Thematic analysis was conducted to determine opportunities and challenges for implementation in resource-limited settings.

Findings: We identified 8 tools and innovations that can be used for health systems monitoring and evaluation, including 3 data visualization tools that can be used for knowledge translation. These sample cases were compiled and described and results of analysis of challenges and opportunities for implementation were summarized. We identified specific requirements for successful utilization of such tools and how its use can be maximized for policymaking.

Interpretation: Different organizations use a large number of assessment tools, but its success for implementation in resource-limited settings have yet to be tested. This study outlines these challenges, as well as the opportunities, that need to be either addressed or tapped by organizations aiming to improve health systems performance and provide better knowledge translation.

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Abstract #: *2.011_TEC*

Digital surveillance of prescription drug abuse: An accessible methodology for collecting and analyzing twitter NUPM data

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Background: Youth and adolescent non-medical use of prescription medications (NUPM) has become a national epidemic. However, little is known about the association between promotion of NUPM behavior and access via the popular social media microblogging site Twitter, which is currently used by 1/3rd of all teens.

Objective: In order to better assess NUPM behavior online, this study conducts surveillance and analysis of Twitter data to characterize the frequency of NUPM-relevant tweets and also identifies illegal access to drugs of abuse via online pharmacies.

Methods: Tweets were collected over a two-week period from April 1–14, 2015 by applying NUPM keyword filters for both generic/chemical and "street" names associated with drugs of abuse using the Twitter public streaming API. Tweets were then analyzed for relevance to NUPM and whether they promoted illegal online access to prescription drugs using a protocol of content coding and supervised machine learning.

Findings: A total of 2,417,662 tweets were collected and analyzed for this study. Tweets filtered for generic drugs names comprised 232,108 tweets (including 22,174 unique associated URLs) and 2,185,554 tweets (376,304 unique URLs) filtered for street names. Applying an iterative process of manual content coding and supervised machine learning, 81.7% of the generic and 12.3% of the street NUPM data sets were predicted as having content relevant to NUPM respectively. By examining hyperlinks associated with NUPM relevant content for the generic Twitter data set, we discovered that 85.5% of the tweets with URLs included a hyperlink to an online marketing affiliate that directly linked to an illicit online pharmacy advertising sale of Valium without a prescription.

Interpretation: This study examines the association between Twitter content, NUPM behavior promotion, and online access to drugs using a broad set of prescription drug keywords. Initial results are concerning, as our study found over 45,000 tweets that directly promoted NUPM by providing a URL that actively marketed illegal online sale to a prescription drug of abuse. Additional research is needed to further establish the link between Twitter content and NUPM, as well as to help inform future technology-based tools, online health promotion, and public policy to combat NUPM online.

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Abstract #: *2.012_TEC*

Blended learning in a low-resource environment

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Background: The global burden of surgical disease is a well documented but often under prioritized global health initiative. Deaths due to anesthesia remain a significant contributor to perioperative mortality in developing countries. Most of these deaths are consider avoidable and many anesthesia providers suffer from a lack of training and educational resources.

Blended learning, an old educational concept that has gained recent attention in medical curriculum, combines online learning outside of the lecture hall with an in-class activity. This "flipped classroom" approach allows the student to learn at his or her own pace using the video-based resources, and then reinforces that knowledge in the classroom through interactions with teachers and peers.

This study aims to evaluate the usefulness of a blended learning course in a low-resource setting.

Methods: Through a NIH-funded Medical Education Partnership Initiative grant that partners Stanford University with the University of Zimbabwe College of Health Sciences (UZCHS) to promote medical training and research in developing countries, the anesthesia departments formed a collaboration to increase educational resources for the anesthesia trainees. A needs assessment determined the UZCHS registrars (residents) desired video lectures. A blended learning lecture series was created utilizing video lectures and classroom learning activities for four topics covering anesthetic emergencies. Anonymous knowledge tests and five-point Likert scale surveys evaluating clinical preparedness were distributed to the UZCHS registrars before and after the educational invention. The surveys also evaluated the clinical relevance, usefulness, and adaptability of the learning modules.

Findings: Comparison of the surveys demonstrated an increase in preparedness after the educational intervention. Knowledge test scores also increased in all four lectures. Further questioning extracted a desire for more video lectures and an inclination among the registrars to create their own.

Interpretation: Providing instructive videos easily accessible from a computer creates a flexible learning environment and increases the availability of educational material in a low-resource setting.

Funding: Stanford Department of Anesthesiology, Perioperative and Pain Medicine, Stanford Center for Innovation in Global Health.

Abstract #: *2.013_TEC*

The global burden of lipodystrophy, a rare disease

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Background: Lipodystrophy is a rare disease in which patients lack subcutaneous adipose tissue. These patients represent an extreme model of the metabolic syndrome (insulin resistance, dyslipidemia, fatty liver) seen in obesity. Management of lipodystrophy is challenging, and effective therapies such as recombinant human leptin (metreleptin) and concentrated U-500 insulin are not globally available. For over 40 years, the National Institutes of Health (NIH) in the US has studied patients with lipodystrophy from around the world. We herein describe the demographics of lipodystrophy patients seen at NIH to help understand the global burden of this disease, and discuss challenges in medical management worldwide.

Methods: We reviewed demographics of patients who participated in NIH studies between 1976 and 2015 and global availability of therapies.

Findings: Of 193 patients, 79% were female and 21% were male. Mean age was 34.6 ± 18.9 years. 28% had acquired lipodystrophy and 72% had genetic lipodystrophy. Ethnic distribution was 60% Caucasian, 13% Hispanic, 11% African-American, 5% Middle Eastern, 4% Southeast Asian, 2% each African, Caribbean, and Native American, and 1% other. 28 countries were represented. The geographic distribution of residence was 77% Americas , 14% Europe, 4% Asia, 3% Middle East, 2% Africa, , and 0% Oceania. Of the 150 patients from the Americas, 83% were from the US, 9% South America, 3% Central America, 3% Canada, and 1% Caribbean.

Interpretation: Access to metreleptin therapy depends on country-specific drug approval. Currently, metreleptin is approved only in the US for generalized lipodystrophy, and in Japan for all lipodystrophy types. It is available in other countries for compassionate use, including the UK, France, Spain, Germany, Italy, Serbia, and the Netherlands. Patients from other regions may travel to the US or elsewhere to obtain metreleptin via clinical trials. Many patients with lipodystrophy also require U-500 insulin for diabetes. U-500 may be obtained via Lilly country representatives in countries where it is not marketed.

The NIH dataset demonstrates the worldwide burden of lipodystrophy. NIH has been a leader in the treatment of lipodystrophy; however, resources available to treat patients at NIH are not always available in patients' home countries.

Funding: National Institutes of Health, National Institute of Diabetes and Digestive Kidney Diseases.

Abstract #: *2.014_TEC*

Outcomes of endemic Burkitt lymphoma patients treated using a patient-oriented approach

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Background: Endemic Burkitt lymphoma (BL) is the commonest childhood cancer in sub-Saharan Africa. BL tumors are fast growing but very responsive to treatment and potentially curable if treated early. However, survival is poor with approximately half alive at one year post diagnosis. Retrospective data on patient outcomes are limited by misclassification of diagnosis, poor access to cancer chemotherapy, and loss to follow-up.

Aim: Through the implementation of a comprehensive clinical care project we sought to improve access to care and survival for children with BL at the Uganda Cancer Institute (UCI).

Methods: The Burkitt Lymphoma Project aims to address: adherence support, nutritional support, treatment gaps, improved diagnostics and quality control through data collection. We used proportions to summarize key project outputs and Kaplan-Meier methodology to estimate 1-year survival.

Results: We followed 121 children with confirmed BL from July 2012-July2014. Baseline median age was 7 years (range 1-18); 61 % were male, and 52% had early stage disease. First-line chemotherapy {cyclophosphamide, vincristine, and methotrexate (COM)} was given to 86% (104/121) children; 12% died before initiating chemotherapy, and 2% refused treatment. All patients and their families received adherence support consisting of reminder calls and transport reimbursement for clinic visits. Of 657 chemotherapy doses dispensed, 28% were supplied during shortages. Of 104 patients initiating COM, 75% completed treatment (6 cycles of COM), 3% were switched to second line therapy before completing COM, 10% died during treatment, 8% were lost to follow-up and 4% refused further treatment. Of the 76 patients restaged after 6 cycles of COM: 76% had complete response (CR), 16% partial response, 8% had stable disease or progressive disease. BL relapsed before the 1-year anniversary post diagnosis in 21% of patients who had CR to COM. One-year overall survival was 51%, 95% CI (37%, 64%).

Interpretation: Addressing gaps in the existing treatment infrastructure for BL at UCI resulted in an improved level of adherence and decreased number of patients lost to follow-up. COM induces a sustained complete response in only 60% of BL patients completing treatment. Survival outcomes remained poor, likely due to inferior treatment regimens and late presentation.

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