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Surgical Diagnosis and Procedure Codes for Outcomes Research in a Ugandan Regional Referral Hospital: The Mbarara Experience

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METHODS: We performed a retrospective analysis of the Emergency General Surgery database at Kamuzu Central Hospital (KCH) in Lilongwe, Malawi over 16 months (September 2013-December 2014). Bivariate and logistic regression analysis was used to compare mortality outcomes in patients with and without peritonitis.

RESULTS: There were 867 adult patients with an emergency general surgery complaint. There were190 patients (21.9%) who presented with peritonitis, with a mean age of 32.6 ± 20.3 years, and a male preponderance (62.6%). Mortality rates for patients with and without peritonitis are 20.0% and 8.6% ($p<0.000$), respectively. In patients with peritonitis, 139 (73.2%) had surgery, with small bowel perforation (23.6%) and appendicitis (23.6%) as the most common postoperative diagnoses. Delayed presentation, nonoperative intervention, and delayed surgery were significantly associated with mortality ($p=0.032$, 0.018, 0.038). Logistic regression modeling showed an adjusted odds ratio of mortality for patients with peritonitis to be 2.87 ($p<0.000$, CI 1.77-4.66).

CONCLUSIONS: Peritonitis is a significant cause of mortality among general surgery patients in sub-Saharan Africa. Increasing access through modification of the patient-provider interface, increasing the surgical workforce, and providing the prerequisite health care infrastructure would likely have a significant impact on mortality.

Surgical and Trauma Care in Low- and Middle-Income Countries: A Systematic Review of Tools to Evaluate Capacity

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INTRODUCTION: Surgical and trauma capacity assessments help guide resource allocation and inform research to improve care for the injured in low- and middle-income countries (LMICs). To help forge consensus on existing instruments, we undertook a systematic literature review of studies using 5 tools: the WHO Guidelines for Essential Trauma Care; WHO Tool for Situational Analysis to Assess Emergency and Essential Surgical Care; Personnel, Infrastructure, Procedures, Equipment, and Supplies tool; Harvard Humanitarian Initiative tool; and Emergency and Critical Care tool.

METHODS: Publications describing the methodology of implementing capacity survey tools in LMICs were identified using PubMed, Scopus, and Web of Science databases. Evaluation of reference lists and additional forward searches were performed. Included articles underwent thematic analysis.

RESULTS: Forty-one articles were included, describing evaluation of 1,170 facilities across 36 LMICs. Seven themes were identified: inclusion of district-level hospitals, inclusion of highest level hospitals, exclusion of private facilities, site visits for completion of surveys, direct inspection for verification, checking surgical logs for verification of procedures, and reduction of number of items in the checklist.

CONCLUSIONS: The survey tool chosen should be based on the focus of the assessment and ability of the system to conduct in-depth, externally appraised assessments. Evaluations should consider type of facility, feasibility of site visits, verification of responses with inspection and surgical logs, and modifications to the tool for effective implementation. Evaluations are fundamental to establish a baseline before implementation of improvements in surgical and trauma care in LMICs.

Surgical Diagnosis and Procedure Codes for Outcomes Research in a Ugandan Regional Referral Hospital: The Mbarara Experience

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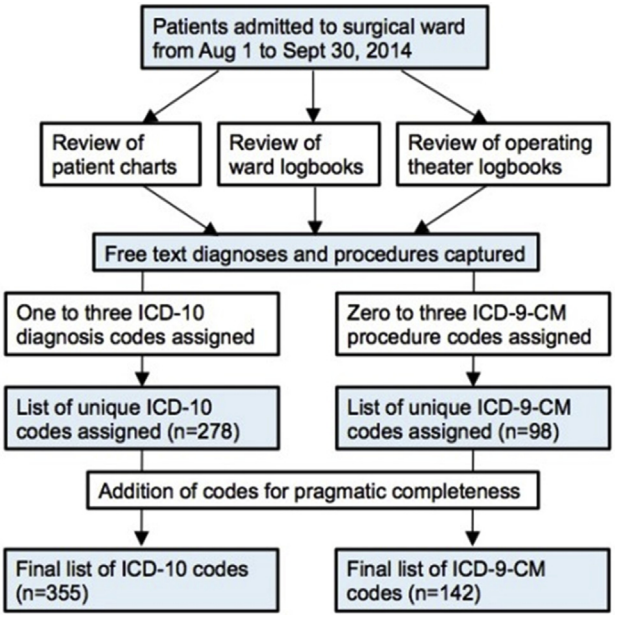
INTRODUCTION: It is difficult to measure surgical outcomes in low-income settings because there is a wide variety of surgical conditions and procedures, and existing coding systems are large and complex, making implementation difficult. We describe the development of an abbreviated surgical diagnosis and procedure code list at Mbarara Regional Referral Hospital, a 323-bed hospital in Uganda.

METHODS: We reviewed patient charts, ward logbooks, and operating theater logbooks to identify all admissions to the surgical ward between August 1 and September 30, 2014 (Fig). Based on a combined assessment of admission diagnosis, indication for surgery, procedure(s) performed, postoperative diagnosis, and



discharge diagnosis, we assigned ICD-10 diagnosis and ICD-9-CM procedure codes. Codes were aggregated to generate diagnosis and procedure code lists.

RESULTS: We assigned 278 unique diagnosis codes and 98 unique procedure codes to admissions during the study period. One hundred twenty-seven diagnosis codes represented 80% of diagnoses, and 42 procedure codes represented 80% of procedures. A maximum of 3 diagnoses and 3 procedure codes was sufficient to describe each admission and each procedure, respectively. Seventy-seven diagnoses and 44 procedure codes were added for pragmatic completeness (eg, bilateral vs unilateral versions of codes, additional anatomic sites). The final code lists consisted of 355 diagnoses and 142 procedure codes.

CONCLUSIONS: An abbreviated coding system based on ICD-9 and ICD-10 codes describes the majority of surgical conditions and procedures at a Ugandan regional hospital. A standardized coding of diseases and interventions may assist quality improvement, resource allocation, administration, and research in hospitals in low-income countries.

Systematic Evaluation of National Surgical Capacity in Lebanon in Times of Crisis and Refugees

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INTRODUCTION: Lebanon is a middle-income country where 1 in 4 people are currently refugees. We aimed to assess surgical capacity in Lebanon to identify emerging surgical needs in the evolving crisis.

METHODS: Using Ministry of Public Health and Syndicate of Hospitals' data, a list of all Lebanese hospitals was compiled. Chronic facilities and specialty clinics were excluded. Face-to-face or phone systematic interviews were used to administer the validated Personnel, Infrastructure, Procedures, Equipment, and Supplies (PIPES) survey. Overall and hospital-specific PIPES indices were calculated. Capacity gaps were identified in private and public hospitals.

RESULTS: Of 135 identified facilities, 69 completed the survey. The rest remain unreachable for security and/or administrative reasons. The majority of hospitals were private (74.0%) and urban (75.4%); the median PIPES index was 11.15 (range 10.48-12.79). Overall, hospitals had a median number of 77 beds (nterquartile range [IQR] 52-125), 3 operating rooms (IQR 3-4), 7 general surgeons (IQR 5-10), and 4 anesthesiologists (IQR 3-5). Public hospitals had higher median PIPES indices than private hospitals (12.8 [10.8-14.4] vs 11.1[10.3-12.11]; p=0.007). Most (68.6%) private hospitals had no incinerator and 11.76% had no ICU. Most (55.6%) public hospitals had no blood bank, 22.2% had no postoperative care area, and 11.1% occasionally lacked running water or backup generators. Notable differences in the ability to perform basic procedures in public vs private hospitals include cricothyroidotomy (66.7% vs 92.2%; p=0.008) and skin grafting (61.1% vs 96.1%; p<0.001).

CONCLUSIONS: Surgical capacity in Lebanon suffers from significant infrastructural deficiencies and notable variability in available primary surgical services.

Trauma Severity and Not the Socio-Economic Variables Determine Survival after Penetrating Trauma in a Medium-Income Country

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INTRODUCTION: Survival after severe trauma is lower in low- and middle-income countries. Quality of pre-hospital care, lack of insurance, and differential access to trauma care are possible explanations. The aim of this study was to evaluate the effect of lack of insurance, pre-hospital times, and the nature of the hospital (public or private) in survival after violent penetrating trauma in a middle-income country.

METHODS: Information was collected prospectively. Patients aged 17 years or older, taken directly from the scene during the first 6 hours after the trauma were included. Deaths on admission were excluded. Logistic regressions were used to control for confounders.

RESULTS: There were 320 penetrating trauma patients during June-December of 2012; 201 in a private hospital and 119 in a public hospital. There were 305 (95.3%) males. Median age was 26 years (interquartile range [IQR] 21-35). Median RTS, ISS, and PS were 7.55 (IQR 5.97-7.84), 18 (IQR 16-25), and 0.96 (IQR 0.85-0.99), respectively. There were 64 (20.0%) patients uninsured. Median pre-hospital time was 56 minutes (IQR 32-96 minutes). Death occurred in 69 patients (21.6%). Univariable analyses demonstrated that mortality did not differ significantly between hospitals (odds ratio [OR] 1.14, 95% CI, 0.65-1.99), Mortality trended to be higher in uninsured patients (OR 1.75, 95% CI, 0.94-3.23), and diminished as pre-hospital times were longer (OR 0.75, 95% CI, 0.58-0.95). After adjusting for age, ISS, and TRISS, these associations disappeared; only the severity indexes remained as significant predictors.

Table. Predictors of Mortality, Multivariate Analysis

Variable	Odds ratio (95% CI)	p Value
Hospital	1.13 (0.52-2.45)	0.75
Uninsured	1.41 (0.60-3.33)	0.43
Pre-hospital time, quartiles	0.83 (0.61-1.14)	0.25
Age, y	1.0 (0.97-1.04)	0.80
Injury Severity Score	1.1 (1.04-1.12)	0.00
RTS	0.49 (0.40-0.60)	0.00

CONCLUSIONS: In a middle-income country with well-established intra-hospital care, mortality after penetrating trauma was determined by the severity of the trauma. Type of hospital, lack of insurance, and pre-hospital time affected it only marginally.

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