

Implementation of the first pediatric surgical program in Liberia: a retrospective cohort study

MSF-run BJH surgical program improved access to surgical care for children through addressing surgical backlogs, averting disability, and yielding economic benefit

Liberia's first pediatric surgical program by the numbers:

- 3,448 operations with 4,009 procedures performed
- 34,730 averted DALYs
- \$73.8 mil USD economic benefit

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Background: 1.7 billion children lack access to safe surgical care¹. MSF established the first pediatric surgical program in Liberia to address this gap.

We hypothesized that the program would address a backlog of surgical cases, avert significant disability and yield positive economic benefits.

Methods: This is a retrospective cohort study of pediatric patients (0-15 years) undergoing surgery at the MSF-run Bardnesville Junction Hospital (BJH) in Monrovia, Liberia from January 2018 – March 2022.

Data reviewed include patient demographics, surgical case volume, and surgeries performed. Key outcome measures included averted disability-adjusted life years (DALYs)², and economic benefit (value of DALYs averted)³.

This study received Liberia National Research Ethics Board approval and met MSF Ethics Review Board exemption criteria.

Results: 2,649 children were admitted to the pediatric surgery ward. 3,448 operations, including 4,009 individual procedures, were performed.

Mean age at surgery was 5.7 years. 30% of surgeries were performed for children <2 years of age. Hernia repairs were the most common procedure performed (48.4%).

We calculated 34,353 averted DALYs, and an associated economic benefit of \$73.8 million USD due to 2,796 operations performed. BJH met an estimated 1.6-7.4% of the national pediatric surgical need in 2021.

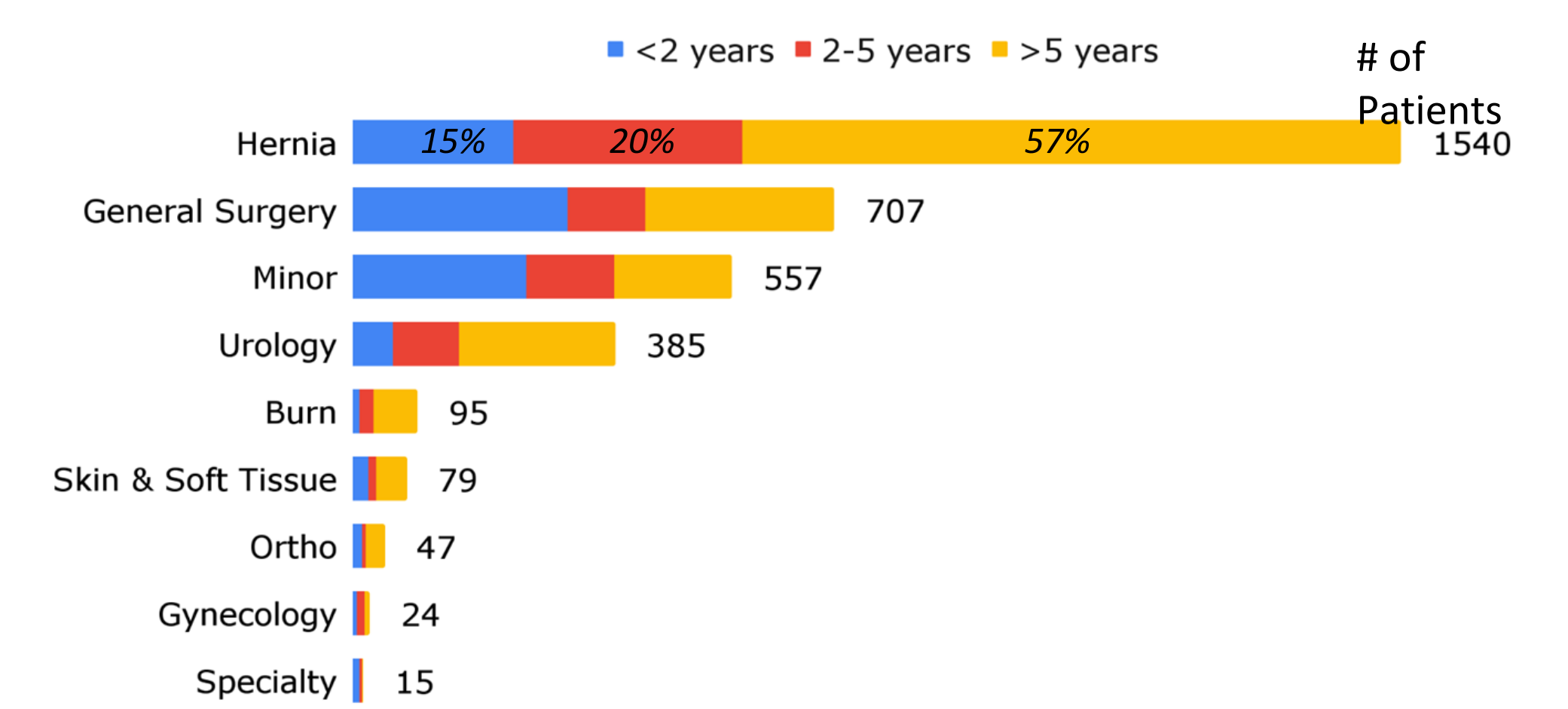
Conclusion: The MSF-run BJH surgical program improved access to surgical care for children, including addressing a backlog of untreated surgical conditions. Strengthening partnerships with the national health system and investing in local surgical capacity are recommended to sustain future efforts.

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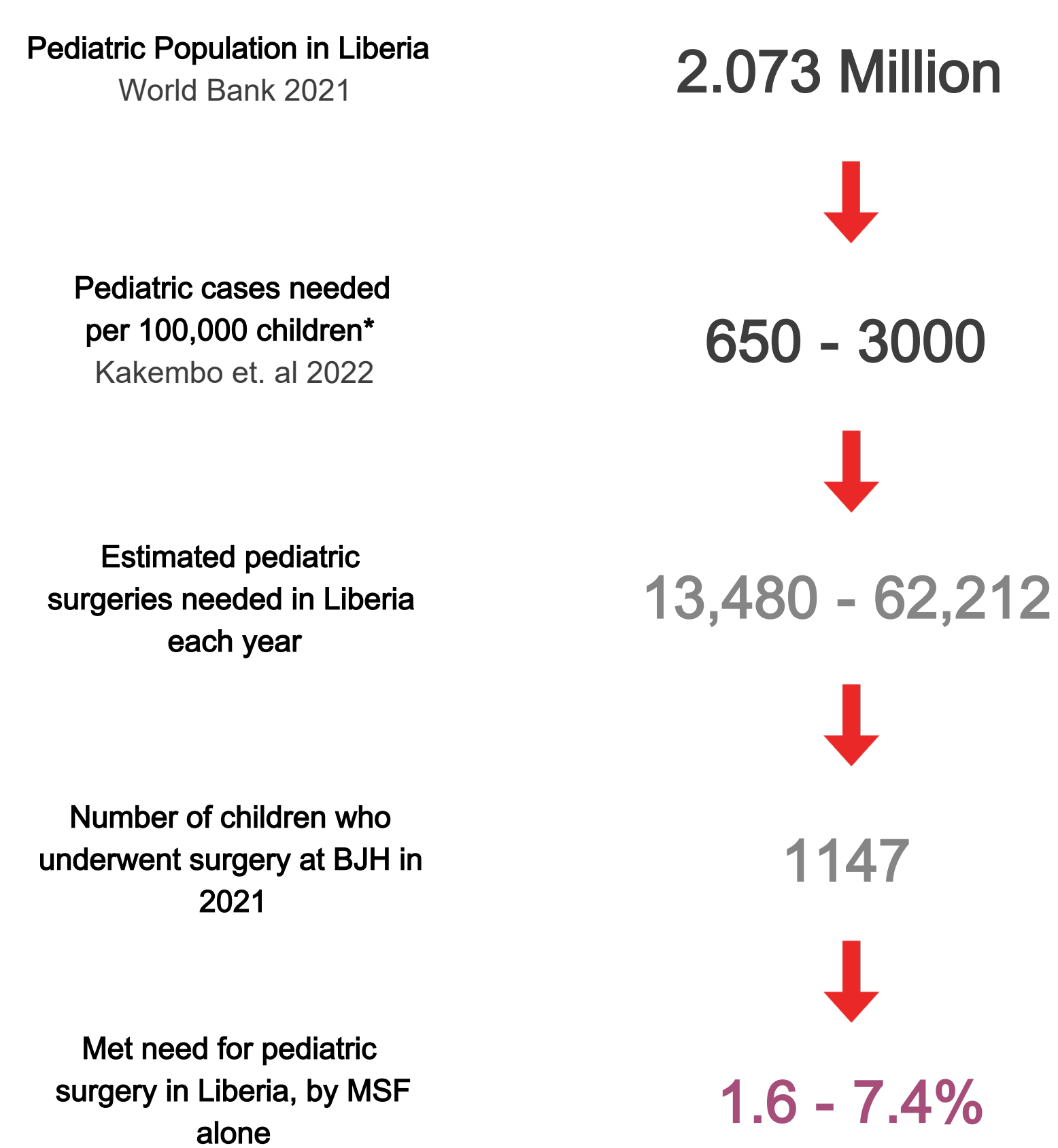
Younger children were more likely to have higher ASA class and require urgent surgery

Variable	<2 years	2 to 5 years	6+ years	Total	p-value
Number	1043 (30.2%)	832 (24.1%)	1573 (45.6%)	3448 (100.0%)	
Sex					<0.001
Male	605 (58.0%)	630 (75.7%)	1238 (78.7%)	2473 (71.7%)	
Female	438 (42.0%)	202 (24.3%)	335 (21.3%)	975 (28.3%)	
Intervention type					<0.001
Elective	703 (67.4%)	719 (86.4%)	1284 (81.6%)	2706 (78.5%)	
Urgent	282 (27.0%)	95 (11.4%)	266 (16.9%)	643 (18.6%)	
Delayed Semi-Urgent	58 (5.6%)	18 (2.2%)	23 (1.5%)	99 (2.9%)	
ASA Classification					<0.001
ASA I	813 (77.9%)	777 (93.4%)	1431 (91.0%)	3021 (87.6%)	
ASA II	140 (13.4%)	27 (3.2%)	88 (5.6%)	255 (7.4%)	
ASA III	53 (5.1%)	19 (2.3%)	44 (2.8%)	116 (3.4%)	
ASA IV	34 (3.3%)	7 (0.8%)	10 (0.6%)	51 (1.5%)	

Hernias were the most commonly performed procedure, with age indicative of delays in access to care



Offered surgical services contributed substantially to Liberia's surgical need



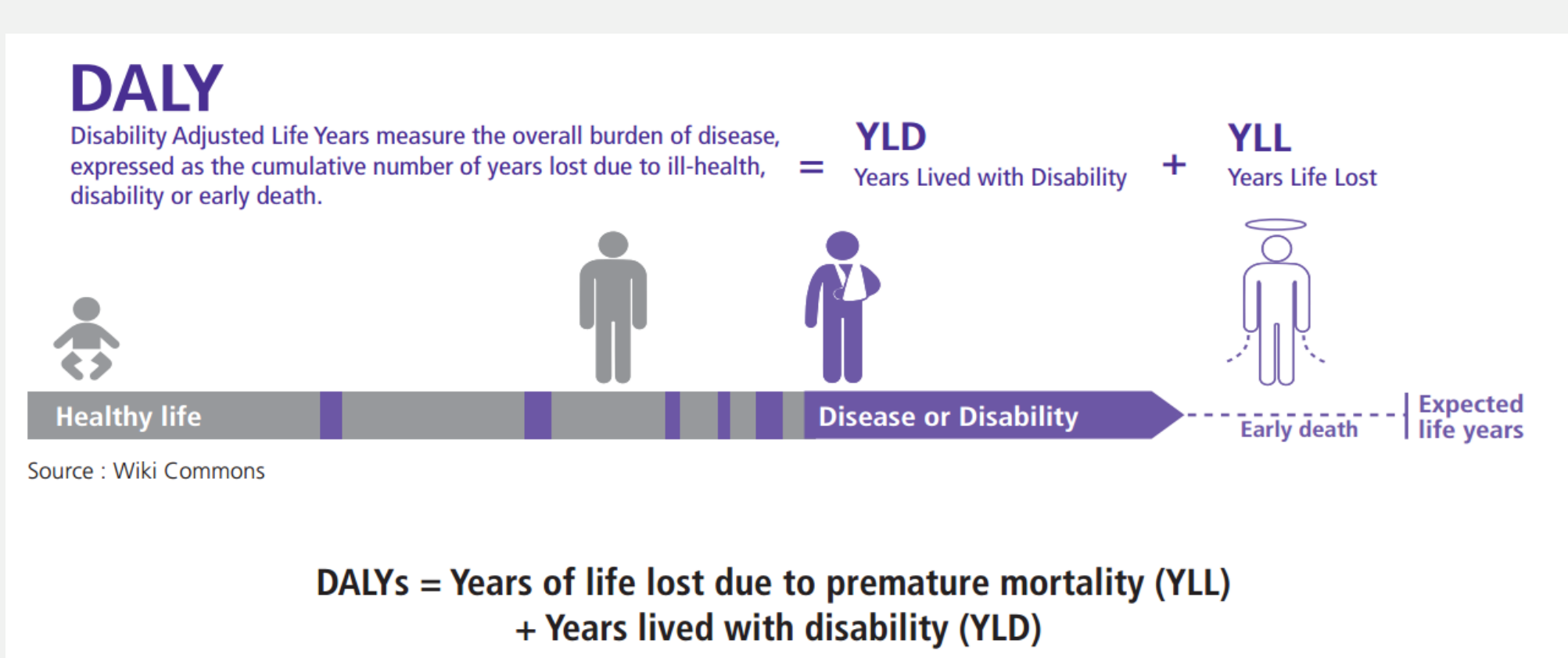
Addressing surgical backlog averts significant disability and has significant socioeconomic benefit to society

Procedure*	Number of Patients	Mean age (years)	Disability Weight	averted DALYs per patient	Total averted DALYs	Economic benefit per patient (\$ USD)	Total economic benefit (millions, \$ USD)
Repair of Inguinal Hernia	1,391	6.8	0.096	5.5	7,637	11,796	16.4
Exploratory Laparotomy	110	6.0	0.8	46.4	5,104	99,688	11.0
Urogenital Intervention	193	5.7	0.275	16.0	3,094	34,444	6.6

* documented as main procedure

2,796 procedures yielded an estimated 34,353 averted DALYs and \$73.8 mil in economic benefit

What is a Disability Averted Life Year⁴?



How is economic benefit calculated?

- Economic value of health benefits yielded from performing a surgery is calculated by computing averted DALYs and the Value of Statistical Life
- Value of Statistical Life (VSL) in Liberia³: \$137,500 USD

References:

1. Mullanpudi B. Bull World Health Organ. 2019.
2. Vos T, et al. The Lancet. 2020.
3. Viscusi WK, Masterman CJ. J Benefit-Cost Anal. 2017.
4. Gold MR. Annu Rev Public Health. 2002.

