PROGRAM IN GLOBAL SURGERY AND SOCIAL CHANGE
Harvard Medical School

Data Quality Assessment of Surgical Registries & Electronic Data Entry in Rural Ethiopian Hospitals

S. Bari[1], J. Incorvia[1], L. Drown[1,2], K. Garringer[1], O. Ahearn[1], K. Iverson[1,3], A. Bekele[2], A. Beyene[4], J.G. Meara[1,5]
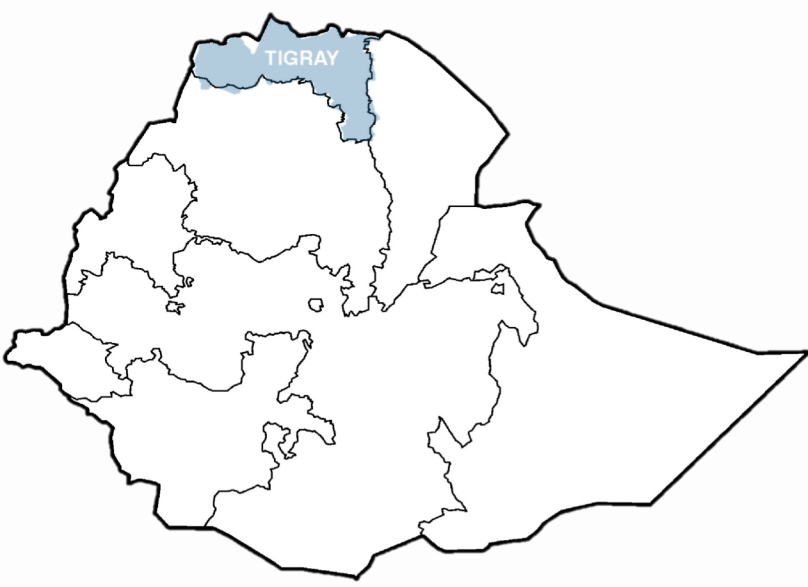
Safe Surgery 2020

Background

Tigray, Ethiopia

Safe Surgery 2020 is a collaborative initiative in Ethiopia that aims to improve national surgical capacity and to fill gaps in existing data on surgical outcomes.

Under the scope of SS2020, a Data Quality Intervention (DQI) was implemented in mid-2018 in 5 rural hospitals in Tigray, Ethiopia to develop local capacity around collection and analysis of surgical key performance indicators (KPIs).

DQI activities included piloting of surgical registries that capture patient data for calculation of KPIs, and entering these data into an online platform, REDCap. Surgical teams were trained on both activities, and quality controls were programmed into REDCap.

This study evaluates the quality of data captured in the registries and accuracy of electronic data entry.

Methods

Four quality checks were conducted on surgical data during DQI activities:

REGISTRY DATA QUALITY was retrospectively assessed using a dual approach:
1a) Overall Completion
Totaling missingness of key variables in 7 clinical registries: Operating Room, Operating Room Scheduling, Anesthesia, Inpatient, Ward, Referrals, and Surgical Site Infection Registers.
1b) Cross-Registry Consistency
Reviewing a random sample of 10% of patients to assess consistency in data fields across registries.

ELECTRONIC DATA ENTRY was also audited by:
2a) Data Entry Verification
Reviewing a random sample of 10% of patients to tally errors in data entry of registries.
2b) Calculation Accuracy
Determining percent error between 5 KPI values calculated from REDCap data (measured value) and values calculated directly from registries (accepted value from source data). These KPIs are:

1. Surgical Volume
2. Surgical Site Infection
3. Peri-Operative Mortality
4. Anesthestic Adverse Event
5. Referrals Out

Findings

REGISTRY DATA QUALITY
1a) Overall Completion: A review of 16,000 data fields across 7 registries showed minimal missing data (~1%). (Table 1)

1b) Cross-Registry Consistency: A review of 462 data fields across 46 randomly selected patients found minimal inconsistencies across registries (<5%). (Table 2)

	Operating Room Register	Operating Room Scheduling Register	Anesthesia Register	Inpatient Register	Ward Register	Referrals Register	Surgical Site Infection Register	TOTAL
Total Data Points (n)	3531	1830	3840	2948	2376	1712	48	16285
Data Points Missing n(%)	19 (.3%)	4 (.1%)	28 (1.6%)	81 (4.6%)	35 (2.3%)	14 (.7%)	0 (0%)	181 (1.1%)

Table 1. Overall Completion: Percent missingness by registry

Number of Patients	Number of Data Points	Number of Inconsistencies n (%)
46	462	23 (4.99%)

Table 2: Cross-Registry Data Consistency

ELECTRONIC DATA ENTRY ACCURACY

2a) Data Entry Verification: An assessment of 46 patients in REDCap identified data entry errors in 18.1% of all data fields reviewed.

2b) Calculation Accuracy: The percent error between KPI calculations of source data (Registry) and electronic data (REDCap) was greater than 5% for 10 of 25 compared values. (Table 3)

KPI	Hospital 1			Hospital 2			Hospital 3			Hospital 4			Hospital 5		
	RedCap	Registry	% diff	RedCap	Registry	% diff	RedCap	Registry	% diff	RedCap	Registry	% diff	RedCap	Registry	% diff
AAO	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	1	-100%
POMR	0	0	0%	0	0	0%	0	0	0%	0	0	0%	1	1	0%
SSI	0	0	0%	0	0	0%	0	0	0%	2	1	100%	1	1	0%
Surgical Volume	94	98	-4.10%	9	9	0%	6	9	-33.30%	71	91	-22%	12	13	-7.70%
Referrals	39	37	5.40%	40	44	-9.10%	18	29	-38%	41	47	-12.80%	0	18	-100%

Table 3. Calculation Accuracy: Percent error between KPI calculation of source data (Registry) and electronic data (RedCap)

Interpretation

The DQI intended to equip rural Ethiopian hospitals with tools necessary to capture quality surgical data. A preliminary quality assessment of registries showed few inconsistencies and missing fields, indicating high-quality data input, whereas verification of data entered electronically shows several discrepancies from the source data.

Potential limitations to data entry include insufficient human resources and limited technological capacity. These results suggest that capture of high-quality surgical data in rural Ethiopian hospitals is feasible on paper, but barriers exist in patient-level electronic data capture that require further exploration.