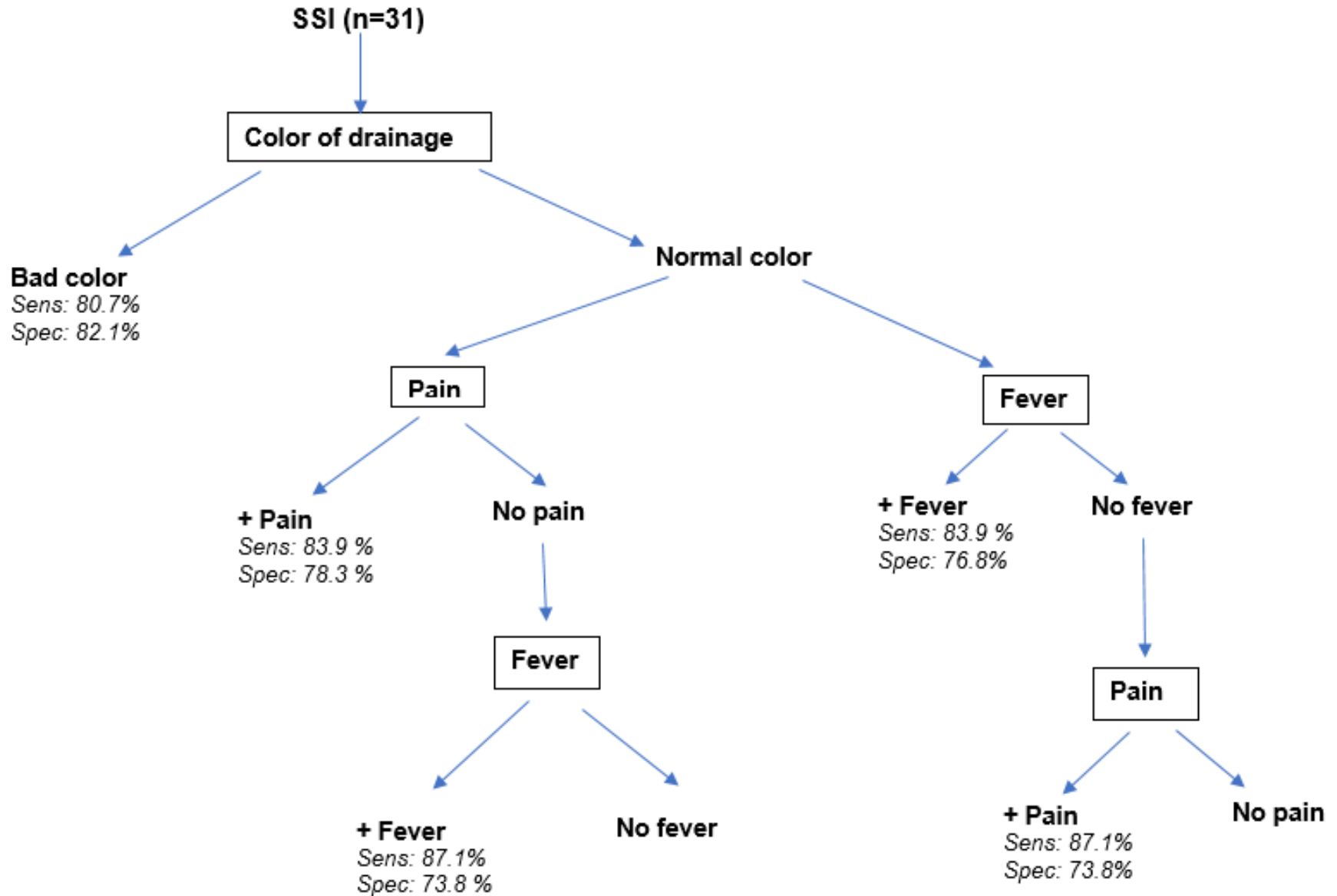
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- 729 C-sections at KDH, of which 622 were eligible for follow-up.
 - 550 women screened (88.4%)
 - **10.9% developed an SSIs after discharge.**
- Dataset split into two sets:
 - March-July used to develop a screening algorithm (n=294)
 - August-October used to validate screening algorithm (n=231)

Most predictive of GP-administered questions



Most predictive of CHW-administered questions





Results

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- Selected three questions most predictive of SSI:
Purulent drainage, fever, or increasing pain
- In validation dataset:
 - GP: sensitivity=95.2%, specificity=83.3%
 - CHW: sensitivity=76.2%, specificity=81.4%



Predictors of SSIs - preliminary

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The following factors were significantly associated with SSI:

- weighing more than 75kg: OR=22.0, $p=0.006$
- spending more than \$1.25 while traveling to health center: OR=3.53, $p=0.016$
- housewives (compared to farmers): OR=6.8, $p=0.004$)

Neither receiving preoperative antibiotic nor postoperative antibiotic was associated with presence of SSI.



Are we effectively preventing infections?

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Extensive chart reviews on abx prescribing (n=332)

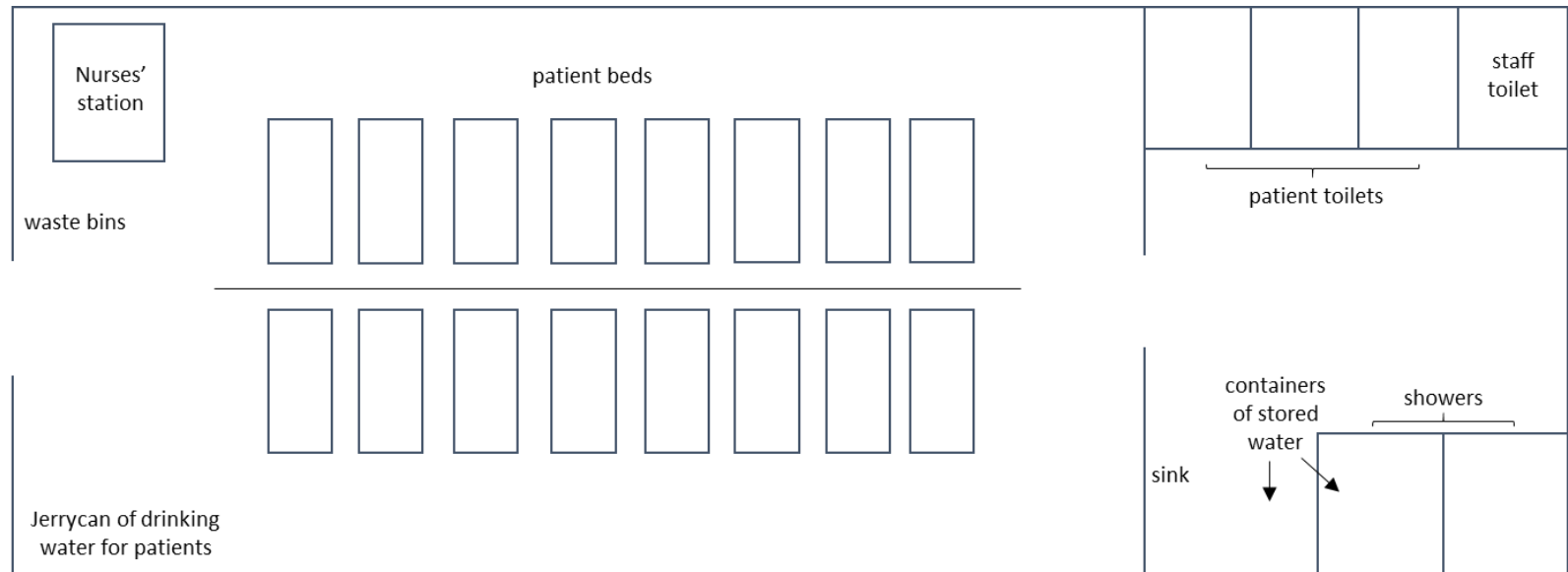
International guidelines	Observed practice
<u>Preoperative:</u>	
<ul style="list-style-type: none">• 1 antibiotic within 1 hour of incision	<ul style="list-style-type: none">• 76.8% receive a pre-op abx• 59.7% of those received within 1 hour of incision
<u>Postoperative:</u>	
<ul style="list-style-type: none">• Abx only as indicated	<ul style="list-style-type: none">• 98.5% received a post-op abx• Of those, 98.5% received two different post-op abx

Led by F. Kateera



Are we effectively preventing infections?

Layout of Postpartum Maternity Ward – WASH resources



Led by K. Robb



WASH Variability assessment:

- Data collected from Feb. 1st –Mar. 30th, 2018
- Collected every day in morning, afternoon, and evening
- Times selected to capture range of activities within postpartum ward

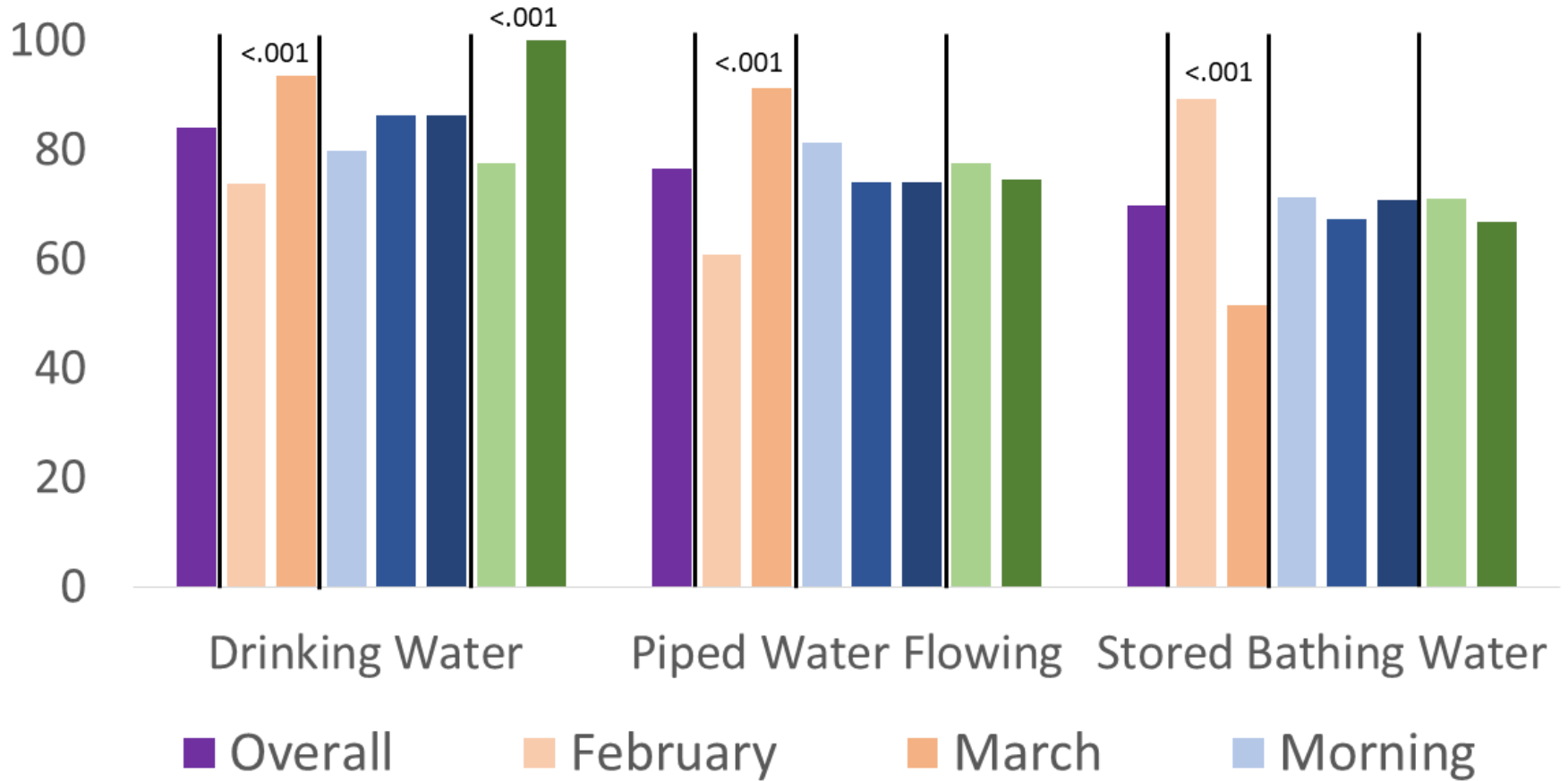
Morning (9am): This time-point coincides with medical rounds. Doctors and nursing staff are present. The morning cleaning has been completed, the patients have eaten breakfast, and some are resting. No family caregivers are present.

Afternoon (2pm): This time-point coincides with visiting hours. Family caregivers are present and mothers are eating lunch. Nurses and cleaners are also present.

Evening (7:30pm): This time-point coincides with dinner-time for mothers. Family caregivers who will spend the night are present and nurses are leaving for their own dinners. Cleaners are also present.



Water Access





Conclusions

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- High rates of SSIs, that need to be identified early to lower morbidity and mortality.
 - mHealth-CHW randomized trial underway
- Antibiotic prescribing deviates from international guidelines.
 - What are the appropriate prescribing practices?
 - How can we standardize?
- WASH resources are available, but variable.
 - Can we improve WASH to decrease infections?
 - How can we standardize?



Acknowledgments

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