Patient Safety Forum 2018

Conference Proceedings

Kingdom of Saudi Arabia
Ministry of National Guard Health Affairs
King Saud Bin Abdulaziz University for Health Sciences

patientsafetyforum.org
Message from the CEO

A warm welcome to the 2018 Annual Patient Safety Forum.

This year’s forum is taking the learning process for improving healthcare safety and quality to a completely different level.

In addition to the robust scientific program and the interactive educational experience, the research and improvement aspect of the forum is the strongest to date.

It is truly inspiring to witness the massive influx of abstracts representing different aspects from patient safety research to improvement work. This is a clear indication of the passion and enthusiasm among healthcare workers to improve quality and patient safety.

On behalf of the MNG-HA staff and the teams who worked diligently to make the Forum a great success, I would like to thank all the abstracts authors and welcome all participants and attendees and wish you all a fruitful and a productive experience.

Bandar Al Knawy, MD, FRCPC
Chief Executive Officer, Ministry of National Guard –Health Affairs
President, King Saud bin Abdulaziz University for Health Sciences
President, Patient Safety Forum 2018
Message from the Chairman of the Scientific Committee

It gives me great pleasure to welcome you to the 8th Annual Patient Safety Forum.

The 2018 forum aims to provide participating organizations and individuals with cutting edge updates as well as practical knowledge and skills for immediate impact in the workplace.

In addition, the forum serves as a platform for sharing learnings and success stories. The massive numbers of submitted abstracts is an inspiring indicator of the passion to improve healthcare quality and safety in the nation. This is coupled with a rigorous peer-review process to ensure consistent evaluation and inclusion of high-quality projects.

I strongly encourage you to view these poster, interact with the project leaders and help us evaluate and appreciate their work, your contribution to this process is extremely valuable.

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The abstract review committee would like to acknowledge Dr. Ola Babelli and Dr. Yasser Kazazz for their editorial assistance, Ms. Catherine Marinas and Mr. Jayson Diño for coordination and administrative support.
Prevalence and Associated Risk Factors of Fall Injuries Among Hospitalized Children in a Tertiary-Care Center in Saudi Arabia: A Cross-Sectional Study Based on Retrospective Chart Review

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Problem
Children falling during hospital stay is a major patient safety issue. Inpatient pediatric falls can lead to many negative consequences. Unlike for adults, there is a paucity of information about the prevalence and risk factors associated with child falls during hospitalization.

Background/context
This study aimed to identify the prevalence of fall injuries among hospitalized children and describe the demographic and environmental factors that could predict higher risk of severe outcome for fall.

Methods
This was a cross-sectional study based on retrospective chart review of children presenting to King Abdullah Specialized Children’s Hospital (KASCH) in Riyadh, Saudi Arabia. The study covered all inpatient pediatric falls during the first year after transition from the KAMC to KASCH (from April 1, 2015, to April 30, 2016). Data were obtained via the electronic safety reporting system (SRS).

Results
During the study period, a total of 48 fall events were reported. The prevalence of falls in 4860 admitted children was 9.9 (95% CI 7.5-13.1) per 1000 patients. High incidence of fall was seen among boys (54.2%), children aged 1-5 years (45.8%), children with high risk of fall (72.9%), children with normal mobility status (43.8%), and patients with no history of previous fall (68.8%). Only 25% of falls resulted in severe outcome.

Conclusion/lessons learned
Fall among hospitalized children can lead to devastating outcomes, but can be prevented by using a valid pediatric fall assessment tool. All health care providers should recognize and take into consideration all the factors that increase the admitted child risk of fall for better quality of care and patient safety.
Enhancing Pediatric Emergency Department Patient Flow by Reducing Admission Rate

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Problem

Overcrowding of pediatric emergency department (ED) patients occurred in King Abdullah Specialized Children's Hospital (KASCH) in Riyadh due to increased length of stay (LOS) of patients who required ED management of more than 4 hours (accepted LOS in ED before disposition plan) and unavailability of beds for admission. Some admitted patients with specific pediatric conditions were discharged within 24 hours after admission. The patient flow was greatly affected, because the number of pediatric patients also increased in the ED due to delays in clinical decision making and management, resulting in overcrowding.

Background/context

The three ED units are the Triage/Urgi-Care Center for low acuity patients, the Acute Care Unit for moderate acuity patients, and the Resus Unit for high acuity levels, with a total of 54 clinical beds. Increased patient ED length of stay before a disposition plan is made, inappropriate early admissions blocking admission beds, and increased ED boarding with ED overcrowding is a common problem.

Methods

A QI Team was initiated to study the causes of overcrowding. The team collected data of ED visits and explored root causes of overcrowding. Such factors were related to increased length of stay due to delayed clinical decision making and unnecessary admissions of some specific pediatric ED conditions, which led to increased ED patient boarding and blocking of admission and ED beds. Based on this, the team established a Clinical Decision Unit (CDU), which is a short-stay 12-hour observation unit located within the Acute Care Unit consisting of six designated rooms. Clinical criteria were developed for admission and discharge of ten pediatric ED clinical conditions that mostly require short-time ED management with probability of discharge of 80% matching the highest international benchmarking rates for observation units. The team utilized a Plan-Do-Study-Act (PDSA) quality model to test and implement the strategies identified. The total number of patients admitted to the CDU, diagnosis, and LOS were collected on a daily basis.

Results

In 2016, after introduction of the CDU in the pediatric ED, the total ED hospital admission rate from March until December 2016 was 5.72%, the CDU discharge rate was 79.7%, with an admission reduction rate of 25.09%. In 2017, the ED hospital admission rate was 5.47% with CDU discharge rate of 71.5%, and admission reduction rate of 31.66%.

Conclusion/lessons learned

Strict adherence to the CDU guidelines will facilitate proper clinical decision making and reduce unnecessary hospital admission, thus decreasing ED patient boarding and overcrowding, and improving ED flow.
Reducing Hospital Bed Stay in the Pediatric Inpatient Department at King Abdullah Specialized Children’s Hospital (KASCH)

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Problem
Delays in discharging patients resulted in a bottleneck in patient flow that ultimately impacted on patient safety and satisfaction, and overall organizational efficiency. Obstacles were identified that prevented early and timely discharge from acute beds, thereby causing blockage of patient flow in the pediatric department.

Background/context
The Pediatric Discharge Lounge was designed to accommodate medically stable patients (aged from birth to 14 years) who were discharged by their MRP and waiting for the release of medication and transportation. This area is a ten-bed unit, located near the Pediatric Emergency Department of the King Abdullah Specialized Children’s Hospital.

Methods
A strategy was developed whereby a series of Plan-Do-Study-Act (PDSA) cycles were undertaken to test and refine the revised patient flow methodology within the hospital at predetermined timeframes during the course of 2 years. Daily bed management meetings were introduced that were attended by key stakeholders such as clinical, nursing, and bed management case workers. On-call Directors of Nursing would also chair the meetings to effectively support any challenges identified and work on a plan of escalation at the end of the week and into the weekend. Training needs were addressed through internal upskilling programs and efficiency and effectiveness measures by monthly analysis of key performance indicators and from end user surveys distributed to patients’ parents and through dialogue with staff.

Results
Following its implementation, it was noted that the discharge trends are every morning, from 0900-1200H - 36.3%. Peak time of discharge activity between 1300-1600H - 55.4%, evening 1700-1900H - 8.3%. During year 2 only 12 (0.3%) patients returned to the ward from the discharge lounge due to sudden and unexpected symptoms and failure of transportation. As part of a revised patient flow methodology, the discharge lounge has successfully achieved its second year of sustainability and has been effective in reducing length of stay through a cost neutral strategy that has saved the organization a modestly estimated one million SAR to date.

Conclusion/lessons learned
The discharge lounge effort has resulted in almost zero delays for inpatient beds in the emergency department, and has achieved zero delays in admitting waiting list elective cases. This was a cost-neutral project implemented by using existing resources of location, equipment, and manpower. An overall cost saving during the 2-year program has equated to almost one million SAR and saved 383.6 beds days. Patient satisfaction survey trends show a 90% satisfaction from very good to excellent experience during their stay in the discharge lounge.
Use of a Clinical Algorithm to Improve Utilization of a Dedicated MERS-CoV Ward in MNGHA-WR

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Background/context

Middle East respiratory syndrome coronavirus (MERS-CoV)-related respiratory disease is an emerging infectious disease caused by an RNA virus related to the beta group of coronaviruses. Most patients with MERS develop severe acute respiratory illness with symptoms of fever, cough, and shortness of breath, with 40% mortality. The National Guard Health Affairs (NGHA) develop guidelines that mandate to admit any suspected or confirmed cases of MERS-CoV to airborne isolation. During 2017 a survey was conducted to determine the percentage of MERS-CoV and non-MERS-CoV patients admitted to the isolation ward. Length of stay of patients admitted for MERS-CoV isolation was compared with length of stay of non-MERS-CoV patients. MERS-CoV patients were removed from isolation if they improved clinically and had at least one nasal sample for MERS-CoV PCR return negative. An algorithm was developed to help early identification and discontinuation of isolation.

Methods

Data for the MERS-CoV PCR results were retrieved from the Microbiology Department. The occupancy of isolation rooms was monitored on a daily basis for one year from January 1, 2017, to December 31, 2017. Length of stay was calculated for patients admitted to the MERS-CoV ward to either discharge home or transfer to another unit. Total number of days for patients with suspected MERS-CoV and non-MERS-CoV were collected and average length of stay calculated for both types.

Results

A total of 600 patients with suspected MERS-CoV were admitted in Ward 20 and 80 non-MERS-CoV patients. The total patient days for both categories was 2026. Total patient days for suspected MERS was 2157 (mean 3.35) and for non-MERS-CoV isolation 529 (mean 6.61). The length of stay of patients without suspected MERS was almost twice that of patients with suspected MERS-CoV.

Conclusion/lessons learned

The availability of a clear clinical algorithm can facilitate decision making and early discontinuation of isolation of MERS-CoV cases. This helps in rapid transfer of cases, which can result in better utilization of isolation rooms.
Reducing Sacral and Heel Pressure Ulcers in Critically Ill Patients

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Problem

In the last quarter of 2016, the prevalence of sacral and heel pressure injuries was noted to have increased among patients admitted to the general intensive care unit (ICU), based on monthly audits performed by the hospital wound care team.

Background/context

This project was performed in the general ICU of King Abdulaziz Medical City in Riyadh. The ICU was a 21-bed unit that admitted medical, surgical, and trauma patients. The hospital was a 1000-bed tertiary-care hospital. Hospital-acquired pressure injuries are common adverse events of illness, are associated with extended length of stay, sepsis, and mortality, and may hinder functional recovery. In the general ICU, bedside nurses screen for presence of pressure injury, turn patients periodically, and use support surfaces to prevent its occurrence. A wound care team performs monthly audits and provides consulting services to ICU nurses.

Methods

Root cause analysis for the increased prevalence of pressure injury was performed. Barriers to patient turning were investigated. Multiple interventions were implemented that included the following improvement strategies: routine risk assessment using the Braden Scale, application of soft silicone dressing on sacral areas and heels of high-risk patients, testing ICU nurses’ competencies about pressure injury prevention with formal education, allocation of wound care nurse to the general ICU, leadership involvement, encouragement of rectal tube use, and deployment of a trained turning team with evidence-based guidelines on contraindications.

Results

The number of affected patients in the fourth quarter of 2016 was ten. After the implementation of the multifaceted interventions, there was a gradual decrease in the prevalence of sacral and heel pressure injuries (Figure 1). The rate went down from approximately six pressure injuries per 1000 patient days in the third quarter of 2016 to 0.5 per 1000 patient days in the last quarter of 2017.

Conclusion/lessons learned

Multifaceted interventions were associated with a reduction in sacral and heel pressure injuries in ICU patients. Sustaining success requires continued implementation of these interventions, audit, and active staff involvement.
Noise in the Intensive Care Unit: An Overlooked Hazard to Patients and Staff

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Problem
The environment in the intensive care unit (ICU) is often noisy, which may lead to sleep deprivation and delirium in patients and may hinder their recovery. Noise may also affect ICU staff concentration, performance and health.

Background/context
The sound level in hospitals is recommended to be 30 to 35 dB. In this project, our objective was to examine the noise level in the general ICU of King Abdulaziz Medical City in Riyadh to define the extent of the problem and to identify daily patterns. The hospital was a 1000-bed tertiary-care centre and the ICU was a busy 21-bed unit that admitted medical, surgical and trauma patients.

Methods
Two sound meters (SOUNDEAR II®) set to detected noise above 45 dB, were installed on December 21, 2017 in two areas in the general ICU outside patient rooms. Monitor 1 was close to the main entrance door and Monitor 2 was close to the main nurse station. Data were periodically retrieved from the devices and analyzed.

Results
Analysis of data showed that noise level exceeded 45 dB in 88.9% of the time for Monitor 1 and 14.2% for Monitor 2 (p<0.001). In Monitor 1, the maximum noise level was 60.4 dB (sound 45.1 to 50 dB in 67.4% of the time; 50.1 to 60 dB in 20.5% and > 60 dB in 0.01%). In Monitor 2, the maximum noise level was 63 dB (sound 45.1 to 50 dB in 11.2% of the time; 50.1 to 60 dB in 2.9%, > 60 dB in 0.1%). In both meters, there were multiple sound spikes that probably corresponded to increased staff activities, such as nurse handover (0700 to 0730 and 1900 to 1930), physician rounds, family visits and other activities. Figure 1 illustrates the noise data from Monitors 1 and 2 on January 2, 2018.

Conclusion/lessons learned
ICU environment is relatively noisy with significant variations between one area and the other and during the day. These data will be utilized to establish a quality improvement project for noise reduction in the general ICU.
Preventing Endotracheal Tube Obstruction in Intubated Patients in the Intensive Care Unit

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Problem
Critically ill patients frequently require mechanical ventilation through endotracheal tube (ETT) to support their respiratory function. Eight incidents of ETT obstruction caused by secretions occurred in the adult intensive care units (ICUs) within a ten-week period (Oct 25, 2016 and Jan 3, 2017). One of the incidents was associated with cardiac arrest.

Background/context
This project was performed in the Intensive Care Department of King Abdulaziz Medical City in Riyadh. The Departments covered the general ICU (21 beds), Trauma ICU (8 beds), Neuro Critical Care Unit (8 beds), Surgical ICU (9 beds), Oncology/Transplant ICU (14 beds) and the intermediate care unit (14 beds). The hospital was a 1000-bed tertiary-care centre. The project was implemented by a multidisciplinary team of physicians, nurses and respiratory therapists.

Methods
First, the causes of ETT obstruction were investigated by a multidisciplinary taskforce and root cause was determined to be the overuse of passive humidification of inhaled gases. Then, the humidification policy was updated according to the current evidence-based guidelines, which restrict passive humidification to short-term mechanical ventilation use. The number of active humidification systems was increased with the support of the hospital administration/Medical Services. ETT obstruction incidents were audited using a standardized form.

Results
The rate of ETT obstruction was 1.5 per 1000 patient days in the preintervention period (8 incidents; Oct 25, 2016 to Jan 3, 2017) to 0.3 per 1000 patients days after the project start (7 incidents, Jan 4 to Dec 31, 2017). Figure 1 describes the number of incidents over time. Four of the seven incidents after the project start occurred in the Surgical ICU and one was associated with precardiac arrest. Five audit forms were reviewed and ETT obstruction was associated with active humidification in 3 incidents and with passive humidification in 2.

Conclusion/lessons learned
Changing gas humidification practices during mechanical ventilation resulted in a significant decrease in ETT obstruction incidents. Staff should be periodically educated about the early recognition of ETT obstruction and humidification guidelines. Moreover, audit of ETT obstruction incidents should be continued.
The Requirement for Warfarin Dosing According to Body Mass Index

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Problem
Warfarin is a high-alert medication that needs special monitoring. Many factors affect its dosing and can cause dosing variation. The problem we are investigating is the relationship between dosing requirement and body weight.

Background/context
Warfarin is an anticoagulant that is widely used to treat patients with venous thromboembolic or atrial fibrillation. There are many factors affecting the required dose of warfarin including body weight; however, effect of body weight was only reported in few studies. Therefore, our study was conducted to use Body Mass Index (BMI) in order to assess the requirements for warfarin dosing.

Methods
A retrospective study that included adults who used warfarin for more than 4 months with at least two consecutive international ratio (INR) readings within therapeutic range. Obese patients defined as those with BMI of 30 kg/m$^2$.

Results
Three hundred and one (301) patients were included in the analysis. Obese patients had a 20% increase in their warfarin requirement compared to those with normal BMI and overweight patients (32.2 ± 15.2 vs. 27.4 ±17.3 and 26.8 ± 12.7), respectively; p = 0.013.

Conclusion/lessons learned
Obese patients required higher doses of warfarin in comparison to other patients and should be considered when initiating or adjusting the warfarin dose.
Safety and Efficacy of Using Dexmedetomidine in Pediatric Intensive Care Unit: Retrospective Chart Review

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Problem
Dexmedetomidine is not approved by USFDA for use in pediatric population and it is only approved for sedation in adult for 24 hours. In National Guard Health Affairs Pediatric ICU (NGHA PICU) we use it in pediatric patients with height doses and for long duration. We are assessing the safety of using it report and how do you use it.

Background/context
Dexmedetomidine is a selective α2 adrenergic agonist, it was approved by USFDA in December 1999 to be used initially for sedation in adults who are intubated and mechanically ventilated during treatment in intensive care unit; then in October 2008 was approved for sedation prior to and/or during surgical or other procedures in non-intubated patients. Manufacturer recommends duration of infusion not to exceed 24 hours. There are limited data on its use in children.

The aim of this study is to describe the use of dexmedetomidine for sedation in the Pediatric Intensive Care Unit (PICU) in regards to the dose, duration of infusion, effect on heart rate (HR) and systolic blood pressure (SBP).

Methods
The study was conducted at the PICU, King Abdullah Specialty Children Hospital, Ministry of National Guard. We did retrospective charts review for all children less than 14 years admitted to between May 2014 and April 2015 who received dexmedetomidine. Demographic data, HR, SBP, starting and maximum dose, time and duration of infusion and the concurrent use of midazolam were collected. IRB approval was obtained with a waiver of the informed consent.

Results
A total of 65 children with a median age of 24 (1 to 156) months, weight of 11(2.3 to 90) kg. The reason of admission was 64.6% for medical indications and 35.4% for surgical indications. The starting dose was 0.48 mcg/kg/hr (0.25-1 mcg/kg/hr), and the maximum maintenance dose reached is 0.84 mcg/kg/hr (0.4-1.5 mcg/kg/hr). For the duration of infusion, the mean was 7.30 days (1-34 days), and there were 2 patients reached 60 and 63 days of dexmedetomidine infusion. There was no significant difference in duration of infusion with respect to age group (P =0.082). There was a significant decrease in HR (P= <0.0001), baseline 114.23 + 22.08 bpm, and post-infusion 105.49 + 21.65 bpm. No hypotensive episodes necessitate the discontinuation of infusion were reported (100.45 + 15.42 mm Hg). Majority of patients (55%) were able to wean off midazolam after starting dexmedetomidine infusion, while 43% was still on midazolam infusion and the dose range of midazolam was 1-6 mcg/kg/min.

Conclusion/lessons learned
Using dexmedetomidine for sedation as a continuous infusion in the PICU seems to be relatively safe. Prospective randomized clinical trial is warranted to prove more safety and efficacy data on the use of dexmedetomidine infusion for the intubated pediatric patients.
The Impact of Teamwork and Communication on Staff Perception and Patient Safety in the Emergency Department

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Problem
Emergency Department (ED) is one of the most vulnerable areas to poor communication and to teamwork-based medical errors that affect patient safety. One way to prevent medical errors is by well-structured training and assessing of healthcare workers. A novel strategy to accomplish this training is by simulation-based (SB) teamwork and communication training.

Background/context
This study will provide simulation-based training to the ED staff in the National Guard Health Affairs hospital (NGHA), Jeddah, Saudi Arabia using the TeamSTEPPS curriculum and will assess its effectiveness to improve staff perception toward teamwork and communication, and to reduce medical errors.

Methods
This research is a single-subject experimental design with the interventional incorporation of simulation training in ED cases. The paper’s methodology focused on 3 domains. 1) Patient safety in the ED. 2) Inter-professional and multidisciplinary simulation team training. 3) Team dynamic enhancement by using TeamSTEPPS principles. The study was covered over 3 phases: 1) A pre-intervention perception survey using T-TPQ (TeamSTEPPS Teamwork Perceptions Questionnaire) and utilizing Team Emergency Assessment Measure (TEAM) to assess real staff perception during code in the ED toward teamwork and communication. 2) 18 multidisciplinary full-day-sessions through simulation that were followed by focused brief on site sessions in the ED on weekly bases. 3) A post-intervention perception survey and TEAM assessment in the ER.

Results
Perception survey covered five different aspect of teamwork including: Team Function, Leadership, Situation Monitoring, Mutual Support and Communication. Overall staff perception about teamwork in ED: the response in pre-simulation was 69% (n=1850) “Agree”, 27% (n=724) “Neutral” and 4% (n=121) “Disagree”. The overall response improved significantly post-simulation with the p-value <0.0001. “Agree” increased by 15% to be 80% (n=3058), “Neutral” decreased by 36% to be 17% (n=653), and “Disagree” response decreased by 39% to be 3% (n=104).

Conclusion/lessons learned
In conclusion, the given results showed partial achievement of the anticipated changes of reducing the avoidable medical errors through enhancing non-technical skills among ED staff. It was accomplished through some examples of near misses that were avoided by proper communication, the nurses’ ability to speak up and the verification of physicians’ orders. We are currently in a process of collecting data of Phase three second part which is the TEAM assessment in real ER environment and link it to one of ER KPIs which is the Length of Stay (LOS) in the ED.
Switching of Cyclosporine Dose from Intravenous to Oral Post Allogeneic HSCT in Saudi Pediatric Population

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Problem
It is challenging to predict the equivalent oral dose of cyclosporine when switching from IV to oral. There is no clear conversion factor for pediatric population post hematopoietic stem cell transplantation.

Background/context
This is a retrospective chart review study done in King Abdullah Specialized Children Hospital. Different conversion factors have been recommended from previous studies. One study recommended doubling the dose of cyclosporine when switching from IV to oral, while another one recommend to increase the IV dose by nine-fold.

Methods
Data from 35 pediatric patients who underwent allogenic stem cell transplantation have been collected in Microsoft excel sheet. Data included patients’ demographics, IV doses and levels, oral doses and levels, renal and hepatic functions, and concurrent medications during, and after transplantation. The primary end point was to determine the appropriate conversion factor to be used for switching from intravenous to oral cyclosporine. Data analysed using Microsoft Excel, tables have been created to compare the intravenous doses of cyclosporine with oral doses during therapeutic levels.

Results
Cyclosporine switched to oral for all patients after an average of 21 days from starting intravenous cyclosporine. 20 patients reached the therapeutic level of cyclosporine before switching to oral. The average conversion factor for these patients was 1:1.6. For patients with cyclosporine level of 251 to 350 ng/mL, it was enough to add 30% of intravenous dose when converting to oral, and for patients with levels less than the target, doubling the dose of intravenous cyclosporine to convert to oral results in reaching the target level.

Conclusion/lessons learned
To maintain the target level of cyclosporine, it was appropriate to use an average of 1:1.61 as conversion factor when switching from intravenous to oral cyclosporine in pediatric patients who underwent allogenic HSCT in King Abdullah Specialized Children Hospital- Riyadh and reach the target level of cyclosporine before switching to oral. Other conversion factors might be used in case of higher or lower cyclosporine levels to reach the target level directly.
The Impact of Mock Code Simulation in Improving the Timeliness and Effectiveness of First Responders in a Code Blue Event

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Problem
During unannounced mock code simulations there was delay of the first responders in identifying deteriorating patients, which in turn delayed the process of activating a code blue and the team arrival.

Background/context
King Abdullah Specialized children hospital is a 600 beds hospital catering to pediatric, oncology and organ transplantation patients. 7 general pediatric wards were included in the mock code simulation program in collaboration with the pediatric residency program. The delay in initiating effective CPR has been a global concern worldwide. Some of the factors contributing to this concern are nurse’s lack of confidence, critical thinking and the ability to act in a stressful situation. Although all health care workers in KAMC are mandated to have a valid BLS certification, some of them have difficulties applying the lab simulated practice in the clinical setting.

The goal is to train the general pediatric wards staff to respond to a code blue event in a timely effective manner by mock code simulation in their respective areas.

Methods
Baseline data was obtained from each unit of the timeliness of the responders to a mock code simulation. The mock code was unannounced to the unit staff and was conducted in the clinical area. The assessment included the nurse assessment of patient responsiveness, CPR initiation, Code Blue activation and multifunctional pads placement for patient monitoring and defibrillation if needed. As well as the team dynamic and communication between the team members. After the staff training in scheduled unit based mock code sessions, unannounced mock code simulation conducted in the wards involved.

Results
The involved wards were assessed in multiple opportunities after baseline data collection and staff training. Unannounced mock code simulation was conducted in each ward with time difference between each opportunity of 1 to 2 months. The time in seconds for each data component was calculated, and team dynamics were assessed. Multidisciplinary team debriefing post event was done emphasizing the areas of improvement. Intensive training was conducted therefore as per unit performance and specific to the areas of improvement identified during the event.

More unit based training is required as the increase of staff retention and new staff adjustment to the unit new environment are barriers in achieving our goal.

Conclusion/lessons learned
The results show improvement in the timeliness of responding to a deteriorating patient which impacted on the process of activation of a code blue. The review of codes by the CPR committee shows that BLS was initiated in the same minute of the cardiac arrest. The mock code simulation is conducted weekly and providing an educational opportunity to all team members. Regular mock code simulation sessions are conducted every 3 months as in order to sustain the staff performance, in addition to the unit based education conducted by the unit CRN.
Direct Physician Engagement as a Stewardship Modality to Curtail the Overuse of Antimicrobials in the Intensive Care Units at a Tertiary Care Hospital in Saudi Arabia

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Problem
Antimicrobial misuse by treating physicians is believed to be a major contributor to this problem.

Background/context
Antimicrobial Resistance (AMR) is a major healthcare threat worldwide. As bacteria have become resistant to almost all available antimicrobials, previously treatable healthcare infections have now become life threatening. Antimicrobial misuse by treating physicians is believed to be a major contributor to this problem.

Methods
As part of the infection prevention and control departmental activities, the Antimicrobial Stewardship Program (ASP) team conducted a prospective audit in the adult and trauma ICUs at King Abdulaziz Medical City-Riyadh (KAMC-R) between September and December 2017. The ASP team consists of an ID consultant and 2 infection control practitioners. Targeted antimicrobials were reviewed by the ASP team and treating physicians to determine the appropriateness given the available clinical and laboratory information. Interventions were recommended by the ASP team, who also checked the implementation of these interventions by treating team.

Results
A total of 401 antimicrobial prescriptions were reviewed during the audit period. Frequently prescribed antimicrobials included piperacillin/tazobactam (20.2%), meropenem (19.7%), and vancomycin (10.5%). Empiric therapy represented 68% of all prescriptions, followed by therapeutic (29%), and prophylactic (3%) ones. Cultures were available for 384 (96%) prescriptions and the results were positive for 37% of them. Of the 401 antimicrobials reviewed, 314 (78.3%) were appropriately prescribed (Figure 1). Corrective interventions were suggested by the ASP team in 86 (21.6%) of the prescriptions. The most common intervention suggested was discontinuation of the antimicrobial (63%), followed by change the type of antimicrobial or its dose (50%), de-escalation (9%), and IV to oral (1%). Overall 54 (63%) of the 86 interventions recommended by the ASP were carried out by the treating team.

Conclusion/lessons learned
Direct engagement of an infectious disease physician of the ASP team with treating physicians in ICU setting can lead to improvement of the appropriateness of antimicrobial use. The concept of direct physician engagement holds promise as an effective stewardship modality.
Enhanced Flu Vaccine Methodology; Success and challenges at King Abdulaziz Medical City, Riyadh

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Background/context
HCW may acquire influenza both in the health care setting and in the community, and they can easily transmit the virus to patients in their care. Reducing the viral disease burden among patients and healthcare workers is one of the strong recommendations of Saudi Ministry of Health and Centre of Disease Control in the US. Objective was to implement a series of overlapping methods to improve the vaccine utilization.

Methods
An enhanced vaccination campaign has been designed to implement between September 2017 and end of February 2018. The following methods were used; (1) Adopting six sigma lean process (Design, Measure, Assessment, Improve and Control), (2) building partnerships with clinical leadership (3) Assigning nursing liaisons, (4) Printing and extensive distribution of campaign materials (5) Voice reminders through the hospital media three times a day, (6) conducting flu educational session in all hospital location specially those known of low compliance, (7) Improving Access to Vaccination by setting multiple stations and booths in different units (8) Recruitment of volunteer vaccinators and offering incentives for nurse vaccinator, (9) Setting quality checks to reduce the amount of vaccine wastes, (10) Supporting universal vaccination and signed waiver form vaccine refuses. The outcome of the campaign was the vaccination rates for different professional categories and patient care units. The outcomes were compared to previous years.

Results
During the current campaign, a total 37,555 has been vaccinated out of 40,000 targeted HCWs which represent a vaccination rate of 93.8%. The vaccine doses administered in the current campaign (40,000) was almost double of the last campaign (25,260). Similar to previous years, nurses had the highest vaccination rates (85%) while physicians had the lowest (44%). Both nurses and respiratory therapists had better vaccination rates compared with previous years (Figure 1). Similarly, intensive care units and to less extent emergency departments had better vaccination rates compared with previous years (Figure 2).

Conclusion/lessons learned
Implementation of several overlapping methods to enhance flu vaccinations at healthcare setting helped us improving our flu vaccination rate in some professional categories and hospital locations. However, we still far from achieving our target of >90% vaccination coverage. As done before in some other institutions, it is suggested that flu vaccine should be mandated in our hospital for yearly contract unless it is clinically contraindicated.
Assessment of Knowledge, Attitude and Practice Regarding Oxygen Therapy at Emergency Departments In Riyadh, In 2017

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Problem

Increase mortality rate due to over oxygenation of some emergency conditions like ST-elevation myocardial infarction (STEMI) during pre-hospital and hospital treatment due to lack of Knowledge, Attitude and Practice (KAP) regarding Oxygen Therapy (OT) is a significant problem. Based on literature review of previous similar studies; in 2015 in Addis Ababa, Ethiopia, trauma patients, patients with STEMI, and hypoxic COPD patients who present acutely to the Emergency Departments (ED) were impacted by this problem.

Background/context

Work was done at ED in urgent and critical care unit in four canters: King Abdulaziz Medical City, King Saud Medical City, King Khalid University Hospital and Saudi Red Crescent. Our target population was nurses, paramedics, Emergency Medical Technicians and EMS physician who are working in ED during the periods scheduled from Oct 2017 to Jan 2018. It is known that there is clear knowledge, attitude and practice gap among ED nurses.

Methods

In this cross-sectional quantitative study, a structured questionnaire was used to assess KAP related to OT. Purposive sampling technique was used. Target participants as mentioned above. Data were collected by medical student and analysed using SPSS.

Results

Knowledge: A total of 429 answered the questionnaire. The majority of participants 84% (362) believed that patients with STEMI and SpO2 ≥ 90% on room air require OT and only 16% (67) knew that it might harm their patients. There were 68% (294) who consider providing OT to all patients with head injury and normal SpO2.

Attitude: 90% (384) of participants who agreed that humidification is the best effective practice to prevent soreness from upper respiratory tract dryness while few 3% (13) disagreed and the rest were neutral.

Practice: Even though 66% (282) of participants followed the best practice in using pulse oximetry (PO), only 22% (95) were aware of its limitations which may affect SpO2 reading.

Associated factors: The main factors which were associated with poor KAP were work load, lack of local guidelines and shortage of training programs. carried out by the treating team.

Conclusion/lessons learned

The participants demonstrated clear gap in knowledge and practice towards OT. However, the majority demonstrated a positive attitude. Based on the results of this study, it is recommended to re-train all ED staff according to recent updated guidelines on OT. Hospital protocol must be developed.
Mishaps in the Labour Ward – Preventable Through Risk Management System  

**Problem**

High risk pregnancies account for about 6-8% of all the pregnancies, yet, we never know when a low risk pregnant female can end up with complications intrapartum or postpartum. To prevent any mortality/morbidity from happening, a system was developed. Risk Management System was formed and all the High Risk Occurrences that happened in our unit were recognised and recorded in a Risk Log Register.

**Background/context**

This study was conducted in the Department of Obstetrics & Gynecology at the International Medical Center, which is a private tertiary care center with an average of 4200 deliveries annually.

Categories were made. High risk occurrences were identified and recorded in the risk log register. Risk Management team was formed – which comprised of Department's consultants, specialists, residents, nurses and members from the QIPS. Weekly meetings were conducted, and the cases recorded over the week were analyzed and remedial plans were put in place. All the cases recorded were later transferred on the access software and were made digital.

**Methods**

The digital databank of Risk log had 603 cases. About 30 cases had missing data. High risk occurrences that happened in the unit for egs: Preeclampsia, Shoulder Dystocia, Postpartum Hemorrhage, cord prolapse, admission to ICU, low APGAR score etc., were identified and recorded by the unit nurses and doctors in the Risk log register. Weekly meetings were conducted and each case recorded over the week was analyzed in depth. The involved team/department in the case were spoken to, to analyze more about the details of the incident, and also to know if it was preventable or unpreventable. Risk score was then calculated using the risk matrix to analyze how likely is it to happen again?

**Results**

**By this study we concluded that:**

1. The most common identified problems are 125 cases (20.7%) of concerns about management in labour, 44 cases (7.2%) of delay in elective caesareans, 42 cases (6.9%) of birth injury and 33 cases (5.4%) of opening second theatre for crash/emergency caesareans. Among the high risk occurrences that were identified were preeclampsia (1.6%), eclampsia (0.3%), shoulder dystocia (3.9%), PPH (10.1%), fetal anomaly including undiagnosed fetal anomalies (2.3%), unexpected transfer to NICU (3.1%), Significant infection (0.9%), Return to theatre (0.4%), Postnatal readmission of mother (0.4%), trauma to other internal organs (1.3%), Loss/Retention of swab (0.1%), Manual removal of placenta (0.3%), Cord prolapse (0.8%), misdiagnosis of antenatal screening (3.9%), seriously ill patient (2.4%), admission to ICU (1.9%), still birth/neonatal deaths (1.9%), low APGAR/low pH (3.9%), maternal resuscitation (2.6%), third/fourth degree tear (2.6%), severe sepsis occurred in (0.2%) and VTE & PE (1.3%).

2. Most commonly identified cause was noncompliance (29.3%) followed by unpreventable (26%), communications issues (12.7%) and lack of guideline (11.9%).

3. Actions taken was discussion done with the involved team/department (50.4%).

4. Guidelines/protocols and flowcharts were put.

5. Training courses were started and training was given to physicians, residents and nurses in order to manage obstetrical emergencies in an evidence-based manner. Risk scores were analysed for each category. Most common risk scores were 6 and 9 requiring monitoring and action respectively.

**Conclusion/lessons learned**

Risk Management System Review is an important tool in the modern labour ward and provides valuable information in obstetric care. It helps us to direct our resources to deal with high risk cases. The study highlights the need for improvement in antenatal care which would help early identification of high risk occurrences. It is based on the risk register. The feed into the risk log identification system is by far much more powerful than using Occurrence Variance Reports (OVR). The former is more focused and based on clear parameters with a much easier identification system.
Improving Emergency Physicians Handovers: A Baseline Assessment

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Problem

Communication failure is one of the leading causes of preventable medical errors, especially in the Emergency Department setting. Establishing a structured handover process has been shown to reduce the rate of medical errors and preventable adverse events. In addition, the Emergency Department at KAMC-Riyadh was cited by the Joint Commission for the lack of a structured handover process.

Background/context

This project was conducted at the adult Emergency Departments at King Abdulaziz Medical City in Riyadh, which has an annual volume of approximately 150,000 visits. The project targeted all emergency physician to physician handovers across the entire spectrum of patient illness severity. The aim of the project is to improve the emergency physician handover process by implementing standard communication processes in more than 80% of patient handovers.

Methods

Using the improvement science methodology, the project was divided into three main phases. The first phase involved understanding the current performance “baseline” on the nature of handovers and the physician’s level of satisfaction with the existing process. Emergency medicine trainees observed handovers and recorded the verbal handover elements in an electronic data collection form, following that, receiving emergency physicians were asked to fill a form assessing their rating of and satisfaction with the handover they just received. The second phases involved the development of a structured handover process that meets international standards as well as the local emergency physician’s needs. The third phase would involve the implementation of a structured electronic handover form in the electronic medical record, this tool is scheduled to be implemented in 2018.

Results

A baseline measurement involving 323 patient handovers showed that only 15% of handovers contained all essential elements as agreed by the Delphi process. The assessment also included the receiving physician’s satisfaction that resulted in a 30% dissatisfaction of current handovers.

Conclusion/lessons learned

Our current assessment shows that only 15% of total handovers in the ED contain the essential elements from the Delphi consensus. We are developing an electronic handover tool to be implemented in the electronic medical record, and it is scheduled to go live in February 2018. We are working on reducing the number of patient handovers by introducing overlap shifts, and improving nursing participation in physician handovers. This improvement is urgently needed to improve patient safety and maintain our accreditation status.
Use of Simulation Based Learning Method in Medical Education: From Medical Students’ Perspective at King Saud Bin Abdulaziz University for Health Sciences, Riyadh

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Problem

Use of Simulation Based Learning (SBL) as an alternative technique as a substitute to teach on real life patients is commonly used in medical education. Consequently, effectiveness of SBL use in medical teaching can be derived from the perspectives of medical students and health professionals. This study was conducted with the aim to assess the perception of simulation use on medical students learning at KSAU-HS.

Background/context

This cross-sectional study was conducted in the College of Medicine in King Saud bin Abdulaziz for Health Sciences in Riyadh (COM-KSAU-HS/R) from November 2016-January 2017.

Methods

Both male and female students in COM-KSAU-HS were included in the study. Consecutive sampling was employed as the method of sampling. A self-administered semi-structured questionnaire was used for conducting the study which was administered to each of the study participants after their informed consent was taken. Utmost care was taken to maintain privacy and confidentiality. SPSS 20 was used for statistical analysis.

Results

Among 145 students, who participated in the study, 68% were males and 32% were females. Overall, respondents from each year (male and female) were satisfied with SBL. The lower satisfaction was reported in the areas such as the available skill labs facilities, allocated time for skill labs and debriefing sessions. There was a significant difference between the satisfaction scores among two genders on different aspects of SBL. Whereas no significant difference was identified between the participants' scores on the satisfaction with different items related to SBL and year of education.

Conclusion/lessons learned

Overall, study showed a satisfaction about SBL among students in KSAU-HS. Different areas were identified that still need improvement. It is recommended that training of facilitators on aspect of debriefing and feedback should be conducted to get the maximum benefits of SBL.
The Burden of Antimicrobial Use in Pediatric and Neonatal Intensive Care Units, A 33-Month Surveillance Study

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Problem
Antimicrobial usage data among the pediatric and neonatal population is minimal. Such information is necessary to develop and monitor prescription practices with the aim of improving usage of antibiotics to limit side effects and the emergence of resistance.

Background/context
As part of the ongoing antimicrobial stewardship activity aiming to reduce the burden and cost of antimicrobial consumption at our hospital, we sought to quantify antimicrobial consumption in pediatric and neonatal population. The objective was to calculate population-specific antimicrobial consumption.

Methods
A prospective surveillance study was conducted at King Abdulaziz Medical City, Riyadh, Saudi Arabia, between October 2012 and June 2015 in two pediatric and one neonatal intensive care units (ICUs). Usage data was collected on a daily basis by the infection preventionists assigned to the specific ICU. Data were presented as days of therapy (DOT) per 1000 patient days and 100 admissions, and daily percentage of use.

Results
During the 33 months of the study, a total 30110 DOTs and 6930.5 DOTs were monitored during 4921 admissions contributing to 62606 patient-days. Cephalosporins represented 38.0% of daily use of all antimicrobials in pediatric ICUs followed by vancomycin (21.9%), carbapenems (14.0%), aminoglycosides (8.8%), and piperacillin/tazobactam (8.8%, Figure 1). Their uses were 265.1, 152.6, 97.6, 61.4, and 61.4 DOTs per 1000 patient-days (respectively). Aminoglycosides represented 45.4% of daily use of all antimicrobials in neonatal ICU followed by cephalosporins (30.4%) vancomycin (13.6%), and carbapenems (8.3%). Their uses were 147.5, 98.7, 44.3, and 27 DOTs per 1000 patient-days (respectively). Unlike pediatric ICUs, piperacillin/tazobactam and fluoroquinolones were rarely used in neonatal ICU. Patients at neonatal ICU had slightly more days of antimicrobials use compared with patients at pediatric ICUs during the same admission (650.1 versus 589.6 DOTs per 100 admissions). However, after adjusting for the length of stay, patients at pediatric ICUs had double days of antimicrobials use compared patients at neonatal ICU (697.0 versus 324.5 DOTs per 1000 patient-days).

Conclusion/lessons learned
We are reporting high consumption of cephalosporins in pediatric ICUs and aminoglycosides in neonatal ICU at a tertiary care hospital in KSA. Considerable amount of carbapenems and vancomycin are used in pediatric and neonatal ICUs. Such data will be of value in establishing and monitoring the functions of an antimicrobial stewardship program for the pediatric and neonatal ICUs and most importantly in guiding on education and interventions needed to ensure judicious use of antimicrobials.
Improving Antimicrobial Prophylaxis in Surgical Procedures at King Abdulaziz Medical City, Western Region (KAMC-WR)

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Problem
Preoperative antimicrobial surgical prophylaxis is one of the necessary pillars of optimum and safe perioperative care. At the time of this intervention, surgical prophylaxis was not being monitored at our institution, KAMC-WR. In July 2017, The Joint Commission International (JCI) added a standard that requires facilities to develop and implement an antimicrobial stewardship program (ASP) which includes an element on proper use of prophylactic antibiotics. Hence, as a part of an ASP initiative, an evaluation of surgical prophylaxis practices at KAMC-WR was conducted in order to identify gaps in the adherence to surgical antimicrobial prophylaxis guidelines.

Background/context
Surgical site infections are among the most common healthcare-associated infections. They are associated with increased length of stay, hospital re-admission, mortality and increased cost of treatment. In an effort to assess current surgical antimicrobial prophylaxis trends, multidisciplinary team meetings were organized and an audit process was created targeting all adult patients undergoing surgery at our facility starting April 2017. The team included nurses, physicians, pharmacists, and the quality department. The goal was to identify our practices and possible areas that could be improved.

Methods
The team developed an Antimicrobial Surgical Prophylaxis Audit form. Nurses were responsible to fill it out for each patient going to the operating rooms. The form included information on patient demographics, surgery type, antibiotic, dose, route, timing of administration and intraoperative administration of prophylactic antibiotics. We designed an Access database and dashboard in order to generate reports according to our identified measures including appropriate dosing and timing of administration. Interventions were developed based on our findings and included educational sessions targeting nurses, pharmacists, and physicians. Audit results were shared with the various teams during these educational sessions and through official communication. Junior surgeons were invited to educate their colleagues on appropriate surgical prophylaxis during the 2017 Antibiotic Awareness week.

Results
A total of 1972 adult records were audited. There was a significant improvement in appropriate dosing from 35.05% in month of April 2017 to 56.15% in the month of September 2017 (P<0.05). Appropriate timing of administration also improved from 42.03% to 54.3%, respectively (P<0.05).

Conclusion/lessons learned
The interventions consisting of audit, education and feedback proved to be effective in improving the dosing and timing of administration of prophylactic antibiotics. However, in order to further reduce the variation in dosing and timing of administration, and to have an even more significant improvement, standardization is necessary via the use of surgery specific preoperative checklists.
Surveillance of Dengue Disease in King Abdulaziz Medical City, Jeddah, Saudi Arabia from 2004 - 2017

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Problem
Dengue is endemic disease in Jeddah. In spite of efforts by MOH and municipalities, cases are still increasing. In 2017, the highest number of laboratory confirmed dengue cases was reported in King Abdulaziz Medical City, Jeddah (KAMC-J).

Background/context
Dengue is emerging mosquito-borne viral disease influenced by environmental risk factors. It causes severe flu-like illness and sometimes leads to potential lethal complications. According to the WHO, incidence of dengue has increased 30-fold over the last 50 years with 50-100 million cases occur annually in over 100 endemic countries. Because of several reports of difficulties in using the previous classification of dengue (undifferentiated fever, dengue fever (DF) and dengue haemorrhagic fever (DHF)), the WHO changed the classification based on disease severity (dengue with and without warning signs and severe dengue).

Methods
Dengue disease surveillance data from 2004 – 2017 in King Abdulaziz Medical City-Jeddah were reviewed. Both suspected and laboratory-confirmed cases were identified.

Results
Since 2012, number of reported dengue cases in King Abdulaziz Medical City-Jeddah is increasing. Almost 100 cases were reported each year from 2012 till 2016 which is more than three times the average number of cases reported in the previous years since 2004. In 2017, number of cases significantly increased to 279 laboratory confirmed cases. Simultaneously, during earlier years from 2005 -2012, confirmed cases represented about 1/6 of the suspected cases, compared to one-third of the suspected cases from 2013 – 2017.

Conclusion/lessons learned
Physician awareness of disease clinical presentation significantly contributes to case identification and would reduce burden of disease on healthcare system. Environmental sanitation and mosquito control remain the essential preventive intervention measures. Community education and collaboration of relevant governmental and non-governmental sectors should be enhanced. Future studies should focus on availability of accurate, fast and easily conducted diagnostic procedures.
Reducing Patients Waiting Time in King Abdulaziz Medical City Jeddah (KAMC-JD) OB-GYN Clinic

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Problem

The project emanates from the Perfect Month Initiative conducted for the Outpatient Services. One of the areas concerned is Obstetrics and Gynaecology, increased waiting time which have been experienced by the patients, and recorded an average waiting time of 80 minutes that exceeded the average set time expected of 60 minutes which has affected proper utilization of healthcare services and caused stress for Physicians and patients.

Background/context

In March 2017, KAMC-Jeddah has initiated a “Perfect Month Initiative” that involved all staff from board to clinical area. As a result, the OB/GYN Clinic stood out with an average of 80 minutes patient waiting time from registration to patient seen by physician.

Methods

An interdisciplinary team has been formed to undertake a 6-month project using the Lean Six Sigma methodology and tools. Define, Measure, Analysis, Improve, and Control (DMAIC) framework has been used to improve turnaround time (TAT) to less than 60 minutes from registration up to patient seen by physician.

The data has been gathered retrospectively using Excel and Best CARE system. Focus population includes new, booked, walk-in out-patients excluding inpatient, suspected MERS-CoV and those with double appointments. Target improvement measures includes 1) average 60mins. TAT between patient registration to patient seen by physician and 2) TAT of 15 minutes from patient arrival to triage time.

Also, patient seen with preference, patient late arrival to appointment time, patient waiting time per specialty/per day of week and average duration per procedure are measured and their correlations analysed. Meeting with Department Heads and team members were held wherein issues identified using fishbone, recommendations gathered, prioritization matrix formulated and timelines agreed.

Results

Pre-intervention: 10 weeks period
1. only 16% (612/3,725 patients) were triaged within 15 minutes of arrival (median time=51 minutes).
2. only 30% (962/3246) were seen by physician within 60 minutes of arrival (median time=82 minutes).
3. Baseline Sigma Level of 0.54.

Post-intervention: 13 weeks period
1. 77% (3,606/4,684 patients) were triaged within 15 minutes of arrival (average time= 14minutes).
2. 54% (2,347/4,353 patients) were seen by physician within 60 minutes of arrival (average time= 63 minutes).
3. Sigma level of 1.60.

Conclusion/lessons learned

By the end of improve phase, the following were met:
• Minimized patient waiting time to improve efficiency and productivity.
• Improved patient experience by providing optimal quality care and safety of patient.
• Improved patient flow in various steps of out-patient care system.
• Engagement of all front-line staff and leadership inpatient flow improvement.
The Perceived Benefits and Challenges of Adopting and Implementing Lean Six Sigma Methodology in Hospitals in Saudi Arabia

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Problem
Despite the rapidly increasing interest in Lean Six Sigma as a quality improvement methodology which can be seen in many manufacturing and service businesses as well as in the public sector but on the other hand there is a wide consensus that Lean Six Sigma application in healthcare is still in its infancy stage in many countries. Lean Six Sigma methodology is less established in developing countries compared to developed countries and in healthcare compared to other sectors. Studying Lean Six Sigma implementation in healthcare taking Saudi Arabia as an example for developing countries has been inviting due to lack of previous studies or references.

Background/context
The target group includes healthcare leaders and quality professionals working in Saudi healthcare organizations representing the three main sectors forming the Saudi healthcare system which are Ministry of Health (MOH), governmental agencies other than MOH and private sector.

Methods
This study is based on quantitative approach through a structured self-administered questionnaire including mainly closed end questions and minimal number of open end questions with an aim to collect empirical data which can be statistically analyzed. The survey has been directed through email to 332 invitees. The response rate was 23.5 percent which is satisfactory.

Results
The study has identified process improvement, waste reduction, lead/cycle time reduction and medical errors reduction as the main benefits while top management commitment, understanding Lean Six Sigma tools and techniques, effective communication and teamwork skills as the most crucial factors for success. Resistance to change and inability to sustain improvements are the most frequent and difficult challenges impeding Lean Six Sigma implementation in healthcare. Basic quality tools requiring no or simple statistical knowledge are more important and frequently used in healthcare unlike tools relying on advanced statistics. Conducting workshops with hands on training is essential as it is the most effective training method.

Conclusion/lessons learned
The evolution of quality management profession identity in healthcare is evident. The study has concluded that Lean Six Sigma is still in its evolution stage in healthcare especially in developing countries. The SAQ developed in this study provides a valuable tool for future studies.
Impact of effective Communication Among In-patient Palliative Care Providers

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Problem
Decision taken to admit palliative care patients to related wards was delayed due to lack of communication. Those patients who needed medical attention were delayed for admissions and those who could be discharged were staying longer. Weekend process for decision making (admissions and discharge) were sluggish.

Background/context
Ministry of National Guard Health Affairs hospital in Riyadh is a well-established 1500+ bedded healthcare facility in Saudi Arabia and caters services to all the National Guard employees and other eligible patients. Department of Oncology has Palliative Care clinics and has a revolving door that admits and discharges patients. According to records there are at least 50,000 oncology patients visiting the oncology clinics on an annual basis.

Methods
Department introduced the “Morning Consultant Rounds” to start at 8:00 am, where they discuss patient condition, possible discharges and planned admissions for the day. This communiqué and reports generated were reviewed, monitored and a final Daily Bed Management report was generated by 10:00 am and a monthly report was consolidated and shared with multi-disciplinary team and Nursing Department.

Results
Daily Morning rounds: Palliative care started with 30% compliance in January and after August 2017 they reached 100% compliance for the rest of the year which displays a sustained trend in communication that resulted in the following:

• Average length of stay for 2017 which 21 days and in the last quarter it went up to 26 days. This trend in increased length of stay should continue for Palliative Care patients.
• Average ED boarding time remained well below the hospital targeted boarding time of 6 hours or less boarding in ER (This shows an improvement in communication and decision making to bring patients to the ward).
• Bed Occupancy rate was 86% in January and in December it was increased to 96% (steady growth in bed occupancy shows quick decisions to admit patients to the ward from other areas).
• Patients admitted from other areas in the first quarter 31% admissions from other sources and in the last quarter it increased to 48% patients coming from other services.

Conclusion/lessons learned
Communication among the multidisciplinary team improved number of admissions, did not achieve the targeted time of discharge, increased number of elective admissions compared to ER patients. ER boarding time was maintained below the hospital target of 6 hours or less. Patients were taken care of in timely fashion that shows the fewer patients ended up in ER.
Optimization of Clinic Management to Reduce Walk-ins

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Problem
Increased Walk In patient visits in Gynaecology Oncology clinics. Physicians could not accommodate scheduled patients and were also unable to prioritize on critical patients due to non-availability of appointment slots. Too many walk-in patients were visiting the clinic that were not requiring any medical attention.

Background/context
Ministry of National Guard Health Affairs hospital in Riyadh is a well-established 1500+ bedded healthcare facility in the capital city of Saudi Arabia and caters services to all the National Guard employees and also to other eligible patients. Gynecology Oncology section of the department of oncology has a huge patient base in the city. According to records there are at least 4000 patients visiting the clinics on an annual basis.

Methods
Close monitoring of number of scheduled visits and walk in visits to see the ratios in departmental statistics and data. Increased number of clinics, clinic allocation for each consultant to discuss results with the patients, removed clinics such as the miscellaneous clinic.

Results
Scheduled patient in the clinics-
Total new patients seen in new scheduled clinic increased from 19 patients in November 2016 to 24 patients in October 2017.
Follow up patients seen increased from 143 in November 2016 to 245 patients in October 2017.

Walk in patients-
New patients seen decreased from 73 in November 2016 to 43 in October 2017.
Follow up patients also shows a decrease from 26 in November 2016 to 10 in October 2017.

Conclusion/lessons learned
Results display a trend of decrease in walk-in patients in the clinic, increased number of patients seen in scheduled clinics which validates the outcomes. Team work used in developing new clinics, deleting existing clinics was effective and collaborative behaviour gave birth to process ownership. Number of scheduled patients “seen” on regular appointment has increased.
Effectiveness of Two Asthma Education Methods for Guardians of Children with Asthma Attending a Tertiary Pediatric Hospital in Riyadh

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Problem

Asthma education for caregivers is a cornerstone for effective childhood asthma management. A previous study at our centre showed a negative correlation between parent’s level of education and ED visits. As a quality improvement project our team wanted to explore the effectiveness of an educational video in improving access to asthma education.

Background/context

At King Abdulla Specialist Children Hospital, a large tertiary centre in Riyadh, our team of medical students from King Saud Bin Abdulaziz university designed a 3 minutes caregiver targeted Asthma animated video and we set up a study to compare the effectiveness of two methods: Face to face session with asthma educator and a locally developed Asthma education video.

Methods

Our team designed a 3 minutes caregiver targeted Asthma animated video. Parents/caregivers of children with asthma attending our outpatient clinic were randomly selected cross-sectionally and demographic information was obtained. A Validated Arabic form of “Asthma Awareness Questionnaire” was conducted as a baseline. Then subjects were randomly assigned to two arms of educational modalities: Asthma specialist educator’s session or watching our educational video. Both educational modalities were tailored to cover aspect of knowledge surveyed in the questionnaire. Post the educational session, the questionnaire was repeated to assess their newly acquired knowledge.

Results

56 participants were randomly selected. 20 participants were interviewed by Asthma Specialist Educators and 36 participants watched the video. 51% of the subjects were above 30 years old, 70% had only general education and 50% stated that they participated previously in an educational activity about asthma. The mean questionnaire score for the asthma specialist educators increased from 57.6 SD 6.3 to 67.7 SD 6.3, P< 0.001. The mean score for the video group increased from 57 SD 9.2 to 66 SD 8.2, P< 0.001. Wilcoxon Signed Ranks Test showed that the impact of the video on the questionnaire score was greater than the Asthma Educator.

Conclusion/lessons learned

Both Asthma educational methods were effective. Our results show that a well-designed video is no inferior to asthma specialist nurse in delivering a targeted educational message. The implication of the results in our current era of technology and smart phones is attractive and a more cost-effective way of asthma education.
Infection Control Management of Pan-Drug Resistant Klebsiella Pneumonia Cluster of Cases in Adult ICU- King Abdulla Specialized Children Hospital (KASCH)

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Problem

King Abdulla Specialized Children Hospital (KASCH): is a 600-bed capacity hospital with 22 adult ICU beds that provides care to adult Hematology/Oncology and post organ transplant patients.

In August 2017 two cases of Pan-drug resistant Klebsiella pneumonia were reported. Infection prevention and control conducted a retrospective study to identify and confirm a cluster occurrence. Hence, a multidisciplinary meeting was formulated, composed of Nurses, physicians and Infection control staff.

Background/context

Multidrug-resistant (MDR) gram-negative bacterial infections are a prevalent problem in many countries all over the world. Moreover, intensified use of broad-spectrum antimicrobial agents has resulted in more emerging resistant organism. The impact of emerging MDR reflects seriously in quality of healthcare system especially on immune compromised patients. This lead to increase mortality and morbidity with increase the cost of health care KASCH is providing care for very vulnerable patients (Haematology/Oncology, Pediatric and Organ transplant).

Methods

Fish-bone tool was used to conduct root cause analysis. Various recommendations and interventions were formulated based on four pillars:

1. Environmental: Includes extensive environmental microbiological swabbing, housekeeping practice audits of cleaning/disinfecant and implementation of H2O2 fumigation system.
2. Staff: Education to increase awareness and conducting competency assessment for infection control practices.
3. Surveillance: By initiating active surveillance testing for Carbapenem-resistant Klebsiella pneumonia (CRKP) upon admission and discharge for all ICU patients using real time PCR of rectal swab testing, also activation of antibiotic stewardship program (ASP).
4. Patients and visitors: Place all patients in empiric contact isolation, restrict visit and increase awareness on importance of hand hygiene.

Results

Since November 2017 till January 2018, no cases were identified in addition we noticed increase compliance with all infection control practices.

Conclusion/lessons learned

A multifaceted intervention featuring active surveillance, enhancement of staff awareness and competency, environmental cleaning in addition to proper use of antibiotics resulted in sustained “zero” cases of Pan-drug resistant Klebsiella pneumonia among ICU patients.
Using Lean Methodology to Scale Up Utilization of Cardiac Cath Lab in KFCC-Jeddah

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Problem

Cardiac Cath Lab in KFCC- Jeddah was doing average of 70 cases monthly, approximately 3-4 cases per day. Majority are Coronary Angiogram/Angioplasty that last for 15-20 minutes. There were some cases that had delays in throughput. Significant delays in Cath Lab procedures contribute to the underutilization of the Labs thus also increases waiting list.

Background/context

Cardiac Catheterization Laboratory is one of the areas in King Faisal Cardiac Center- Jeddah. It consists of two Cath Lab rooms that care for inpatients, outpatients and emergencies. Potential variants of patient flow in Catheterization Lab and how strict adherence to procedural start time impacts department productivity.

The utilization rate during the Q1 2017: Cath Lab 2= 28% and Cath Lab 3 = 16.4%. And the number of delays increased that were mainly due to late assessment on admission (N=25), procedural consent not ready (N=17), patient escort late arrival (N=7) and Cath Lab team incomplete (N=3). The waiting list for booking patients during the same period were also huge (N=78).

Methods

Retrospective study was conducted during the Q1 2017, utilizing LEAN methodology and other quality tools like IHI Rapid Improvement (Plan, Do, Study, Act) in order to decrease delay procedures and increase utilization of Cath Lab. The intervention started during the Q2 2017 whereby a multidisciplinary team was form. Cath Lab process flow was assessed. Data were collected and analysed using fishbone diagram and detailed process mapping to be able to identify the root causes and close the gaps in the process. Recommendations were formulated and immediate actions were done.

Results

Cath Lab utilization rate increased during Q3 2017: Cath Lab 2 from 27% to 48% and Cath Lab 3 from 16.4% to 44%. The number of delayed procedures also declined, late assessment on admission (25-0), procedural consent not ready (17-0), patient escort late arrival (7-2) and Cath Lab team incomplete (3-1). The waiting list were decreased to 37 whereby 50% of those were contacted to be schedule but no response and the other 50% were not yet booked, they are still waiting for pre-operative TEE and other investigations.

Conclusion/lessons learned

By building a locally appropriate data management system and training staff to apply data to evidence-based decision making, hospital staff were empowered to drive the patient flow process well into the future. The results and effectiveness of our intervention suggest that using problem-solving methodology to strengthen key Cath Lab management systems can enhance quality of care.
Decrease Adult Inpatient Endoscopy Cancellations by Improving Multidisciplinary Communication Applying TeamSTEPPS Methodology in KAMC - Jeddah

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Problem

In KAMC-JD data shows increase endoscopy procedure on same day cancellations for Adult Inpatients Medical Wards. There was 34% (N=21/62) cases in 1st Quarter 2017, comparing to 15% (N=11/74) cases in 4th Quarter 2016. This is directly affecting endoscopy procedure room workflow and leading to inefficient utilization. It also causes dissatisfaction medical and nursing staffs in addition to patients and relatives’ disappointment. Additionally, it contributes to high booking waiting list.

Background/context

Endoscopy unit is one of the most dynamic areas in King Abdul-Aziz Medical City- Jeddah (KAMC-JD). It consists of two endoscopy procedure rooms, which serve inpatients and outpatients. Therefore, efficient utilization of procedure rooms with existing resources in presence of high demand for endoscopy procedure is an area of interests for improvement. Same day cancellation of adult inpatient booked endoscopy procedures is the main concern, jeopardizing flow and inadequacy of utilizing resources. It approximately costs a hospital 5000 SR for each cancellation that could be utilized more inventively. Implementing unified, patient integrated, safe and evidence-based health care will improve patient outcomes. In addition, enhancing communication among staff will improve not only facility utilization but will also increase staff and patient satisfaction. Therefore, TeamSTEPPS initiative was introduced in our institution. It’s an evidence-based teamwork system designed to improve quality, safety and efficiency.

Methods

Retrospective study was conducted during the last quarter of 2016, utilizing TeamSTEPPS methodology and other quality tools in order to decrease Endoscopy cancellations for adult inpatient. Pre-Assessment Survey was initiated with regard to Teamwork Perception amongst staffs. Initiation of the project begun in Q1 2017 wherein a multidisciplinary team was assembled. Some checklists were designed using TeamSTEPPS tools and Endoscopy Communication Form to enable streamline communication between medical and nursing staffs.

Results

All Monthly booked and cancelled adult inpatient in medical wards Endoscopy procedures were monitored and audited. After implementation of recommendations, data shows significant reduction from 32.5% (N=32) pre-intervention (Oct 2016- Apr 2017) to 10.8% (n=16) post-intervention (Jul- Sept 2017), p-value (0.005).

Conclusion/lessons learned

Applying TeamSTEPPS strategy improved performance and work flow of adult inpatient endoscopy procedure, and subsequently resulted in increased work efficiency and reduction of procedure cancellation. Additionally, implementing TeamSTEPPS in our organization has been proven to be an effective tool to enhance communication, teamwork and reduces staff tensions and worries.
Data-Driven Antibiotics Selection, Susceptibility Patterns in Emergency Department Patients with Urinary Tract Infections

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Problem
Urinary tract infections are among the most prevalent infections in ED patients. Changes in pathogen profile and susceptibility patterns isolated from urinary tract infections accentuate the need for regional review to generate information that can guide antimicrobial therapy.

Background/context
The aim of the project was to optimize antibiotic selection based on local susceptibility results.

Methods
This was a retrospective review of culture results of samples sent from ED, King Abdulaziz Medical City, Riyadh in a period of 3 months (February- March- April 2016).

Results
Total of 2128 urinary cultures sent from ER with 504 positive culture (=23.7%), 125 contaminated culture (=5.9%), and 1499 negative culture (=70.4%). The highest rate of positive cultures is among females older than 45 (ranging between 28.41% to 35.8%). The lowest rate of positive cultures is among males younger than 45 (=10%). The predominant organism identified was E.coli accounting for 54% of all positive cultures including E.coli ESBL identified in 15% of positive cultures. The predominance of E.coli was observed among both genders and across all age groups. Common organisms following E.coli varied widely according to age and gender. Organisms resistant to commonly prescribed outpatient antibiotics were present in almost 25% of positive cultures (E.coli ESBL 15%, K pneumonia 2%, Carbapenem Res. K. pneumonia 1.5%, Vancomycin Resistant Enterococci 1%, P. aeruginosa 3%, MDR P. aeruginosa 1%, MDR P. Mirabilis <0.5%) with variable sensitivity to Meropenem, Imepenem, Vancomycin, Colistin.

Conclusion/lessons learned
The low rate of positive cultures among males younger than 45 years of age mandates a reduction in rate of urine testing in this subgroup. The unique pattern of pathogens and varying prevalence of multidrug resistant ESBL mandates periodic analysis of culture results. The UTI order set in the EMR should be adjusted based on culture and sensitivity results to improve the decision support process. Publishing examined results to be available for local practitioners and treatment protocol makers will help tailor treatment protocols to target community.
Reducing the Rate of Catheter Insertion to Reduce Catheter Associated Urinary Tract Infection: A Quality Improvement Project

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Problem
The high prevalence of catheter associated urinary tract infections (CAUTIs) is well established in literature. It accounts for 36% of all health care associated infections in the United States. In a study the 91% of urinary catheters placed within 24 hours of admission were inserted in the emergency department with more than half judged later to have been avoidable.

Background/context
King Abdulaziz Medical City in Riyadh, Saudi Arabia is a large academic hospital with a 150,000 visits emergency department. Resulting in a high rate of hospital admission through its ED. The rate of ED-placed Foley catheter insertion among patients admitted through the ED of our institution has never been established and no recent interventions in regards to CAUTIs prevention have been done.

Methods
This is an ongoing improvement project to assess the impact of implementing a set of interventions to reduce CAUTIs by reducing the rate of urinary catheter insertion in the ED. The first phase of this study was completed by retrospectively reviewing charts of patients admitted through the ED on three different time periods (1-7 November 2016, 1-7 December 2016, 1-7 January 2017) to establish the rate of catheter placement in our ED. The ongoing intervention phase compromised of changes in the electronic health care system to introduce a decision support process aiming to decrease unnecessary catheterization. Along with it, educational materials are to be distributed in the ER and among ED physicians and nurses. The final phase will be similar to the initial review to establish the rate of catheter insertion post intervention and assess the impact of our project.

Results
For phase one, a total of 647 patient admitted through the ED on the specified time periods with 87 catheter insertions during ED visit making the rate of catheter insertion in our ED= 13.4 per 100 admissions. Following the intervention phase the rate of catheter insertion will be reassessed and the impact of the intervention program will be determined.

Conclusion/lessons learned
Depending on phase one results, the higher rate of Foley catheter insertion found in our ED suggests a higher percentage of avoidable Foley catheter insertions. Predicting large room for improvement with appropriate interventions.
Introducing a New Patient Sedation Pathway in PDTU: Improving Efficiency and Safety – KASCH

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Problem
The large expansion of imaging procedures ordered in pediatric population led to increase demand on the use of sedation outside the operation room provided by various health care providers. Although there is a variation in protocols, procedures and medication used, the primary aim is to provide a safe sedation that is also effective and efficient.

Background/context
Following concerns raised during Joint Credential Appointment International (JCI) review over access to immediate advanced pediatric life support (PALS) during the transportation of the sedated child. We introduced a new pathway for sedating children attending the pediatric day treatment unit (PDTU) for CT scan. Previously our children were admitted to PDTU for initial assessment and administration of oral sedation in PDTU. The child will be then transported by a staff nurse to the imaging department sedated. But with concerns over immediate access to PALS during transfer and possible higher failure rate.

Methods
We modified our pathway to transport the child un-sedated to the imaging department where oral sedation will be given in the imaging department and the patient will be monitored in designated recovery area with access to trained PALS providers until he is awake. We designed a retrospective review of pediatric patients’ ages 3 months to 14 years old who underwent Computerized Tomogram (CT) during 18-months period. In this study we seek to access the safety, efficacy and efficiency of the new pathway.

Results
Data was available for 62 children, 6-month period on the old pathway (27) and for 1 year on the new pathway (35). 27 patient required sedation on the ward, 2 cases (7%) required second line medication in imaging department and 2 cases (7%) failed sedation. There were no reported adverse events during that period. Data was available for 1 year on the new pathway, 35 children required sedation which was administrated in the imaging department. Only one child (2%) required second line medication. None of the children failed sedation on the new pathway. There were no reported adverse events during that period.

Conclusion/lessons learned
The new patient sedation pathway added a new protective layer of patient safety by providing access to immediate PALS during the sedation process. The above data also provided an evidence of high level of efficacy and efficiency of the new pathway with no failed sedation and only 2% needed top up medication. We have no incidence of adverse event reported over the study period. The overall improvement in efficacy, efficiency and patient safety during the sedation process will resulted in reduction of failed sedation for imaging and further need for rebooking. Consequently, better utilization of resources and reduction of health economic and costs.
Smart Glucochecks Frequency Guidance for Medical Inpatient

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Problem

Glucochecks cause a lot of discomfort to the patient, in addition to being costly to the health service as well as time-intensive to the nursing staff.

Background/context

Diabetes Mellitus (DM) has reached epidemic proportions globally especially in Middle Eastern Gulf States. A significant proportion of in-patients in any of these countries harbour DM at any given time. Glucochecks cause a lot of discomfort to the patient, in addition to being costly to the health service as well as time-intensive to the nursing staff. To the best of our knowledge, there are no published guidelines for continuous assessment and the need for rationally reducing glucochecks frequency.

Methods

A Smart Glucochecks Frequency (SGF) guidance was developed and tested in three medical wards with the primary goal of reducing excessive and unnecessary use of glucochecks in medically-stabilized in-patients with controlled glucose readings. A target of two glucochecks per day was utilized for 2 months (June and July 2012). A knowledge translation monitor (KTM) was used to assist the monitoring of this intervention.

Results

Out of a total of 257 in-patients, 175 had DM (68.1%). Only 3 were having a SGF of two per day. The KTM intervention resulted in additional 48 patients being switched to SGF. Only 2 needed restarting a more frequent monitoring. SGF resulted in a net reduction of 360 glucochecks per month.

Conclusion/lessons learned

The SGF guideline resulted in a reduction in unnecessary glucochecks. Its impact on patient satisfaction, as well as on health-care expenditure also, it’s friendly and helpful Method for nurses and their satisfaction will be guaranteed by:

- Reducing work load dramatically.
- Prevent developing scar tissue in patients’ digits.
- Save time which improves patient quality care.
- Shows baseline (Random, Fasting) for B/S readings which means that medication that given to patient is effective and on the right track.
Using an Early Warning Score System in the Acute Medicine Unit of a Medical City In Saudi Arabia is Feasible and Reduces Admissions to Intensive Care

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Problem
Early Warning Scoring Systems (EWSS) based on vital signs help to detect and define clinical deterioration.

Background/context
Early Warning Scoring Systems (EWSS) based on vital signs help to detect and define clinical deterioration. When combined with a system of prompt and appropriate clinical responses, several studies have reported that EWSS improve outcomes. However, the literature is contradictory and there are few high-quality studies. Moreover, there have been no studies of EWSS in hospitals in the Middle East. A study of the use of the Physiological Early Warning System (PEWS) in the acute medicine unit (AMU) of King Abdulaziz Medical City, Riyadh (a 1500 bed medical city) in Saudi Arabia was therefore performed.

Methods
Data were collected on all adult patients (>18 years) admitted to the Acute Medicine Unit (AMU) in KAMC between 01/12/11 and 31/05/12. Patients’ vital signs were monitored at least 6 hourly unless more or less frequent observations were requested by the treating physicians. The PEWS was introduced to the AMU on 15/03/17. Physicians were not allowed to adjust the parameters of the PEWS scoring system in this study. Besides collecting standard demographic data and PEWS data; feasibility was assessed by reviewing the clinical records of the data required to calculate PEWS and the response of healthcare professionals to the score. Effect on outcomes was considered by comparing the use of the critical care rapid response team (CCRT) and transfer to ICU as well as the final outcome (i.e. discharge from hospital or death), readmission rates and length of inpatient stay (LOS) before and after introduction of the PEWS to the AMU. Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS; SPSS Inc., USA). Continuous data are presented as mean ± standard deviation were assessed using Student’s T test. Categorical data were analyzed using the Chi-squared test.

Results
This study demonstrated that the use of PEWS was feasible in this setting without ward-based medical cover. Although Critical Care Response Team (CCRT) activation was not reduced, admissions to the intensive care unit (ICU) were. Thus, these data suggest that the use of EWSS in this clinical setting improved the responses to deteriorating patients by primary teams and thereby reduced admissions to ICU. However, CCRT involvement was not reduced because the PEWS escalation algorithm overlaps with that for CCRT activation.

Conclusion/lessons learned
This study is the first to demonstrate the feasibility and benefit of using the PEWS in an AMU without ward-based medical cover in a multi-cultural tertiary hospital with a CCRT in Saudi Arabia. In the context of previous studies that report similar outcomes in various other settings; our data support the implementation of EWSS in KSA. This can ensure effective and judicious utilization of overburdened acute services and can minimize adverse outcomes. By improving outcomes without increasing cost and reducing ICU admissions and possibly even the need for CCRT; use of EWSS can improve the quality of health care services whilst increasing efficiency.
Effectiveness of Automated Specimen Collection Process to Prevent Sample Mislabelling

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Problem
Wrong blood was transfused to a patient. This incidence was detected and reported through SRS system. Fortunately, patient received the same blood type.

Background/context
Receiving wrong patient’s sample in laboratory due to mislabelling error can result in severe and significant consequences which might lead to death. The current practice of specimen collection in King Abdulaziz Medical City identify several gaps in the process, for example the current manual patient identification and order verification at bedside are potential risks, also the lack of integration between all technologies defined as one of the important factors.

Methods
To reduce specimen collection mislabelling, Multidisciplinary team was formulated from all concerned departments to analysis the existing practice and identify the area which needs improvement, then proposed an automated process of specimen collection to close the loop (Starting from the clinician order till receiving the result from the laboratory), relevant international standards and guidelines were reviewed as framework to the proposed solution. Also enabling the technology at point of care by utilizing the barcode readers and systems integration were considered as two important components in the proposed solution. One clinical unit was selected as a pilot unit to examine the new proposed solution for one-month period.

Results
A failure mode, effects and analysis (FMEA) was conducted post implementation for both the existing manual process and the new implemented process, this is to measure and identify the areas of improvement. As result, the positive patient identification by using barcode technology avoided mislabelling incidents to reach the laboratory, and make the detection of this error visible to the end user at the point of care.

Conclusion/lessons learned
The new process led to quality improvement of patient safety by reducing the potential risks for mislabelling. In addition, the time of the process was reduced, helping the physician to decide for the proper treatment in timely manner.
The Comprehensive Unit Safety Program for Mechanically Ventilated Patients (CUSP 4 MVP): Multicentre Project In Saudi ICUs


Johns Hopkins University School of Medicine

Problem

Ventilator-associated pneumonias (VAP) are the most common healthcare-associated infection in ICU patients, with a reported incidence rate of between 9% and 28% in some studies. A recent meta-analysis of 6284 patients from 24 trials reports an overall VAP-attributable mortality rate of 13%. Infection with VAP is associated with an increased use of broad-spectrum antibiotics, an additional 9.6 days of mechanical ventilation (MV) and increased ICU stay from 4.3 to 13 days, and infection ultimately costs an average of more than US$40,000 per episode. The burden of VAP is projected to get worse as the global population ages and more multidrug-resistant organisms emerge.

Background/context

VAP rates have changed little over time despite the existence of guidelines for prevention. The need for multifaceted interventions to increase compliance with guideline recommendations and reduce the burden of harm from VAP is tremendous. However, implementing evidence-based interventions that is proven to improve health outcomes has many barriers in practice. One needs simple, locally relevant, evidence-based summaries of what should be done; measures that are scientifically valid yet meaningful; and focused efforts to improve the local culture before provider behaviour can be changed. We previously presented data regarding the changes in compliance with evidence-based recommendations over time in our cohort. We now present the impact of the intervention on ventilator-associated events (VAEs) in patients.

Methods

14 ICUs from 6 hospitals in Saudi Arabia participated in the third cohort of the Comprehensive Unit Safety Program for Mechanically Ventilated Patients (CUSP 4 MVP) Project led by the Johns Hopkins Armstrong Institute for Patient Safety (AI). Each participating ICU was required to for a unit-based safety team of key local stakeholders and opinion leaders based on the CUSP model. These teams then implemented at least one of up to three bundles of evidence-based intervention guidelines to improve various aspects of care of ventilated patients in their ICU. These included daily spontaneous awakening trials, spontaneous breathing trials, and early mobility of ventilated patients. Training of participants on both the adaptive work (CUSP, teamwork, communication) and technical work (evidence based practice bundles, data collection) was via scheduled project teleconference calls.

Results

The collaborative collected 141 units-months of data on a totaling 47912 ventilator days. We compared participant performance in regards to the outcomes of interest (ventilator associated events) with the first three months of data collection being considered as baseline, irrespective of calendar start date. Over the intervention period, there was a decrease in the overall rate of VAE, and specifically infection-related ventilator associated complications, and possible ventilator associated pneumonias

Conclusion/lessons learned

This project was one of the first to create a collaborative cohort of ICUs from different healthcare sectors of the Saudi healthcare system. We were also able to demonstrate the feasibility of successfully pairing a validated adaptive intervention like CUSP with a technical one like evidence based practices to improve the care of mechanically ventilated patients in the Saudi healthcare system. This led to an improvement in the rate of VAEs in participating ICUs over a relatively short period of time. Our hope is that this evidence of benefit to clinical outcomes from this project will provide the impetus for a large-scale multicenter quality improvement collaborative to improve the care of mechanically ventilated patients, and eventually others, across the Kingdom.
Initiative to Reduce Unnecessary Lumbar X-Ray in the Emergency Department: Choosing Wisely Campaign

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Problem

Lumbar x-ray is a frequent test used to assess patients with low back pain in the emergency department. X-rays carries the risk of radiation and we believe that it is overused in the emergency department. Ordering too many unnecessary lumbar x-rays in the emergency department puts our patients at risk of radiation, reduces efficiency and increases costs on the system.

Background/context

There have been many initiatives all over the world to avoid unnecessary medical tests, treatments and procedures. These initiatives are known as “choosing wisely” it started with the ABIM Foundation five years ago and is spreading since. We at King Abdulaziz Medical City Emergency Department see around 100,000 visits a year. We are initiating a campaign to reduce unnecessary lumbar x-rays for nontraumatic low back pain. We aim to raise awareness and educate our physicians by showing them data and monitor their ordering habits.

Methods

We have collected the data of all lumbar x-rays performed in the month of April 2017. We looked at the number of tests, indication for traumatic or nontraumatic pain, ordering physician, cost of each test and the delay it causes on the system.

Results

Total of 171 lumbar x-rays ordered. 65% of the x-rays were for nontraumatic indications. 100% of the nontraumatic x-rays were negative for any fractures. The cost of the unnecessary lumbar x-rays was 235000 SAR annually. It adds one hour to the patient length of stay in the department.

Conclusion/lessons learned

We have found that a large number of unnecessary lumbar x-rays are being performed in our department. This puts our patients at risk of unnecessary radiation, increase the use of resources and cost on the system. Further, there is a big room for improvement. This problem could be tackled by approaching the physicians and communicating with them by showing them the results, monitoring performance and giving feedback.
Multifaceted Infection Control Strategies to Control Multidrug-Resistant Acinetobacter Baumanii In Adult Intensive Care Unit In A Tertiary Hospital In Eastern Region, Saudi Arabia

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**Problem**
Multidrug resistant Acinetobacter baumanii (MR-AB) has emerged globally as a significant pathogen in hospitals. During 2010, our hospital experienced an increase of MR-AB in Adult Intensive Care Unit (ICU).

**Background/context**
Our adult ICU consists of 10 acute care beds, which caters medical-surgical cases. The hospital is a tertiary institution located in the Eastern region of Saudi Arabia. All patients in ICU with positive MR-AB were included. In March 2010, a multidisciplinary team was formed to implement and determine the effect of multifaceted strategies in controlling MR-AB in our hospital.

**Methods**
Active surveillance was initiated to determine the prevalence rate of MR-AB infection/colonization per 1000 patient days (PD). Using active surveillance culture, this was done during admission in ICU, after 48 hours of admission and every week for all patients if there is a positive MR-AB, acquisition rate of MR-AB was calculated per 1000 patient days. Average daily colonization pressure was also monitored. Risk variables and outcome variables were also included in the surveillance method.

In addition, a multifaceted infection control strategies carry out from March 2010 up to present. These include hand hygiene, contact isolation, cohorting of patients, daily chlorhexidine bath, and environmental cleaning and disinfection. Compliance with these infection control strategies was audited.

**Results**

**Interventions**
Hand hygiene compliance of HCWs initially was 89%, in 2011-2017 was increased to 93%. Daily Chlorhexidine bath was adopted for all patients in ICU, compliance is about 100%. In 2012, we adopted CDC protocol for evaluating cleaning and disinfection for environmental surfaces. Initially, the compliance is 84.6% it was increased to 92% in 2013-2017.

**Outcome**
Prevalence rate of MR-AB was 20.7/1000 PD in 2010, it was decreased by 50% (13.8/1000PD) in 2011-2012. In 2017, declined to 1.2/1000 PD. MR-AB acquisition rate was 11.8/1000 PD in 2010, it was decreased by 57% (7.5/1000PD) in 2011-2012. In 2017, dropped to 0.8/1000 PD. Average daily colonization pressure was 0.21 in 2010. In 2011-2012, it was decreased by 31% (0.16). In 2017, it was reduced to 0.03. Death rate among MR-AB patient in 2010 was 25.7%. It was decreased to 14% in 2011-2012, with reduction rate of 84%. In 2017, an enormous drop to 0% was achieved.

**Conclusion/lessons learned**
Implementing multifaceted infection control strategies help in controlling MR-AB in ICU in our hospital. The commitment and adherence of the healthcare workers to all the infection control strategies are essential in sustaining very low prevalence rate and acquisition rate of MR-AB through the years.
The Specialized Stroke Nursing Program: Our 3 – year Journey in Improving Nurses’ Knowledge in Stroke Care

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Problem

The incidence of stroke has remarkably increasing in the Kingdom of Saudi Arabia. The integration of evidence – based practice is essential in provision of specialist stroke care to all stroke patients. The King Abdullah Medical City (KAMC) in Riyadh has reconfigured the stroke services by creating a novel stroke model where all suspected stroke patients are directly admitted in the hyper-acute stroke unit in order to provide an integrated and specialized care to stroke population. Prior to the launch of the new stroke model, training is imperative to all nurses. The aim of this project is to describe our journey in the development of the stroke training program and competency package for nurses in one acute hospital of Riyadh, Kingdom of Saudi Arabia.

Methods

The development of stroke training and competency package for nurses have 4 phases namely; Phase 1: the creation and implementation of the Specialized Stroke Nursing Program (SSNP) Level 1 (Basic and Intermediate Level), Phase 2: participation of nurses in on-line Stroke Training and Awareness Resources (STARS), Phase 3: skills assessment and validation of nurses in Face, Arm, Speech and Time (FAST) tool, Glasgow Coma Scale (GCS), Phase 4: the design and actual run of the Specialized Stroke Nursing Program Level 2 (Advanced and Integrated Level).

Results

In phase 1, the SSNP Level 1, a 2 day training workshop for nurses was launched in 2014 and completed in May 2017. The program was participated by more than 2,500 nurses from emergency, acute medical, surgical, intensive care, stroke and rehabilitation units. The goal of the SSNP Level 1 is to provide the nurses’ an overview of stroke and multidisciplinary team working. Immediately after nurses’ attendance to this program, they had undergone phase 2 where they have completed the on-line STARS competencies as a prerequisite to proceed to the next phase. In phase 2, 100% (2,500) of nurses, who attended the SSNP Level 1, passed the on-line STARS competencies. In phase 3, the unit educator conducted the skills validation on the application of GCS and NIHSS in clinical practice before sending to the SSNP Level 2. To date, 1,800 nurses (80%) of previous attendees from SSNP Level 1 were deemed competent in GCS and FAST Tool. This phase is in progress. Phase 4 is the design and run of the SSNP Level 2, a one- day the program, is aimed for nurses to gain knowledge and appropriate skills in stroke code activation, prompt response to strokes, advanced assessment in stroke using National Institute for Health Stroke Scale (NIHSS), imaging in stroke and thrombolysis treatment. The target participants of this course are from emergency, stroke and intensive care units. It was launched in July 2017. To date, more than 120 nurses from these areas attended the session. It runs once a week.

Conclusion/lessons learned

Our 3- year journey of developing for stroke training program and competency package for nurse is both rewarding and challenging. We are evaluating the impact of the stroke training program and competency package to stroke patients based on prevention of stroke complications, and improving patient care and experience.
Foodborne Illness: Focused Review and Epidemiology of Community Acquired Salmonella Cases

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Problem

A review of all lab confirmed salmonella cases reported during 2016 were conducted to determine and understand epidemiology of community acquired cases of Salmonella reported by KAMC to MOH and review of our prevention and control strategies.

Background/context

Lab testing for clinical specimen from patient is critical for aetiology of foodborne disease. Lab specimen collected based on sign and symptoms of disease. Commons sign and symptoms of foodborne disease (from hours to week) are diarrhoea, nausea, vomiting, abdominal pain, fever (maybe), increase in WBC (maybe).

Although none of cases were healthcare-acquired infection but community acquired cases prompt us to further investigate and understand KAMC infection prevention process and determine epidemiology of cases.

An intersection meeting of Infection Prevention and Control team was conducted that reviewed the Public Health pathogenic surveillance included discussion on all lab positive cases, policies on the food sanitation and the foodborne disease awareness campaign.

Methods

An epidemiological tracking sheet was designed and documented all current community outbreak variable factors tracking as stated in following table:

Results

Descriptive Epidemiology of Salmonella Cases (September – December 2016)

Conclusion/lessons learned

All reported cases of salmonella confirmed on lab specimen were community acquired infection, however, initiative in review of cases of 2016 generated interest in our team to review our food hygiene and sanitation process and prepared for prevention and control of unfortunate event in case of healthcare acquired foodborne illness outbreak.
Knowledge Deficient Toward Corona Virus Disease In Riyadh, Saudi Arabia

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Problem
To assess the knowledge of the adult population in Riyadh toward the Corona virus.

Background/context
In August 2015, the Corona outbreak caused by Middle East Respiratory Syndrome Coronavirus (MERS-CoV) was the 9th episode since June 2012 in Saudi Arabia. Little is known about the public awareness toward the nature or prevention of the disease.

Methods
In this cross-sectional survey, a self-administrated questionnaire was distributed to randomly selected participants visiting malls in Riyadh. The questionnaire contained measurable epidemiological and clinical MERS-CoV knowledge level variables and relevant source of information.

Results
The study included 676 participants. Mean age was 32.5 (±SD 8.6) years and 353 (47.8%) were males. Almost all participants heard about the corona disease and causative agent. The study showed a fair overall knowledge (66.0%), less knowledge on epidemiological features of the disease (58.3%), and good knowledge (90.7%) on the clinical manifestation of the MERS-CoV. Internet was the major (89.0%) source of disease information, and other sources including health care providers, SMS, television, magazines and books were low rated (all <25%). In a multivariate logistic regression analysis age ≤30 years (Odds Ratio (OR) = 1.647, 95% CI 1.048-2.584, p=0.030), male gender (OR=1.536, 95%CI 1.105-2.134, p=0.01), and no tertiary education (OR=1.957, 95%CI 1.264-3.030, p=0.003) were independent significant predictors of poor epidemiological knowledge.

Conclusion/lessons learned
The study shows inadequate epidemiological knowledge and reliance mostly on the clinical manifestations in our setting for recognizing the corona virus disease. Public health education programs to increase awareness of simple epidemiological determinants of the disease are warranted.
Integrating Six Sigma Model with Team STEPPS: A Plan for Sustaining Interdisciplinary Teamwork.

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Problem

The International Joint Commission (2011) declared that research has found that 70% of all medical errors can be attributed to breakdowns in healthcare team interactions. Health care providers perform interdependent tasks while functioning their own roles and sharing the common goals of quality and safety patient care. Although, the delivery of care requires teamwork, members of these teams are rarely trained to work together as they often come from separate and different disciplines and diverse educational programs.

Background/context

This study was done at the Department of Clinical Oncology and Nuclear Medicine at El Manial Specialized Hospital, Cairo University, Egypt. A convenient sample of the interdisciplinary health team members were recruited to carry out the present study divided into Unit staff (Residents; Nursing staff and clinical pharmacist) and Administrative staff (Quality and Infection Control team; Training and Education team; and Development team).

Methods

Procedure was carried out on the basis of six sigma model for process improvement. The TeamSTEPPS Teamwork Perception Questionnaire (T-TPQ) was distributed on all unit staff; also they have been observed intermittently through “Team performance observation chick list” (TPOC) for three sessions/ week in different shifts. Pareto table was constructed to represent the vital few team work ‘problems. Then root causes of those problems have been identified by Quality and infection control teams; Training and education team and Development team. The resulting list of those root causes had been displayed by cause- effect diagram.

Results

Regarding (T-TPQ) The cumulative percentage of Pareto table indicated that vital few of the problems was more than 90% of total percentage through the following items; inefficient use of resources; Staff didn't understand their roles and responsibilities; unclear articulated goals; The unit didn't operate at a high level of efficiency and Staff didn't scan the environment for important information. Regarding (TPOC), the cumulative percentage of Pareto table indicated that vital few of the problems was 50% of total percentage through the following items: Staff didn't (use SBAR, call outs, check backs and handoff techniques; Conduct briefs, huddles and debriefs; Effectively advocate for the patients using the Two challenge rule, or CUS and didn't use the DESC script to resolve conflict).The main root causes of those problems were lack of clinical supervision, empowerment, training and inter-professional meetings.

Conclusion/lessons learned

Integrating six sigma model with TeamSTEPPS explored the interdisciplinary team work’ problems thus facilitate planning for improvement.
Radiographs Reject Analysis in a Large Tertiary Care Hospital in Riyadh

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Problem
Reject analysis is not comprehensively recorded in King Abdulaziz Medical City (KAMC). Reject analysis is an indicator of any radiology department quality. This study is the first of its kind and scale to be conducted at KAMC, Riyadh. The result of this study helps to improve radiological services and reduce the unnecessary radiation exposure to the patients.

Background/context
King Abdulaziz Medical City is a large tertiary care hospital in Riyadh, Saudi Arabia with a bed capacity of 1500. About 185,000 radiographs are performed annually.

Methods
A retrospective study was conducted in the medical imaging department at KAMC from January 2013 to August 2017. The data was collected over a period of 5 years from a dedicated electronic rejection system "Peervue®". The rejection is performed by a certified radiologist and communicated electronically to the concerned technologist.

Results
A total of 455 rejected radiographs were reviewed and analysed. 247 of the reviewed rejected radiographs were adults amounting to (60%) while 166 were pediatrics amounting to (40%). In terms of gender, 231 (56%) of the rejected radiographs were for male and 182 (44%) were female. In our study, the most common reason for rejection was labelling (22%), followed by procedure protocol (20%), positioning (14%), post-processing (14%), artefacts (13%), wrong documentation (9%), and exposure factors (6%). On the other hand, positioning has been reported out in other studies as the most frequent reason for rejection representing as high as (56%) of the overall rejection. The rejection due to artefact is (13%), which is comparable to other reported data in the literature recorded (11%). In KAMC, the rejection due to exposure factors is (6%), the rejection due to exposure factor is significantly low due to the utilization of digital systems with extended dynamic range. In contrary, hospitals that use analog system scored much higher rejection (54%) due to the narrow exposure latitude. In terms of body parts, more than (70%) of the rejected radiographs were either for extremities (43%) or chest (31%). The remaining includes abdomen (9%), spine (8%), pelvis (5%), and head and neck (4%).

Conclusion/lessons learned
Reject analysis has been used to investigate the quality of radiographic examinations in KAMC radiology department. In our study, we have identified the most common reason for rejection which is labelling. Extremities compromise the highest rejection, whereas head and neck are the lowest. The outcome of this study can be used to set-up training programs to improve the quality in the department.
Reducing Hospital Bed Stay in Pediatric Inpatient Department at King Abdullah Specialized Children’s Hospital (KASCH)

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Problem

Delays in discharging patients resulted in a bottleneck in patient flow that impacted ultimately upon patient safety, satisfaction and overall organizational efficiency. There were obstacles identified that enabled early and timely discharge from acute beds, thereby causing blockage of patient flow in the Pediatric department.

Background/context

The Pediatric Discharge Lounge was designed to accommodate medically stable patients (with age from birth to 14 years old) who were discharged by their MRP and waiting for the release of medication and transportation. This area is a ten-bed unit, located near the Pediatric Emergency Department of the King Abdullah Specialized Children’s Hospital.

Methods

A strategy was developed whereby a series of (PDSA) Plan- Do- Study- Act cycles were undertaken to test and refine the revised patient flow methodology within the hospital at predetermined time frames during the course of 2 years. Daily bed management meetings introduced attended by key stakeholders such as clinical, nursing and bed management caseworkers. On call Directors of Nursing would also chair the meetings to effectively support any challenges identified and work on a plan of escalation at the end of the week going on weekends. Training needs were addressed through internal upskilling programs and efficiency and effectiveness measures by monthly analysis of key performance indicators and from end user surveys distributed among parent’s patients and through dialogue with staff.

Results

Following its implementation, it was noted that the discharge trends are every morning, from 0900H-1200H - 36.3%. Peak time of discharge activity between 1300H-1600H - 55.4%. Evening 1700H-1900H - 8.3%. During year 2 only 12 patients (0.3%) returned to ward from Discharge Lounge due to sudden and unexpected symptoms and failure of transportation. As part of a revised patient flow methodology, the discharge lounge has successfully achieved its second year of sustainability; been effective in reducing length of stay through a cost neutral strategy that has saved the organization a modestly estimated one million SAR to date.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total No. of Patients Transfer In</th>
<th>Beds days Saved</th>
<th>Estimated Cost Savings (SAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>3398</td>
<td>186.9</td>
<td>467,250.00</td>
</tr>
<tr>
<td>2017</td>
<td>3475</td>
<td>196.7</td>
<td>491,750.00</td>
</tr>
</tbody>
</table>

Table 1: Comparative Data for the Estimated Cost Savings, 2016 and 2017

Conclusion/lessons learned

The discharge lounge efforts has resulted in almost zero delays for inpatient beds in the Emergency Department, has achieved zero delays in admitting waiting list elective cases. This was a cost-neutral project implemented by using existing resources of location, equipment and manpower. An overall cost saving during the two year program has equated to almost one million SAR and saved 383.6 beds days. Patient satisfaction survey trends show a 90% satisfaction from very good to excellent experience during their stay in the Discharge Lounge.
Does the Specialized Stroke Nursing Program for Nurses Help to Reduce the Door to Needle Time in Thrombolysis Treatment for Acute Ischaemic Stroke? Our Experience In One Acute Hospital In Riyadh, Saudi Arabia

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Problem
The benefits of tPA in patients with acute ischemic stroke are time-dependent, and guidelines recommend a door-to-needle time of 60 minutes or less. (The American Heart and Stroke Association, 2017). However, there are many barriers in achieving this target. One of them is the lack of awareness and education of healthcare providers who participate in attending or responding to stroke code activation. And nurses, being the front liners in the emergency unit, should have adequate knowledge and skills in facilitating the thrombolysis process, monitor and address issues of delay in achieving the door to needle time. The King Abdulaziz Medical City (Riyadh) offers 24/7 thrombolysis service to eligible stroke patients. And ER nurses are involved in triaging, facilitating, administration and monitoring thrombolytic therapy. With this entrusted challenge to emergency room (ER) nurses, education is imperative. The aim of this project is to evaluate the effect of stroke education initiative for ER nurses in reducing the thrombolysis door-to-needle time (DTN).

Methods
A Specialized Stroke Nursing Program (SSNP- Advanced Level), a one-day evidence-based stroke program, was developed and run for ER nurses to gain an overview of integrated stroke care, early recognition of stroke using FAST tool, rapid response to strokes, principles of thrombolysis, thrombolysis timelines and targets based on AHA recommendation, assessment of patient using NIHSS, interpreting imaging in stroke, tPA administration and monitoring of patients following a tPA. The SSNP (Advanced Level) was launched in June 2017 and up and running to date. Simulations, interactive cases, case presentation, role playing and demonstration have been optimized as teaching-learning strategies to make the session more meaningful to participants. After each run, participants were asked to evaluate the program using a feedback form. The DTN data were collected prospectively for every stroke code activation from July 2017 to December 2017 and compared the results in the previous 6-month data.

Results
The SSNP (Advanced Level) was attended by more than 100 nurses from ER unit. The program itself was well received by the participants. Three themes emerged from the participants’ evaluation: (1). Clinically relevant program for ER nurses, (2). The use of different teaching approaches work well to retain participants’ key learning points (3). The program has a potential to improve patient’s outcomes after a stroke. From January 2017 to June 2017, a total of 7 patients received a tPA with a DTN mean of 78 minutes. Following an education intervention for ER nurses, from July 2017 to December 2017, a total of 11 patients had been thrombolysed with a DTN mean of 52 minutes. Of these 11 patients, majority (100%) met the target of <60 minutes DTN.

Conclusion/lessons learned
Education plays a vital role in increasing awareness of nurses about rapid recognition of stroke in the emergency. There is a correlation between education and absolute reduction of DTN in thrombolytic therapy. However, further study is needed to identify other variables that contribute in achieving <60 minutes of DTN target (i.e., multidisciplinary team working, and early stroke code activation and immediate decision by the physicians in administering a tPA). The results of this nursing education intervention suggest that increasing awareness about “time is brain concept” in thrombolysis treatment could possibly change ER nurses’ perception, misconception and behaviour toward prompt and urgent stroke care. The stroke physicians are currently developing similar program for junior doctors who participate in attending stroke code activation.
Predicting Postoperative Atrial Fibrillation Using CHA2DS2-VASc score: A Retrospective Observational Study

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Problem
Postoperative atrial fibrillation (POAF) is an arrhythmia most commonly seen after cardiac surgery. It is associated with increased mortality, cost and adverse events.

Background/context
A retrospective observational study was conducted from Jan 2010 to Dec 2014. Medical charts were reviewed for all adult patients admitted to the Abdulaziz Cardiac Centre (KACC).

Methods
Patients who underwent coronary arteries bypass grafting (CABG) or off pump coronary arteries bypass grafting (OPCAB) with or without aortic valve replacement or mitral valve/tricuspid valve repair and aged > 18 years were included. Data collected were: demographic characteristics; medical history; pre-operative medications; pre-operative ejection fraction (%); date of surgery; type of surgery; CHA2DS2–VASc score; indicator for POAF (yes/no), and if yes, date of POAF development; and time between cardiac surgery and development of POAF.

Data were analysed using SPSS 21.0 (release 21.0.0.0). Descriptive statistical analyses were performed on data collected from the study sample. Categorical data were analysed using the Chi-square test. A t-test was used to analyse continuous variables with approximately normal distributions. A Cox proportional hazards regression model was used to examine the effect of CHA2DS2–VASc score on POAF risk.

Results
- Of a total 1254 patients, the mean age was 60.68 ± 10.21 years old, and 84.6% were male. Patients’ average body mass index (BMI) was 28.5 ± 5.8 kg/m2.
- In terms of medical history, 87.8% of patients in the cohort had triple vessel coronary heart disease, 70% were diabetic, 67.1% had hypertension, and 9.5% had congestive heart failure. Most patients reviewed had no carotid artery disease (91.8%), cerebrovascular accident (95.5%), nor peripheral disease (93.7%).
- At a cut-off score of ≥2 the CHA2DS2–VASc showed a 96.8% sensitivity and 23.1% specificity for predicting POAF. It also showed increased risk at higher scores, score of at least 3 significantly predicted the occurrence of events (P value .000) (figure 1).
- Age, male gender, high BMI were significant predictors of POAF (P value <0.001, P value 0.05, P value <0.001).
- Patients who received statins preoperatively were at significant lower risk (P value .001).
Figure 1. Postoperative atrial fibrillation (POAF)-free rate curves for patients and CHA2DS2–VASc scores. Kaplan–Meier survival analysis showed that patients with CHADS2–VASc scores of at least 2 had a marginally higher event rate than did patients with CHADS2 scores lower than 2 (log-rank, P=0.075; A). In addition, a CHA2DS2–VASc score of at least 3 significantly predicted occurrences of POAF (log rank, P<0.000; B).

Conclusion/lessons learned

Under the theme of patients’ safety, the best management of POAF should be by way of prevention. The CHA2DS2 – VASc score and other clinical patient features studied in this project can prove to be strong predictors of adverse events post operatively and thus a guide for discriminating patients who can benefit from stronger preoperative optimization from patients who are at lower risks of POAF.
Incidence, Predictors and Severity of Adverse Events Among Whole Blood Donors

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Problem
Adverse events have been reported post blood donation. Donors might refrain from donating again due to such events which lowers the blood supply in collection centers.

Background/context
This study measured the incidence, predictors and severity of adverse events among donors of a single whole blood unit at one of the largest donation centres in Saudi Arabia. The blood donor centre at KAMC was established in 1984 under the Department of Pathology and Laboratory Medicine and has been accredited by the College of American Pathologist (CAP) and American Association for Blood Banks (AABB), both since 1986. The centre is operated by 24 technicians, 5 apheresis nurses and 1 physician, all directed by a laboratory director and a supervisor. Its current capacity has reached 16 blood donation chairs, for donating whole blood and apheresis. On annual basis, the blood donation centre supplies around 26,000 blood units to the community of KAMC, the public and hospitals all over the kingdom upon request.

Methods
A retrospective cohort was conducted in 2015 to investigate the adverse events immediately post donation. Screening donors and blood withdrawal was performed by a team of well-trained full-time employees. Donor characteristics such as age, blood pressure, hemoglobin level, weight and history of donation were described and tested as potential risk predictors. Eligible blood donors were 18,936/ 24,634 (76.8%).

Results
Incidence of adverse events found 1.1% (208 donors), of which 0.65% had mild symptoms (chills; nausea; pallor; dizziness; nervousness; headache), while 0.45% had severe symptoms (hypotension; convulsions; syncope; respiratory distress; emesis). Multiple logistic regression showed that, the incidence of adverse events was significantly higher among young age donors < 0.002, higher hemoglobin levels RR[95%CI] = 1.30[1.15–1.46], lower weight donors < 0.001 compared to older age donors 30, lower hemoglobin levels, heavier weight donors 75, and previous donors, respectively. More severe adverse events were observed among older and heavier donors, previous donors, lower hemoglobin levels and hypertensive donors but with no statistical significance.

Conclusion/lessons learned
Young blood donors, donors with lower weight and first time donors are at higher risk of contracting adverse events. Higher hemoglobin level is also a potential risk predictor of adverse events post whole blood donation.
The Development of Stroke Code Activation for Inpatient Hospital: How to Prepare Nurses in Action?

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King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

Problem
A stroke code activation for in-hospital patients will be introduced at the National Guard Health Affairs (King Abdulaziz Medical City Riyadh, KAMC), Kingdom of Saudi Arabia in order to address delays of identifying stroke on inpatient wards and communication barriers about the need of urgent medical intervention. Nurses play a significant role in activating a stroke code since they are the first to recognize stroke symptoms in the ward. Prior to the launching of the stroke code activation, developing departmental policies on criteria for stroke code activation and increasing awareness among nurses regarding prompt recognition of stroke symptoms in the ward are therefore, imperative.

Methods
A stroke code activation pathway protocols for in patients was developed in order to facilitate a rapid process of assessing patient with a suspected stroke and to provide a timely administration of intravenous thrombolysis and thrombectomy treatments. Also, a Stroke Activation session and Fast Session (SAFE), a nursing education initiative was introduced and implemented in October 2017. It is a 30- minute daily protected session for nurses that underpin the following key concepts:

a. What is stroke code activation?
b. What are the criteria for stroke code activation?
c. How to recognize stroke symptoms using Face Arm Speech and Time (FAST) tool?
d. What is thrombolysis and thrombectomy therapy?
e. What is the role of a nurse in the stroke code activation?

It was facilitated by the nurse specialist and was held at the large auditorium to cater all KAMC nurses.

Results
More than 1500 nurses are adequately trained, prepared and ready to facilitate the stroke code activation. The stroke code activation pathway protocol has been disseminated to all health allied professionals (nurses, physicians, and the multidisciplinary team) to inform the process. To date, a mock stroke code activation is planned to initiate in the units to refresh nurses’ and physicians’ facilitating and following the stroke thrombolysis pathway.

Conclusion/lessons learned
Education remains to be the cornerstone in preparing nurses in action the inpatient stroke code activation project. It is an exciting learning opportunity for all nurses to get involved in the hyper acute management of stroke care. It is an excellent example of empowering nurses to take into an advanced level of nursing expertise.
Contribution of the Community to Resistant Infections at Tertiary Care Setting: A Point Prevalence Survey

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Problem
Although several hospitals are implementing different antimicrobial stewardship strategies, the rates of antimicrobial use and resistance is still high. Although multi-drug resistant organisms can be found in both community and hospitals, little is known about the community contribution to resistant infections in the hospital. The objective of the current study was compare the contribution of multi-drug resistant organisms (MDRO) to both healthcare-associated and community-acquired infections at a tertiary care setting.

Methods
Point-prevalence survey (PPS) was conducted on May 11 2017 in 6 Ministry of National Guard hospitals in different regions of Saudi Arabia. Twenty-eight trained infection control practitioners reviewed medical files for all patients (N= 1666) admitted to intensive care units (ICUs) or wards on survey day. Definitions of the National Healthcare Safety Network (NHSN) for infection and MDROs were followed. The outcome was MDROs associated with both hospital-acquired infections (HAIs) and present-on-admission (POA) infections.

Results
Out of 240 infections (114 HAI and 126 POA), 170 (70.8%) were caused by bacteria, 20 (8.3%) by viruses, 5 (2.1%) by fungi, and 38 (29.6%) no organisms were identified. Overall, 34.0% (34/100) of the bacterial HAIs and 34.3% (24/70) of the bacterial POA infections were caused by MDROs. Among the bacterial HAIs, pneumonia (41.7%) and bloodstream infections (46.2%) were the infections most frequently caused by MDROs. carbapenem-resistant/extended spectrum beta-lactamases Klebsiella (29.4%) and MDR Pseudomonas (23.5%) were the most common MDROs causing HAIs. Of the bacterial POA infections, skin and soft tissue infections (50%) and pneumonia (45.5%) were the infections most frequently caused by MDROs. Carbapenem-resistant Escherichia coli (37.5%) and methicillin-resistant Staphylococcus aureus (16.7%) were the most common MDROs causing POA infections.

Conclusion/lessons learned
The community contribution to resistant infections in the hospital is comparable to resistance developed within healthcare facilities. The current findings may indicate that strategies to reduce antimicrobial resistance in the hospital setting should target both the hospital and community.
Improving Patients’ Safety and Team Work by Implementing TeamSTEPPS™ Daily Healthcare Utilizing Deliberate Discussion Linking Event (HUDDLE) Tool In Pediatric Critical Care Unit (PICU)

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Problem
In 2014, MNGHA conducted an institution wide culture survey. PICU results showed weakness in the safety climate domain. Which indicates employees don’t perceive a real dedication to safety. Debriefing revealed the need for mutual trust and transparent relationship between employees and unit management in reporting errors.

Background/context
This improvement journey took place in Pediatric ICU-KASCH, King Abdul-Aziz Medical City, Riyadh, Kingdom of Saudi Arabia, which is composed of 20 beds serve critically ill pediatric patients.

TeamSTEPPS™ is an evidence-based set of teamwork tools, developed by Agency of Healthcare Research and Quality. Aimed at optimizing patient outcomes by improving communication and teamwork skills. One of TeamSTEPPS’s recommended tools is daily safety HUDDLE.

Methods
A team was formulated on Dec 2016 composed of PICU leadership and quality steering committee. HUDDLE has been chosen as the tool of choice using PDSA cycles as improvement methodology.

A process map was created as follows:
- Daily meeting with maximum of 15 minutes of the multidisciplinary team at fixed time.
- Led by the consultant in-service and charge nurse.
- Starts by sharing unit situation, then issues, and concerns of frontline staff.
- Issues are categorized based on certain definitions and documented by charge nurse.

<table>
<thead>
<tr>
<th>PDSA cycles implemented:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Targeted step</strong></td>
</tr>
<tr>
<td>HUDDLE initiation</td>
</tr>
<tr>
<td>Escalation process</td>
</tr>
<tr>
<td>Team feedback</td>
</tr>
<tr>
<td>Escalation</td>
</tr>
</tbody>
</table>

Process measures:
- Compliance to daily HUDDLE by 80%.
- Compliance to HUDDLE elements: Time, duration, and documentation.

Outcome measures:
- Number of issues addressed, and solved during or after daily HUDDLE.
- Culture survey about communication improvement and safety culture in PICU.
Results

From April till November 2017:

- 243 HUDDLEs were done with compliance rate of 81%.
- Median start time is 1430H with average duration of 13.8 minutes.
- Daily HUDDLE addressed 278 issues. Safety issues, communication, and documentation were the major issues raised.
- Most of the issues were solved during HUDDLE. Figure 1

Conclusion/lessons learned

Successful implementation of TeamSTEPPS HUDDLE in PICU significantly improved early identification and resolution of safety issues. Solving issues and feedback improved the interaction among the multidisciplinary team and subsequently patients’ care. Sharing knowledge, errors, and achievements created trust between frontline staff and leadership.
Promoting Effective Sharing and Learning from Incident Reports Using “SAFETY MATTERS”

Souzan alowesie and Sara Alhamdan
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Problem
During Quality and Patient Safety Week in our organization, the topmost raised suggestion by staff was to improve feedback from incident reporting system. Our culture survey results pertaining to safety climate domain was in the “risk zone” (percentage of positive score was below 60). Failure of healthcare organizations to publicize information to raise awareness among staff remained one of biggest hindrance to improving culture of safety.

Background/context
There is scarcity of information in literature pertaining to this area of science, especially in Saudi Arabia-healthcare system. In an effort to improve feedback, we designed a monthly publication titled as “SAFETY MATTERS”. It was launched by Quality and Patient Safety Department (QPSD), King Abdulaziz Medical City, a 1500 bed university-affiliated tertiary care center in Riyadh, Saudi Arabia. By providing timely department-specific information on lessons learned from reporting, we aimed to improve safety climate and rate of incident reporting/1000 bed days by 5%, and improve staff satisfaction with feedback process by 30% within 12 months.

Methods
Our study describes SAFETY MATTERS’ design and evaluates its implications. This publication was modified and improved in phases through PDSA cycles after its release in August 2017. 0.5 FTE QPSD specialist was required to analyze data through Safety Reporting System (an electronic web-based voluntary incident reporting system). Information was displayed on a two-page report and e-mailed to department management. Information includes but not limited to number of submitted reports, top reported event types, top reporting units, affected patient-harm classification, Good Catch reporters, action plans implemented as a result of reporting and information on Sentinel Events and Morbidity/Mortality referrals. We assessed staff awareness and satisfaction with the feedback tool through units’ rounds and web-based questionnaire. Safety climate score was compared to previous patient safety culture survey results.

Results
Rates of incident reporting increased by 9.9% within three months before and after intervention (from 40.26 to 44.7 incident/1000 bed days). Safety climate score (2017) decreased by 3% compared to previous patient safety culture survey results (2014). We did not complete yet staff awareness and satisfaction with this feedback tool through web-based questionnaire, which is planned to be conducted during the 1st quarter 2018. However, QPSD staff conducted an unstructured survey among staff through units’ rounds to solicit preliminary feedbacks.

Conclusion/lessons learned
Our study revealed that developing a systematic method for providing feedback on reported incidents through monthly publication (SAFETY MATTERS) resulted in early signs of increase in rate of incidents reporting, and it informed staff positive feedback. More time is required to assess impact on culture of safety. Significant effort and resources is required to process and track incidents data to generate meaningful information.
Improving Physician Compliance To PICU Patients Standard Transfer Summary Documentation

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Problem
Transfer of PICU patients care is complex due to their just-recovered critical illness. According to JCI reports 70% of the sentinel events resulted from ineffective communication between healthcare providers. After several complains from pediatric receiving teams regard lacking of proper documentation and missing integral data, an objective assessment done by PICU physicians confirmed poor compliance to this important part of a standard and safe handover process.

Background/context
This improvement journey took place in Pediatric ICU, KAMC, Riyadh- which is composed of 20 beds serve critically ill medical-surgical pediatric from ER, OR, HDU and pediatric wards. Multidisciplinary medical teams are involved in the daily patient care including physicians, nurses, respiratory therapist, dietician, clinical pharmacist.

Methods
Transfer summary documentation evaluation was performed by two PICU qualified physicians as baseline data with pre-interventions survey targeted receiving teams to evaluate their perception and satisfaction about the transfer documentation and communicated information.
Several PDSAs were implemented to improve PICU physician transfer documentation as follows:
PDSA1: Implementing an agreed on standard transfer summary form to patient EMR.
PDSA2: Staff education about the standard form and its element to improve physician compliance.
PDSA3: MEMO from the program director to document transfer summary one day before the physical transfer.
PDSA4: Transfer summary confirmation included as part of a mandatory transfer checklist.

Results
Before interventions, 61 patient files (transferred on April 2016) were reviewed, only 18 files (29.5%) had a documented transfer summary. Compliance to most of standard elements was ≤ 50%.
After the implementation of the above mentioned PDSAs there was significant improvement in compliance to transfer summary documentation and its elements; on May/2017, 68 files of transferred patients were reviewed, 65 of them (95.5%) had a documented transfer summary. Figure1
Survey result showed improvement in receiving team satisfaction about communicated information during the transfer process: 83% of the receiving physicians rated it as good to excellent vs. 42% before implementing the standard transfer form.
Conclusion/lessons learned

Effective communication and standard documentation among care givers have a significant impact on the transfer process, team satisfaction and patient outcomes (noticed decreased readmission rate to zero between March-June 2017). Team work and collaboration is essential to achieve the ultimate goal of ensuring patient safety during the transfer process.

Figure 1. Compliance to transfer summary documentation and its elements before and after implementing standard form and education.
Improve Healthcare Workers Compliance Rate To Tuberculosis Post-Exposure Management

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Problem
Health Care Workers (HCWs) who are exposed to patients with pulmonary tuberculosis (TB), have a risk to develop TB Disease and infect other patients and other HCWs. The non-compliance HCWs who do not follow up for post exposure management and TB prophylaxis constitute a serious impact on the infection prevention and control measures of TB in healthcare facilities.

Background/context
The objective of this work was to measure the change in the HCWs' compliance-rate of follow-up for post exposure management before and after intervention measures done, by sending reminders, including awareness message about the importance of post exposure management, to the list of non-compliance exposed HCWs and their supervisors.

Methods
We identified the total number of HCWs who were significantly exposed to confirmed TB patients in KAMC-Riyadh from January till April 2017. All of the exposed HCWs were contacted to visit the surveillance clinic for post exposure management. After six months from the exposure date, we counted the percentage of compliance staff that completed their post-exposure management of TB exposure through all exposed staff. Also, non-compliance HCWs were identified. Emails were sent to the exposed HCWs and their supervisors to remind them to visit the surveillance clinic for post exposure management. The reminders included awareness messages about the importance of post TB exposure management. Then we counted the number of compliant and non-compliant HCWs in response to the reminders for post exposure management. The percentage of both compliant and non-compliant HCWs were calculated before and after the reminders and the awareness messages; to identify the change in the compliance-rate.

Results
During the four month period a total of 164 staff was exposed to patients with pulmonary tuberculosis in different hospital departments. After they were contacted, only 38 (23 %) responded and visited the surveillance clinic for TB post exposure management; however the remaining HCWs 77% (126/164) did not respond to the first call. Then, six months later, we send another reminder for the HCWs who did not respond (126), out of which, 34 HCWs complied and responded to the second reminders for post exposure management. Finally, the total number of compliant HCWs increased to 72 out of the total number of HCWs 167 (44%).

Conclusion/lessons learned
Awareness and follow up of HCWs by reminding them of the importance of post exposure management are important factors to increase the compliance-rate among HCWs who were exposed to TB patients even after a period of time. Our recommendations is to measure the compliance-rate by different model like phone contact or SMS to identify the best model to increase compliance rate.
Development and Implementation of An Acuity Tool for Developing Evidence Based Optimal Nurse Staffing Levels

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Problem

There is a growing body of evidence which identifies links between nurse staffing levels/nurse to patient ratios and quality of care. Low staffing levels have been linked to poor patient outcomes and increased harm. This has been identified by nurses within patient care units and affects all nursing staff and patients. This is a global issue as the majority of nurse staffing levels are based on historical and experiential issues rather than a scientific methodology. Internationally, quality drivers, such as CBAHI, JCI and NICE all contain recommendations for the implementation and use of an evidence based tool to guide organizations in establishing nurse staffing levels that are linked to acuity.

Background/context

This project was undertaken within King Abdullah Specialist Children's Hospital (KASCH – Central Region) and involved all inpatient areas within KASCH. The team includes the Director of Clinical Nursing, Adult and Pediatric Nurse Managers, Clinical Resource Nurses and Nursing Quality Improvement Specialists.

Methods

After extensive discussion regarding nurse to patient ratios there was literature review undertaken to ascertain how nurse staffing levels were agreed on a global perspective. This led to the realization that there was one tool, initially developed within the United Kingdom (UK) which has been adopted and adapted within a number of countries. This tool was initially developed by a group of University Hospitals (Shelford Group) but which evolved into the Safer Nursing Care Tool (SCNT) and NICE Guidance (2014). This has undergone extensive testing and review within the UK, Australia and Scandinavia.

The project commenced in late 2016 and has now undergone multiple PDSA cycles and refinement.

Results

We currently have data, collected for every inpatient on 20 consecutive working days, for 4 inpatient units. This has been achieved by trained assessors who collect data for each patient on the unit from Sunday to Thursday for a minimum of 20 days. Then utilizing staffing multipliers for each sickness and dependency care level. These are based on direct and indirect care, unit management, education and training needs; bed occupancy and other associated work.

Conclusion/lessons learned

The aggregate data suggests that of 2 of the 4 completed units the nurse to patient ratios is equivalent to the staffing levels currently agreed. For the other 2 units it is showing that staffing is slightly below baseline. However this data requires further analysis and triangulation with nursing sensitive elements of care. Once complete, the data will require further discussion and review.

In comparison to international averages the existing nurse to patient ratio is above the international average. However by using an evidence based tool we hope to use the data to provide staffing plans for each inpatient unit.
<table>
<thead>
<tr>
<th>Pilot Area</th>
<th>Current Staffing Plan</th>
<th>Staffing Plan Calculated Using Acuity Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward A</td>
<td>38</td>
<td>37.9</td>
</tr>
<tr>
<td>Ward B</td>
<td>30</td>
<td>37.8</td>
</tr>
<tr>
<td>Ward C</td>
<td>27</td>
<td>28.9</td>
</tr>
<tr>
<td>Ward D</td>
<td>22</td>
<td>27.4</td>
</tr>
</tbody>
</table>
Lean Six Sigma Methodology in Action; Improving the Flow of Patients Requiring Laparoscopic Cholecystectomy

Jane Thomson, Nombuso Gambushe, Rogeni Tumbagaham, Shaymaa Malibari, Abdulaziz Al Jahadali, Peter McCollum, Maryam Khalil

King Abdulaziz Medical City, Jeddah, Saudi Arabia

**Background/context**

The standard procedure for the acute management of cholecystitis is a Laparoscopic cholecystectomy surgical procedure. This can be performed as a day-case surgical intervention on patients with physical status classification (ASA) 1 and 2, proven to positively impact patient outcomes and reduce length of stay. Studies have shown this procedure is often underused in healthcare institutions worldwide. Here, at the Ministry of National Guard Health Affairs-WR (MNGHA), our investigatory data showed similar findings.

Thus, our study aims to: (1) improve the flow of patients requiring laparoscopic cholecystectomy using Lean Six Sigma improvement methodology, (2) and develop a clinical pathway to ensure a consistent, sustainable system equipped with monitoring of compliance.

**Methods**

This study was conducted in the surgical wards and day-care unit at MNGHA from May 2016 to April 2017. Lean Six Sigma Define, Measure, Analyze, Improve, Control (DMAIC) methodology was used. Data collection, retrospectively and prospectively, included: (1) total number of Laparoscopic cholecystectomy procedures performed, (2) number of Laparoscopic cholecystectomy inpatient versus day-case, (3) mapping existing process-flow, (4) turnaround time from admission to surgery, (5) length of stay following surgery, (6) cause-and-effect diagram and hypothesis-testing, (7) and cost benefit to organization. Results were analysed using Minitab 17, and the Mann Whitney and Mood’s Median tests were used to identify factors affecting length of stay.

**Results**

A total of 212 adult laparoscopic cholecystectomy procedures were performed. Of these, 129 were treated as inpatients, while 83 (39%) were treated as day patients. Existing patient flow identified obstacles and inconsistent consultant-led practices. Data for length of stay (LOS) was not normally distributed. Thus, the median LOS and Interquartile Range (IQR) was 3.72 (1.91, 6.61) days. Root causes were identified and hypothesis-testing showed length of stay was affected by patient comorbidities (P=0.000) and patient with ASA score of ≥3 stayed longer (P=0.001). Results also highlighted that patients with ASA 1 and 2 were not admitted as day-case. Cost-benefit to the organization was estimated at SAR 2.5 million per-annum savings with elimination of wastes identified.

**Conclusion/lessons learned**

We have improved the flow of patients requiring laparoscopic cholecystectomy using Lean Six Sigma process improvement methodology. We identified gaps and inconsistencies, streamlined the process, and redesigned the system with the development and introduction of a clinical pathway. Recommendations included all work-up tests completed prior to admission, and the monitoring of patients ASA 1 and 2 admitted as inpatients. Further evaluation of the clinical intervention is required for optimization.
Assessment of Maternal Satisfaction Regarding Quality of Care During Labor at King Fahad Hospital

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King Abdulaziz Medical City, Riyadh, Saudi Arabia

Problem
There is a need for more research to maternal satisfaction in developing countries, where safe deliveries remain a major problem and a major challenge for healthcare. Research into maternal satisfaction could be made a lot of policy for improved quality of care.

Background/context
Maternal health has significantly improved in the 21st century, but still too many women continue to die or suffer severe pregnancy complications every year, such as high blood pressure and diabetes. WHO reported that 99 percent of maternal deaths annually. It was estimated that in 2015, 303 000 women died during and following pregnancy and childbirth. While improving the services provided and maintaining acceptable quality standards it is important to assess maternal satisfaction with care in order to make it safer and culturally acceptable. Determinants of maternal satisfaction covered all dimensions of care across structure, process and outcome.

Methods
A descriptive, cross-sectional, correlational design was used to conduct the study. A convenient sample of 180 Saudi postpartum women who attended Obstetrics and Gynecology postpartum ward at (KAMC-MNGHA) was recruited. Data was collected by using self-administered after an extensive review of electronic data base the questionnaire was developed by the researcher. The questionnaire includes 4 parts namely: demographics data, medical history, obstetrical history and the last part is satisfaction assessment tool.

Results
About 75% of the subjects received non-pharmacological pain comfort measures such as breathing techniques or Massage. In general women were satisfied about their labor and delivery experience. The mean satisfaction score for all items of women satisfaction about health care ranged between 3.81 to 4.21. The mean satisfaction score for all items of women satisfaction about environment ranged between 3.90 to 4.33. The satisfaction mean score of women delivered by midwives was significantly hire the then that of the doctor regarding "Holding the baby immediately after the birth". P = 0.028. There were no significant relationships drawn between maternal satisfaction and their demographic profiles. The outcome showed that the presence of history of abortion among the respondents likely decreases their satisfaction in labor.

Conclusion/lessons learned
This study documented that the services were generally good as evidenced by the women giving an overall rating of satisfied in all aspects of the maternal care which are structure, process and outcomes. This study recommends enhancement of the maternal services to improve maternal satisfaction. Further studies need to be done to assess women’s satisfaction with antenatal and postnatal care.
Safety of Lower Number of Axillary Lymph Nodes Dissection in Breast Cancer Patients

Ahmed Maklad, Emad Eldin Nabil, Ashraf Elyamany
King Fahad Medical City, Riyadh, Saudi Arabia

Problem

Higher number of axillary in dissection is associated with increased operative hazard and post-operative complications compared with less in dissection, there is no clear date about safety of less in dissection as regard to long term survival. Aim of the work, to evaluate the safety of Lower number of axillary lymph nodes dissection (LN), as regards, overall survival (OS) and progression free survival (PFS) in breast cancer patients.

Background/context

For patients with breast cancer, axillary dissection was a standard treatment, especially with patient with positive metastases in the sentinel nodes. For some patients, axillary dissection might be over-treatment, including those who have had a mastectomy. Especially with the new trend of many radiation-therapy centers, provide radiation-therapy for any number of positive lymph nodes.

Methods

This is a retrospective study done in Sohag University hospitals between periods 1/2008 till 12/2014. One hundred and three patients diagnosed with breast cancer were reviewed regarding number of axillary lymph nodes dissected in correlation to progression free survival, overall survival.

We divided the patients into two groups according to number of dissected lymph nodes less than ten LN (31 patients) or more than 10 LNs (72 patients). The patients were categorized into N0 (No LN positive), N1 (1-3 LN positive), N2 (3-9LN positive) in both groups, and N3 in second group only as it is more than 10 LN positive.

Results

Median PFS for patients having more than 10 LN excised was for N0, N1, N2, N3 5.19, 4.77, 4.14, 3.69 years respectively, while in the group with less than 10 LN excised PFS was 4.5, 4.14, 4.08 years respectively with no significant difference between both groups P=0.290.

As regard median OS for patients having more than 10 LN excised was for N0, N1, N2, N3 5.57, 5.94, 4.97, 4.61 years respectively while in the other group having less than 10 LN excised OS was 5.4, 5.14,5.14 years respectively with P=0.117.

Conclusion/lessons learned

Axillary lymph nodes management is controversial and needs to be clarified, we tried to evaluate safety of Lower number of axillary lymph nodes dissection in breast cancer patients. We found that lower number of axillary in dissection was safe and effective method in breast cancer treatment with less side effects, as there were no significant OS or PFS differences with higher LN dissection compared with less LN dissection, further prospective studies are needed to confirm our finding.
Surgical Site Infection in Total Knee Replacement Surgeries (TKR): A Paradigm Shift

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Problem
An increase in surgical infection rates following TKR approaching 2.7%, by the end of 2015. The upper limit of surgical site infection rates in following TKR is 3%.

Background/context
Surgical site infections (SSI) are one of the most significant clinical complications following orthopedic surgeries and are associated with substantial mortality, morbidity, increased length of stay, readmission rate, and impose severe demands on healthcare resources.

Methods
342 patients undergoing a total knee replacement (TKR) surgery between January 2016 and March 2017 with minimum follow up of 90 days after surgery were included in this interventional study, a bundle of targeted interventions were implemented using a systematic Quality framework approach, multiple structure and process changes were made to optimize perioperative care including identifying high risk patients and treating their comorbidities (HgbA1C <7.5%, Treating Obesity BMI >40, Screening and Treating preoperative UTI), patient education and emphasis on using chlorhexidine scrubs the day prior to surgery also implementing evidence based perioperative prophylactic antibiotics guidelines, reduce traffic in the OR room and strict sterility (double prep technique) also the Use of Tranexamic Acid to minimize blood loss and transfusion, Optimize surgery time and the use of Aquacel dressing.

Results
Prior to the above interventions, SSI was diagnosed in 8 patients out of 326 Surgeries in 2014, (2.5%), 7 Patients out of 263 surgeries (2.7%) in 2015, compared to Zero cases of infection out of 342 TKR surgeries (0%) from January 2016 till June 2017.

Conclusion/lessons learned
Our results suggest that the adaptation of multilevel evidence based bundle strategies has proven to be a successful approach in preventing surgical site infection in patients undergoing total knee replacements.
The Public’s Risk Perception of Blood Transfusion in Saudi Arabia

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King Saud bin Abdulaziz University for Health Sciences (KSAU-HS)
Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

Problem

Human beings may face many circumstances, such as surgery, trauma, anemia, etc., in which they could require an urgent blood transfusion. Few studies have examined people’s risk perception of blood transfusion.

Background/context

Public’s risk perceptions of blood transfusions in Saudi Arabia has become even more important after a series of incidences related to the transfusing of contaminated blood to patients, which the Saudi media has given great prominence. This study aimed to evaluate the public’s risk perception of blood transfusion in Saudi Arabia, and to identify factors associated with their risk perception.

Methods

Self-reported questionnaires on blood transfusion risk perception were distributed to the public during a Saudi national festival in Riyadh. Risk perception of blood transfusion scale is rated on a 7-point Likert scale with respect to a group of qualitative characteristics, such as overall riskiness, the extent of worry, dread, the benefits provided, the degree to which the risks are known to those exposed, the degree to which the risks are understood by scientists, the likelihood of fatal consequences, the degree to which exposure to the hazard is voluntary, the amount of control an average person has over the risk, and the extent to which future generations are threatened by the risk. Data were analysed using mean, standard division, student’s t-test, and linear regression.

Results

The overall percentage means score ± standard deviation of risk perception was 59.8±16.1. Male participants were significantly more likely to perceive blood transfusion negatively, both in terms of the dread/severity domain (β=-0.23, p=0.003) and their overall risk perception score (β=-0.17, p=0.028). Older participants were considerably more likely to have a more negative perception (β=0.12, p=0.041) of the benefits of blood transfusion compared to younger participants. Study participants who received blood in the past had a significantly better perception (β=-0.13, p=0.029) of the benefits of transfusion. Additionally, participants who had previously donated blood had a considerably more positive perception in the dread/severity domain (β=-0.18, p=0.017) and their overall score (β=-0.15, p=0.045).

Conclusion/lessons learned

Saudi males are more likely to perceive blood transfusion as a high-risk procedure. Similarly, older Saudis will probably have a more negative perception of the benefits of blood transfusion. Previous recipients and donors will likely have a better perception of the benefits of blood transfusion and a more positive overall risk perception.
Implementation of Evidence Based Program to Improve Cleaning Performance: Saudi Healthcare Institution Experience

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King Saud Medical City, Riyadh, Saudi Arabia

Problem
Increase in environmentally resilient hospital-acquired infection (HAI) pathogens near patient surfaces in our hospital. Patients being impacted by the problem. Currently there is no consistent methodology to evaluate environmental cleaning process at king Saud Medical City.

Background/context
Institution: KING SAUD MEDICAL CITY
Department: INFECTION CONTROL DEPARTMENT
Team involved: Infection control staffs, Nursing and Environmental service staffs
Focus: Critical care units and Operating theatres

Methods
Study type: Pre and Post intervention audit.
Setting: The study included in total 40 patient’s rooms and 20 patient’s bathrooms among (Intensive Care Unit, CCU, Burn units, isolation ward and inpatient wards) as well as 10 Operative theaters(OR). The responsibility of nursing and environmental staff cleaning of HTO’s were performed as per hospital policy and protocol.
Duration: 24 weeks divided into two phases (2016).

Strategies and Tools: Enhanced hygienic monitoring Program-Encompass system (florescent gel) was used to assess surfaces cleaning effectiveness by the following steps:
• Applying fluorescent gel spots on the high touch objects in the selected areas.
• Monitoring the surfaces after cleaning by Infection Control staff using ultraviolet light torch to detect if any gel residue.
• Recording and generating reports about percentage of high touch surfaces cleaning.
• Phase I: 12 weeks unannounced monitoring process for baseline assessment of cleaning level.
• Intervention duration: 2 weeks
• Feedback about base line report of HTO’s cleaning to all stalk holders.
• Training for nursing and environmental service (ES) personnel about High touch surfaces, disinfectants use, cleaning technique and frequency using videos and live demonstration to overcome language barrier.
• Distribution of educational posters.
• A joint “Blame free” policy between IPC, Nursing and ES leadership.
• Rewarding Nursing and ES personnel who present high performance.
• Phase II: Monitoring of HTO’s cleaning quality for 10 weeks post intervention.
Results

**Data calculation:** \[(\text{Number of HTO's cleaned} \div \text{Number of HTO's monitored}) \times 100\].

**List of (HTO’s):** Bathroom Handrail by Toilet, Bathroom inner door knob, Bathroom light switch, Bathroom sink, Toilet bedpan Cleaner, Toilet Flush Handle, Toilet seat, Room sink, Room Light switch, Room Inner Door Knobs, Call Button, Chair, Telephone, Tray table, Iv pole (Grab area), Bed Rail/control, Bedside Table Handle, Anaesthesia Cart, Anaesthesia Pole, Cabinet Door, Light Glass Surface, Light Side Handle, Light Switch, Mobile Equipment, OR Door Handle, OR Table Controls, OR Table Mattress Top, OR Table Railing, Table Strap, Telephone.

Table includes baseline (Phase I) cleanliness percentage results compared to Phase II results conducted over 5,300 high touch objectives area (HTO’s).

<table>
<thead>
<tr>
<th>Department</th>
<th>Baseline (Phase I) Cleaning</th>
<th>Phase II Cleaning</th>
<th>Cleanliness Improvement Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn ICU</td>
<td>49%</td>
<td>85%</td>
<td>36%</td>
</tr>
<tr>
<td>CCU</td>
<td>51%</td>
<td>91%</td>
<td>42%</td>
</tr>
<tr>
<td>MICU</td>
<td>14%</td>
<td>77%</td>
<td>63%</td>
</tr>
<tr>
<td>SICU</td>
<td>19%</td>
<td>71%</td>
<td>52%</td>
</tr>
<tr>
<td>Operation theatres(OT)</td>
<td>46%</td>
<td>91%</td>
<td>45%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>35%</strong></td>
<td><strong>81%</strong></td>
<td><strong>50%</strong></td>
</tr>
</tbody>
</table>

The data was collected using a software-electronic portal survey system in which entered on daily basis will calculate automatically.

The target was selected High touch objects (HTO, s) around patient’s zone.

Conclusion/lessons learned

**Outcome:**

The base line overall average score of cleaning of High touch objects was 35% in patient’s rooms. Following the introduction of Encompass System (florescent gel) with a structured process improvement program led to the thoroughness of disinfection cleaning improving by 81% in patient’s rooms respectively.

The tool-florescent gel can be used to measure only thoroughness of cleaning practice. This system will enable the organization to provide measurable, objective data to reduce the environmentally resilient hospital-acquired infection (HAI) pathogens near patient surfaces in our hospital and support their claims of providing a clean and safe environment for patients, their families, and health care personnel.
Using a Systematic Clinical Registry to Assess Surgical Complications and Identify Areas for Improvement Across Multiple Hospital Sites

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Problem
Healthcare systems worldwide have recently undergone major transformations to improve quality of healthcare and protect patients from harm. Poor quality of healthcare always results in unnecessary spending. Surgical complications are one of the major causes of death and disability worldwide. 50% of the surgical adverse events considered preventable. Evaluating outcomes and comparing all healthcare facilities to standard benchmarks are crucial. Saudi Arabia still lacks the evidence of surgical baseline quality and patient safety data that are important on implementing interventions to improve quality and patient safety.

Background/context
Three major hospitals located in different regions administered by the Ministry of National Guard Health Affairs, namely, Central, Western, and Eastern regions. These referral hospitals mainly provide primary, secondary, and tertiary healthcare services to National Guard employees and their families. In this project, we investigated the feasibility of using systematic clinical registry (American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP)) to assess surgical complications and identify areas for improvement across multiple hospital sites. Moreover, we estimated the additional direct hospital costs contributed to surgical complications in Riyadh site.

Methods
The ACS NSQIP method for quality analyses was applied. A retrospective review of surgical patients’ records that underwent major surgery under anaesthesia was done. We reviewed 2,077 surgical medical records (from 1/7/2015 to 30/6/2016) from three regions: Central, Western, and Eastern. Various events were analysed, including mortality, pneumonia, ventilator use greater than 48 hours, venous thromboembolism, renal failure, urinary tract infection, surgical site infection, sepsis, and readmission.

Results
The study found it was feasible to apply the systematic clinical registry, NSQIP to assess surgical complications across multiple hospital sites. Our findings suggested areas that were determined to be exemplary as described on the results and discussion. Some areas were identified as needing improvement included sepsis, renal failure, ventilator use for more than 48 hours, urinary tract infection, surgical site infection, sepsis, and readmission. More than two million Saudi Riyals (2 226 788 SAR) was estimated as additional costs contributed to the surgical complications in Riyadh.

Conclusion/lessons learned
Using a systematic clinical database registry to assess surgical complications was feasible in Saudi Arabia. The results may be of general interest for improving patient safety and quality of healthcare in that specific setting. However, this approach may be generally applicable to other countries in the region and worldwide not only to measure surgical complication but also to track interventions over time.
Impact of An Educational Session About Gestational Weight Gain on Saudi Pregnant Women's Knowledge and Perception.

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Problem
The impact of antenatal education about gestational weight gain has not been well studied. Therefore, our primary objective was to assess the impact of an educational session about gestational weight gain on Saudi pregnant women's knowledge and perception.

Background/context
A convenient sample of 100 Saudi pregnant women who attended Obstetrics & Gynaecology outpatient clinic at King Fahad Hospital in King Abdulaziz Medical City, Ministry of National Guard Health Affairs/ Riyadh (KAMC-MNGHA) was recruited.

Methods
A quasi experimental design was used to conduct the study. A convenient sample of 100 Saudi pregnant women who attended Obstetrics & Gynaecology outpatient clinic at King Fahad Hospital in King Abdulaziz Medical City, Ministry of National Guard Health Affairs/ Riyadh (KAMC-MNGHA) was recruited. Data was collected by using self-administered close ended questionnaire which consisted of four parts: 1) socio-demographic characteristics; 2) obstetrical history; 3) knowledge assessment about pregnancy weight gain. This part was consisted of 13 closed ended questions; and 4) perception assessment about pregnancy weight gain. It was a likert scale consisted of 13 statements with five responses ranges between strongly disagree = 1 to strongly agree = 5. The total score was calculated for each subject. The score was at the range between 13 to 65. The third and fourth parts was administered twice once before the session (pre-test) and once after the session (post-test). The educational session lasted for 20 – 25 minutes. Audio-visual materials (PowerPoint) used to clarify the session content.

Results
There was a significant improvement in the total knowledge score before and after educational session about pregnancy weight gain including (pregnancy weight gain, risk of over weight gain during pregnancy, and risk of less weight gain during pregnancy) (P = 0.000 for each), as (72%) of the subjects had poor knowledge pre-test compared to (91%) had good knowledge post-test. Also, there was significant differences in total perception score before and after the session (p=0.000). About two third (64%) had fair perception pre-test compared to (69%) had good perception post-test. However, there were no significant differences in the knowledge mean score of the pregnant women across their socio-demographic and obstetrical variables.

Conclusion/lessons learned
Pregnant women have poor knowledge about proper weight gain and its impact on pregnancy outcome. Bridging this knowledge gap is an important step towards improving perinatal outcomes. The educational session has an impact on improving pregnant women's knowledge and perception about proper weight gain during pregnancy.
Clinical Features and Outcome in Saudi Patients with Crescentic Lupus Nephritis at King Fahad Medical City Riyadh, Kingdom of Saudi Arabia

Fadel Alrowaie, Malak Almutairi, Maram AlTurki, Arig AlQahatani, Alhanouf AlHusani
King Fahad Medical City, Riyadh, Saudi Arabia

Problem
To estimate the prevalence of lupus nephritis with crescent in the kidney biopsy and measure correlation between the presence of crescent and renal outcome in King Fahad Medical City.
• To determine the clinical feature of lupus nephritis patients with crescent.
• To examine the relationship between the presence of crescent and serological activity.
• To identify the factors that may affect the outcome among Lupus Nephritis patient with crescent and their respond to treatment.

Background/context
Kidney involvement in systemic lupus erythematosus (SLE) can range from mild to severe and occurs in 50%–70% of patients with SLE. Crescentic lupus nephritis (cLN) is the most severe form and seen mostly in LN class III / IV +V.

The diagnosis of SLE is established on the basis of a constellation of clinical and serologic features. Therapy is directed to specific disease manifestations and involves the use of anti-inflammatory and immunosuppressive agents. Current laboratory markers for LN such as proteinuria, urine protein-to-creatinine ratio, creatinine clearance, anti-dsDNA, and complement levels are unsatisfactory to confirm the diagnosis. These markers lack sensitivity and specificity to diagnose or assess renal disease activity and damage in LN. Significant kidney damage can occur before renal function is impaired and first detection by laboratory markers like abnormal urine sediment or the presence of proteinuria. Persistent proteinuria may not necessarily indicate ongoing inflammation in the kidneys and may be contributed by pre-existing chronic lesions or recent damage in the kidneys during the course of the disease. Renal biopsy is the gold standard for providing information on the histological classes of LN and the relative degree of activity and chronicity in the kidney. The clinicopathological features of LN among Saudi population is not very clear and only limited studies addressed these issues, especially for crescent-forming and crescentic LN as well as its response to treatment.

Methods
Patients who are more than 12 years of age and presented to Nephrology Department with biopsy proven Lupus Nephritis (LN), between 2007 – 2014. We used nephrology database to extract the data, which is prospectively recorded.

Statistical analysis used:
A chart and electronic medical records in addition to nephrology data base at KFMC used in this study. The main variables to be included are demographics (age, sex and weight), biochemistry result hemoglobin (g/dl), Albumin (g/l), creatinine (umol/l), eGFR (ml/min) and 24-hour urine of patients (g /day), immunology (C3, C4, ANA and Anti-dsDNA) in addition to treatment outcome.

Results
A total of 69 SLE patients with biopsy proven lupus nephritis, mean age (30 +10), sex (59 F/10 M), median eGFR 64 (3-173) ml/ min were included in the study. Class IV LN is the predominant histological type in 46 % of the biopsies. Crescent formation was found to be more in female patients (25%). 40% of biopsies have at least one crescent formation primarily in class IV LN followed by class III. The proportion of patient who achieved remission is higher in none crescent forming group 65.2 % compare to 34.8 % of crescent group, while end-stage renal disease is more common in the cLN group with 10 patients compare to 3 patients in non-crescent forming LN, mortality dose not differ between both groups.

Conclusion/lessons learned
Crescent formation is common in patients with proliferative lupus nephritis mainly in class IV and it is associated with poor outcome. We showed that even less than 50% crescents in LN carry a poor outcome in comparison to patients without crescent. Our results suggest the percentage of crescents in renal biopsy should be included in the LN classification in the future as it carries a prognostic significant. As no international recommendation for the treatment of LN patients with crescent specially with less than 50% crescents formation, cyclophosphamide may be superior to mycophenolate mofetil as induction therapy but further studies are needed to confirm this assumption. Our study has a limitation of being a small size, single center, retrospective and lacking the details of remission and relapses, but it has the advantage of having long follow up period.
Cervical Collar Related Pressure Ulcers (CCRPU) in Neurocritical Care Unit: A Quality Improvement Project

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Problem

The Neurocritical Care Unit (NCCU) at the Ministry of National Guard Health Affairs (MNGHA), Riyadh admitted 15 trauma patients with Cervical Collars (C-collars) from April to July 2017, five (33.3%) developed CCRPU.

Background/context

The Advance Trauma Life Support guidelines demand the immobilization of the cervical spine in all trauma patients with possible spine injury. Although C-collars are used to protect the spine, several studies have identified that 6.8-38% of immobilized patients develops CCRPU. The pain and discomfort associated with pressure-related ulcers are known to have a profound impact on the patients’ quality of life, affecting physical, social, psychological and financial aspects of life. Several risk factors including: length of time in the collar, admission to the intensive care, mechanical ventilation, high Injury Severity Score, intracranial pressure monitoring and impaired activity/mobility have been associated with increased risk of CCRPU. The objective of this quality improvement project was to identify the risk factors in our NCCU and implement strategies to decreased CCRPU.

Methods

This study was performed at the MNGHA from 1-April to 31-December 2017. All adults trauma patients admitted to the NCCU with a C-collar in place were prospectively followed for the development of CCRPU, defined as a localized injury to the skin and/or underlying tissue, resulting from sustained pressure of the C-collar. A multidisciplinary team was formulated to evaluate the root causes of the CCRPUs during April-June 2017. The team found that the NCCU was only partially compliant with the Best Practice guidelines for CCRPU prevention, namely: assess and prevent skin breakdown; referral to wound care team for advice and appropriate dressing; removal of hard collar with skin check and washed daily; skin inspection every shift.

Several PDSA cycles were done:

1. Education and reinforcement: all NCCU nurses
2. Skin assessment: inspect below the C-collar on admission and every 4hours
3. Change the cervical collar: choosing the correct type and size
4. Skin protection: Place Mepilex dressing on the skin beneath the C-collar
5. Collar removal: expedite physician order to remove C-collar base on MRI results

The above interventions were implemented on 1st August, 2017 and the incidence of CCRPU followed by the NCCU and hospital HAPI teams.
Results
During the pre-intervention period (1st April-31st July) there were 15 trauma patients with C-collar, 5 (33.3%) developed CCRPU, while in the intervention period (1st August-31st December) this was 21 and 1 (4.8%), respectively. An absolute reduction of 28.6% (p=0.06), with the number-needed-to-treat being 4 (1 in every 4 patient benefited from the intervention).

Conclusion/lessons learned
Implementing a multifaceted intervention was effective in reducing the CCRPU rates in NCCU patients.
The Impact of Blame-Free and Just Culture on Improving Medical Error Reporting: A Systematized Review

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Problem
The medical errors reporting system is an important source of information, as it can help decision-makers focus on safety issues and take corrective measures accordingly. While there are various factors that can contribute to underreporting, many researchers suggest that a blame culture is one of the main reasons for the reduction in medical error reporting and that by creating a blame-free or just culture, error reporting will increase. Understanding how the adoption of a blame-free culture influences clinicians' reporting of medical errors can help us better prioritize the factors and address the issue of underreporting. The aim of this systematized review was to gather evidence on the effectiveness of a blame-free or just reporting culture on improving medical errors reporting.

Background/context
Patient safety advocates have found that the recognition of medical errors is hindered by disciplinary actions and blame cultures, both of which prevent people from learning from their mistakes and improving the quality and safety of healthcare services. Blame-free and just cultures shift the focus from blaming individuals to learning from errors. Furthermore, neither is outcome-biased; therefore, errors and near misses are handled more fairly and are considered to be systemic failures, rather than individual mistakes.

Methods
A systematized search of the literature was conducted using the PubMed and CINAHL electronic databases to identify studies that examined the effect of a blame-free, or just, culture on reporting errors. Publications that address the implementation of blame-free or just reporting culture in healthcare organizations and evaluate its impact on medical error reporting were identified, critically evaluated, and analyzed.

Results
Seventeen papers were identified and included in this literature review. These papers reported the implementation of a non-punitive culture in different types of healthcare settings. The majority of the included studies (n=16) showed a significant increase in the reporting rate following the introduction of various mechanisms to foster a non-punitive culture.

Conclusion/lessons learned
The included studies reported a positive culture shift toward a non-punitive culture, which resulted in an increase in reporting rate. However, it is difficult to attribute this increase in reporting rate to non-punitive culture only, due to the overlap of interventions and the lack of proper control of confounding factors in quasi-experimental studies. There is a need for a more robustly controlled experimental study design that adequately controls for confounding factors to determine the effectiveness of non-punitive culture in improving the reporting rate of medical errors.
Cross Sectional Study of the Trend of Use of Medications and Complementary Therapy by Travelers During Flights

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Background/context
As traveling associated with many problems such as fatigue and sleep disturbances which may make travellers search for solutions to avoid these problems. We aim to determine the trend of use of medications and complementary therapy (CAM) taken by the society to find out how it been used, educate them how to use it correctly and what’s the other non-pharmacological solutions that should be taken in consideration. Our interest in this topic came from that there is no study describes the trend of medication and complementary therapy used during flights in Saudi Arabia.

Methods
A quantitative research approach has been used and 629 travellers were recruited from Saudi Arabia. The survey questionnaire was developed by the researchers after a comprehensive literature review, and it has been modified based on a pilot study consisting of 45 people, in addition to the expert review. For a 4-month period, the survey was distributed electronically through social media, also to electronic surveys distributed to travellers at King Khalid International Airport. Travellers used either prescription and over the counter medications or Complementary alternative therapy or Non-pharmacological therapy.

Results
The vast majority (77.4%) of the total study sample were facing problems such as fatigue or exhaustion during flights. The solutions used were varied between three categories: prescription and OTC medications, (CAM) and non-pharmacological therapy. Paracetamol products were the most commonly used medication followed by antihistamines. Benzodiazepines and antidepressants are also reported. About 40% of people admitted that the source of their information was other people’s experiences such as friends and family, followed by pharmacists.

Finally, 63.4% believe that medications should not be used without prescription while 36.6% do not.

Conclusion/lessons learned
The trend of medication and CAM used during flights in the Saudi population consist of using mostly Paracetamol products. Unfortunately, significant proportions still receive their drug information from other people’s experiences. A substantial portion of the society also believe that medications could be used without.
Embarking on Vital Baby-Friendly Hospital Initiative (BFHI) Program at PMBAH, Medina Al Munawwarah

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Problem
The Ten Steps to successful breastfeeding serve as standards in providing a supportive pathway for women to achieve breastfeeding intentions and guiding healthcare professionals to support breastfeeding.

Background/context
It takes a village to raise a breastfeeding mother. The BFHI is a global effort of the WHO and UNICEF which was launched in 1991 with the aim to implement practices that protect, promote and support breastfeeding.

With the vision of becoming a Baby-Friendly Hospital, Prince Mohammed bin Abdul-Aziz Hospital (PMBAH), Medina has commenced different tools and measures with the aim to create awareness in promoting and supporting breastfeeding as the healthiest choice for new born feeding.

Methods
Several measures have been taken such as involvement policy-makers as part of the process and ensuring stringent training and education sessions to all the healthcare professionals and new born babies’ mothers in the hospital.

A 2-days training course with the aim to create awareness of breastfeeding had been introduced to the 124 staff in August 2016.

Additionally, from January to December 2017, the implementation of the program had been applied to 1,085 out of 1,604 numbers of mothers in the wards who received the breastfeeding education and management.

Results
The highest participation from the training was from nurses who made up 62.1% of the attendees followed by 26.6% doctors and 11.3% other categories. 97.3% participants agreed that they have accomplished the objectives and able to use the skills in the session while a small fraction 2.8% participants disputed on the matters.

In spite of the training, mothers in the antennal and postnatal wards had received education on the benefits of breastfeeding and had been informed about hand or breast pump expression for the Express Breast Milk (EBM) management.

For the month of January - April, the breastfeeding trend was gradually increased among the mothers while August and November had shown the highest percentage with 82% received support for the exclusive breastfeeding. However, the trend was slightly decreased towards the end of the year with only 60% mothers received the support.
**Conclusion/lessons learned**

BFHI program has shown a significant improvement in breastfeeding trend among the mothers which it also transformed the quality of maternity care generally. Moving forward, the team has agreed to use the Ten Steps in BFHI for the upcoming strategies.
Effect of Smoking, Caffeine, and Energy Drinks on Umbilical Cord Blood Unit’s Quality Parameters

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Problem

To evaluate the effect of smoking, caffeine and energy drinks on human umbilical cord stem cells in pregnant women at King Abdulaziz Medical City in Riyadh (KAMC-R) cord blood bank.

To identify maternal and neonatal factors that affects hematopoietic stem cells in the umbilical cord blood.

Background/context

Umbilical cord blood (UCB) is a known source of stem cells that has been used to treat many hematological diseases. UCB have been shown to be affected by maternal and neonatal factors.

The purpose of this study was to assess the effect of smoking, caffeine and energy drinks UCB unit’s quality parameters.

Methods

This was a cross sectional study on 196 mothers who have recently gave birth and donated their UCB, at KAIMRC - Cord Blood Bank, from 2016 - 2017. Maternal and neonatal factors were analyzed using descriptive statistics. Non-parametric Kruskal-Wallis test was used to test for association between smoking, caffeine and energy drinks and lab measurements. P-value of <0.05 was considered significant.

Results

The mean age of donor mothers was 31 years. The mean gestational age was 39.5 weeks. 140 (71%) donor mothers had a vaginal delivery while 56 (29%) had cesarean section. The mean infant weight was 3323g. 39% of consented donor mothers have more than 4 live children and 21% had no previous pregnancy. None of the donor mothers reported active smoking (cigarettes), while 37% reported passive smoking. For those passive smokers had a TNC increase by 18%, CD34 viability increased by 1%, MNC increased by 26% and lymphocyte increased by 28.5% (P= 0.037, 0.046, 0.032 and 0.039, respectively). Donor mothers exposed to shishah fumes had lower infant weight (3093g vs. 3330g, P=0.032). For Caffeine intake, had a major impact as 94% of the donated UCB were discarded due to low volume. For soft drinks intake, white blood cells count was decreased (P=0.026).

Conclusion/lessons learned

The findings will help to screen prospective donor mothers prior accepting for UCB donation to improve the quality of banked UCBU.
Reengineering Communication Process to Reduce Patient No-Show Rates in the Outpatient Clinic

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Problem

Retrospective data analysis showed that 33% of patients who were referred to general paediatric clinic at King Abdullah Specialist Children Hospital (KASCH) did not show up for their appointment.

Background/context

Patient No show data at outpatient clinics at KASCH showed there are noticeable number of patients did not show up for their scheduled appointments leading to unnecessary waste of outpatient clinics resources. Thus, this improvement project aims at reducing the no-show rate in general paediatric clinic to less than 10 %.

Methods

Multidisciplinary team has been formed to address the patients no show. Brainstorming and cause and effect diagram were used to study and identify the main causes for no-show for patients attending the general pediatric clinic. After that, the team decided to conduct a rapid patient survey collecting more information about this problem from patients and their family perspectives. Among the reasons, it has been found that the communication with patients is main issue, especially updating the contact number and verification the reminder SMS. The first intervention was updating patient contact numbers during a same day of clinic visit. The second intervention will develop a policy or guideline for no show more than three times and rescheduling process. Moreover, the third intervention is streamlining the patient discharge process to complete the discharge paper easily and fast. The data on project measures have been extracted, analysed and presented on run and control charts.

Results

The Patient survey of 344 patients about the root causes of this problem revealed that 29% of contributing factors was related to communication factors such as contact number not updated and reminder SMS was not delivered. As a result of this project, the impact of the first selected intervention of reengineering patients’ appointment communication process had led to noticeable reduction in the no-show rate in the general pediatric clinic as shown on control chart below.

Conclusion/lessons learned

The reengineering communications process seems an effective strategy leading to improvement in patients’ communication to avoid no show for scheduled appointment. This project is still on going in the testing and piloting phase and will be carrying on testing the other changes idea related to the potential cases of no show rate till achieve the improvement aim. The most important lessons learned is surveying patient experience is crucial and making the improvement changes a process driven to sustain the improvement made.
Balancing Workload and Improving Performance Productivity of Respiratory Services Staff in General Care Ward’s, King Abdulaziz Medical City-Riyadh- Main Hospital

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Problem
It has been found that the workload among respiratory staff is not balanced. The Data of the daily census showed existence of variation in day to day workload and between areas of services as well. This clear variation of workload between areas would lead to compromising the optimum care delivered to patients, and negatively increase Staff burnout, dissatisfaction and improper use of human capital resources.

Background/context
This project is being conducted in respiratory services in General Care Area (Wards) at King Abdulaziz Medical City (KAMC). It has been estimated around 40% overtime staff is required every month leaving the current staff with little time to rest and causing burnout and fatigue among current staff. This staffing challenge may lead to error and patient safety concern. For 12-hour shift, the National benchmarking for respiratory care workload is 9 hours and the international benchmarking is 9.3 per day. However, we noticed that the current staff productivity is around 6 hours, resulting in wasting valuable human resources and compromising the efficiency and effectiveness of respiratory services. Thus, this improvement project aims to adapting workload balancing techniques among respiratory therapists (RT) at respiratory care department of KAMC that promoting balanced workload and high productivity.

Methods
This is a staff performance improvement project focused mainly on general care areas at KAMC inpatients respiratory services. The Model for Improvement (MFI) has been adopted for this project. Outcome measure was the % of staff workload between (28-32) extracted from the Daily Department census. The Reduction in number of overtime was used as the process measure and balancing measure was the level of Staff dissatisfaction. After conducting the process mapping and drawing the fishbone diagram analysis, several PDSA Cycles were used testing, the idea of Reengineering the process of staff duty, followed by Standardizing treatment time according to international standard. The impact of the project interventions has been assessed analysed and presented in run chart.

Results
Reengineering of area assignments has reduced overtime and allowed us to add another FTE which we believe provide adequate time for better patient mentoring and assessment. In addition, standardizing treatment time according to international standards has reduced the overall number of treatment below the target lower limits, see the figures below

![Total Staff Workload Per Day Before and After the Intervention](image-url)
Conclusion/lessons learned

Despite doing two cycles due to time limitation of the project, we noticed for the first time in twelve months period overtime has been less than 2000, despite adding extra area converge and no new staff added. The compliance to the new workload standard showed very progress, and patient safety and outcomes can be indirectly affected by staff workload. We learned that having skilled middle management with quality tools in hand is highly needed to facilitate and sustain balanced workload among RT staff.
Surgeon Concern and Practice of Protection Against Blood Borne Viruses

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Riyadh, Saudi Arabia

Problem
- To assess surgeon knowledge about blood borne viruses risk and their transmission.
- Needle stick injury reporting.
- Post exposure prophylaxis to blood borne virus.

Background/context
Surgeons are at high risk of contracting infectious viruses such as Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) due to blood contact during operations. The purpose of this study was to assess the surgeons’ awareness to contracting blood borne viruses.

Methods
This was a cross-sectional study with a questionnaire distributed to 241 surgeons at KAMC-R during the period Jun 2017- Jan 2018. Descriptive statistics were used to analyze data collected using STATA v14. Categorical variables were analysed using Pearson chi square test. P-value of <0.05 was considered significant.

Results
A total of 241 surgeons answered the questionnaire, 179 (74.2%) surgeons were males and 62 (25.7%) were female. The mean age ± SD of male surgeons is 35.8 ± 11.0 while for females it is 33.3 ± 9.1. Majority of our surgeons are vaccinated to HBV (96% in males & 97% in females). When asked about the conversion rate post needle stick injury by HIV, HBV and HCV almost two thirds answered incorrectly. When asked about the need for HIV screening before surgery almost two thirds answered YES. When asked about their concern regarding contracting HIV from patients, answers were mixed (see Table 2), only one third of the surgeons were extremely concerned. When asked about risk of needle stick injury during treating patients positive for HBV majority of the surgeons said NO. However, a significant number of female surgeons answered YES 12 (19.4%) compared to 11 (6.15%) in male surgeons (p=.002).

Conclusion/lessons learned
Majority of our surgeons are vaccinated to HBV. However, females appear to be at higher risk of needle stick injury from HBV patients. This requires further investigation to the reasons for such high incidents. More education is needed about blood borne viruses.
Diagnostic Tests for Infections in Emergency Department: a Cost Effectiveness and Outcome Analysis Study

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Problem
Inappropriate antibiotic (ATB) prescriptions are a threat to patients, leading to adverse drug reactions, bacterial resistance, and subsequently, elevated hospital costs.

Background/context
Clinical management strategies of infection vary. It's unclear what effects different management strategies will have on the readmission, costs and cost effectiveness. In emergency department of KAMC the prevalence of inappropriate ATB prescriptions with at least one type of error was 46.2% in 2015. What influences these management strategies? What are their associated costs? How cost effective is to conduct diagnostic tests? Limited studies were published on such research topic. Objective: to describe the prevalence of diagnostic tests requested for infection cases visiting the emergency department (ED), evaluate their impact on readmissions and analysing the associated costs.

Methods
Retrospective cohort, based on four-arm outcome analysis conducted in ER at King Abdulaziz Medical City (KAMC). Inclusion criteria: Infection cases visiting ED. Sampling technique: Randomly selected antibiotic prescriptions through chart review between 2012-2014. Exposures were age, gender, previous medical history, infection type, antibiotics category and coverage, diagnostic tests. Outcome characteristics were (single admission vs. readmission due to same infection) and cost. Significance at p < 0.05.

Results
A total of 5,238/6002 (87.3%) infection complaining visits were analysed. Equal gender distribution was observed (Males 49.2%, Females 50.8%). Paediatrics cases comprised 40.3%, while adults were 59.7%. Almost 88% reported a single ED visit with infection without getting readmitted up till 3 months while the other group were readmitted at least twice within the next 3 months with same infection. The leading infection types were upper respiratory tract infection (URTI) (34%), followed by urinary tract infection (UTI) (23.9%) and lower respiratory tract infection (LRTI) (19.5%). Broad spectrum antibiotics comprised 76% of the sample, and antibiotic categories were mainly penicillin (36.7%) and cephalosporin (29.8%). The prevalence of diagnostic tests was 46% of the visits, and in 71.9% of the cases, the lab cultures were negative.

Bivariate analyses were conducted to identify if the intervention (diagnostic tests) had a certain influence on lowering readmission rate within each subcategory. Cephalosporin and quinolones antibiotic prescriptions with diagnostic tests resulted in statistically significant lower readmission rates compared to the group who underwent no diagnostic tests, p=0.002 and p<0.01 respectively. In lower respiratory tract infections, conducting diagnostic tests significantly lowered readmission rates, p<0.001.

Conclusion/lessons learned
Higher readmission rates were observed among all groups who haven't undergone diagnostic tests. Statistically significantly higher among those who received cephalosporin, quinolone and those with LRTIs.

Cost of treatment of infectious disease in ER is high, mainly aggravated by diagnostic tests. Patients and their families do not bear these costs but rather the hospital does. These results are beneficial for health policy decision makers.
Table 1: Impact of diagnostic tests vs. non-diagnostic tests on readmissions for ED visited patients complaining of infections.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total</th>
<th>Admission status</th>
<th>χ², P, RR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Single</td>
<td>Readmission</td>
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<tr>
<td>Gender</td>
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</tr>
<tr>
<td>Male</td>
<td>1497</td>
<td>Control 1318(88.0%)</td>
<td>179(12.0%)</td>
</tr>
<tr>
<td></td>
<td>1078</td>
<td>Case 961(89.1%)</td>
<td>117(10.9%)</td>
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<tr>
<td>Female</td>
<td>1308</td>
<td>Control 1129(86.3%)</td>
<td>179(13.7%)</td>
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<tr>
<td></td>
<td>1355</td>
<td>Case 1196(88.3%)</td>
<td>159(11.7%)</td>
</tr>
<tr>
<td>Age group</td>
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<td></td>
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<tr>
<td>Paediatrics</td>
<td>1306</td>
<td>Control 1172(89.7%)</td>
<td>134(10.3%)</td>
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<tr>
<td></td>
<td>807</td>
<td>Case 743(92.1%)</td>
<td>64(7.9%)</td>
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<tr>
<td>Adults</td>
<td>1499</td>
<td>Control 1275(85.1%)</td>
<td>224(14.9%)</td>
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<tr>
<td></td>
<td>1626</td>
<td>Case 1414(87.0%)</td>
<td>212(13.0%)</td>
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<td>Antibiotic spectrum</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Broad spectrum</td>
<td>2053</td>
<td>Control 1774(86.4%)</td>
<td>279(13.6%)</td>
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<td></td>
<td>1896</td>
<td>Case 1652(87.1%)</td>
<td>244(12.9%)</td>
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<tr>
<td>Narrow spectrum</td>
<td>752</td>
<td>Control 673(89.5%)</td>
<td>79(10.5%)</td>
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<td></td>
<td>557</td>
<td>Case 502(94.0%)</td>
<td>3(6.0%)</td>
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<td>Antibiotic category</td>
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<tr>
<td>Cephalosporin</td>
<td>727</td>
<td>Control 571(78.5%)</td>
<td>156(21.5%)</td>
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<td></td>
<td>898</td>
<td>Case 760(84.6%)</td>
<td>138(15.4%)</td>
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<tr>
<td>Macrolides</td>
<td>689</td>
<td>Control 594(86.2%)</td>
<td>95(13.8%)</td>
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<td></td>
<td>276</td>
<td>Case 241(87.3%)</td>
<td>35(12.7%)</td>
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<td>Penicillin</td>
<td>1524</td>
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<td>92(6.9%)</td>
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<td></td>
<td>633</td>
<td>Case 593(93.7%)</td>
<td>40(6.3%)</td>
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<td>Quinolone</td>
<td>154</td>
<td>Control 135(9.7%)</td>
<td>139(90.3%)</td>
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<td></td>
<td>498</td>
<td>Case 451(90.6%)</td>
<td>47(9.4%)</td>
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<td>Infection type</td>
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<tr>
<td>URTI</td>
<td>1639</td>
<td>Control 1459(85.0%)</td>
<td>180(11.0%)</td>
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<td>170</td>
<td>Case 153(90%)</td>
<td>17(10.0%)</td>
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<td>Control 0(0.0%)</td>
<td>0(0.0%)</td>
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<td>1260</td>
<td>Case 1105(88.0%)</td>
<td>151(12%)</td>
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<td>OM</td>
<td>530</td>
<td>Control 480(90.6%)</td>
<td>50(9.4%)</td>
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<td></td>
<td>54</td>
<td>Case 48(88.9%)</td>
<td>6(11.1%)</td>
</tr>
<tr>
<td>LRTI</td>
<td>118</td>
<td>Control 26(22.0%)</td>
<td>92(78%)</td>
</tr>
<tr>
<td></td>
<td>842</td>
<td>Case 751(89.2%)</td>
<td>91(10.8%)</td>
</tr>
</tbody>
</table>
Reducing the Incidence of Revisits of Gastroenteritis Patients in Pediatric Emergency Department

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Problem

There is an increased number of pediatric patients with Gastroenteritis visiting and revisiting the Pediatric Emergency Department, thus resulting in overcrowding and increased length of stay. There are some conditions were the compliance to management is inappropriate due to lack of proper education and follow up of instructions.

Background/context

During summer season there is significant increase of Gastroenteritis patients treated in the Pediatric Emergency Department (the Urci Care side of ED only). Our study did not include the Acute Care and Resus Unit of the Emergency Department. There is no standardized Gastroenteritis management that resulted in variation of treatment modalities that predisposed disparity in the nursing care plan and impact the length of stay. The lack of proper patient education and the lack of compliance of management and follow up appointments was leading to increased length of gastroenteritis illness and leading to revisits.

Methods

The team formulated a Quality Improvement project initiative to address the existing challenges to the management of pediatric patient presenting with mild to moderate Gastroenteritis. They convened and brainstormed on the root causes. The team created a Gastroenteritis pathway (Yummy Tummy Protocol) which was introduced to the Pediatric Emergency physicians and nurses to standardize the care of Gastroenteritis patients. The team also initiated written materials for the education of parents to read while they are in the Urci Care and to take home. The team also provided posters in the reassessment area of Gastroenteritis. The pathway was standardized according to the severity of the dehydration, starting from observation, oral hydration and oral Granisetron, to observation (for 16H) with Intravenous (IV) fluid management or admission to the hospital for further care.

Results

May 2017 was the baseline month of the project. There was 97.2% discharge of Gastroenteritis patients with Revisit Rate of 29.3% on June 2017, with application of the project, a pilot study was done that showed Discharge Rate of 99.4% with significant Reduction Rate of Revisit to 6.1%. When the Project started from September to December 2017, the Revisit Rate showed clear reduction with an average of 6.4%.

Conclusion/lessons learned

Collaborative efforts of the multidisciplinary team in the implementation of the Gastroenteritis pathway greatly affected the number of patient revisiting the Pediatric ED. The patient and family engagement in the process contributed to the positive outcome. In future, the team hopes to expand the implementation of the standardized Yummy Tummy Protocol to the rest of the Emergency Areas and the community.
Building Learning System Capacity: High Performance Clinical Based Teamwork

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Problem

Over the past few years, quality and patient safety (QPS) department have been involved in training and facilitating several quality improvements (QI) based teams’ projects at king Abdulaziz Medical City aiming at building their capacity in leading quality improvement project. However, we have noted that most of health care professionals at clinical level don’t have the basic understanding of quality improvement methodologies and terminology.

Background/context

Intensive efforts are under way to improve health care quality and safety throughout King Abdulaziz Medical City. Many of these efforts use different approach to meet the frontline needs and requests to run improvement projects and initiatives in their clinical areas. We consider the organization of clinical microsystems; The tools that shape and enhance the process of care; and the clinical work systems involved in the process of care.

Methods

The clinic team based improvement is an innovative called ‘one to one coaching’. This is a new function been launched on April, 2017 to support clinical and non-clinical staff into improving Quality and Patient Safety. All proposed initiative should align with IOM six quality dimension safety, timeliness, effectiveness, efficiency, equitable and patient-centred. This Improvement project drivers support our organization priority and main goals such as, generating new improvement knowledge, meeting accreditation standard, KPI performance, SRS theme and improve patient treatment outcome. This improvement initiative run through weekly sessions at selected clinics that allows performance improvement (PI) staff to coach healthcare professionals and hospital staff to identify projects, define quality problems, and test ideas that may be solutions and then implement changes across their departments.

Results

The data displays in the figures above that all slots been booked, attended by staff and there was no show, requests been received from different specialties and the most demanding services were nurses.

Conclusion/lessons learned

Quality Improvement Clinic team believe in Better Me, Better Service, and Better Care. It exists to help front line staff to recognise that as a healthcare individual, you have unique small domains of influence that have potential for real, measurable change. The high turnout in the clinic makes us seriously think about developing and expanding it effectively for better outcomes.
Optimizing Bed Utilization of Medical Oncology Daycare at King Saud University Medical City Cancer Center

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King Saud University – King Khalid University, Riyadh, Saudi Arabia

Problem
Adhering to the chemotherapy schedule is crucial in managing cancer patients to achieve the best outcome. With the limited number of beds in the day care, optimizing the use of the available resources has a great impact on cancer patient care. The percentage of no show in the day care reached 25% in 2016 of the bed capacity and this prevented some patients from getting their treatment in the scheduled time and led to unnecessary admissions to inpatient section to receive their chemotherapy.

Background/context
This project was carried out at Medical Oncology Daycare at King Saud University Medical City Cancer Center by the oncology center quality team. The accepted no show in different institution is to be =/< 10% which is our target.

Methods
Using a fish bone diagram concept, areas of deficiencies were recognised based on which we have selected areas of improvement. We have developed an action plan and made our key performance indicator (% of no show/ month) we have settled our target at 10%. Our intervention was through development of communication strategies with key stakeholders (care providers and clients = patients), revise our policies and develop definite intervention steps at pre admission, admission and discharge process. The data collection was the primary responsibility of the day care head nurse and the quality coordinators.

Results
The no show % dropped from 25% to a median of 12% (8.85- 15.93%). The total admitted patient in 2017 compared 2016 showed an increase of bed utilization per month between 5- 33%/ month.

Conclusion/lessons learned
• The bed utilization in MODC has improved since the implementation of Bed Management Pathway. Continuous adherence to the pre-admission process. and the Bed Management Pathway with Continuous monitoring of the no show KPI is mandatory to get to our targeted results
• Figure (1)
Venous Thromboembolism (VTE) Prophylaxis, a Holistic Approach Looking Beyond Conceptual Treatment

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Problem

The incidence rate of post-operative VTE in the primary total joint replacement surgeries increased from an average rate of 0.4% in 2012/2013 to 2.8% in 2014.

Background/context

Patients who undergo elective lower extremity joint replacement surgery are at a high risk for developing a pulmonary embolism. The aim of our study was to develop a quality improvement initiative to help reduce the incidence of pulmonary embolism (PE) following elective lower extremity joint replacement surgery.

Methods

866 patients undergoing a total knee, total or partial hip replacement surgery at a single institution between January 2014 and December 2016 were included in this prospective pre-post interventional study. In July 2015, a bundle of interventions was implemented to reduce the likelihood of PE. A new pre-op risk assessment and post-op adapted order form was implemented, which emphasized appropriate use of chemical and mechanical prophylaxis along with early ambulation. Our primary outcome of interest was development of PE. Data was collected on patient demographics, procedure type, surgery duration, and intervention compliance.

Results

There were 13 PE’s before the intervention and 2 after the intervention. The incidence of PE was significantly higher prior to the intervention (2.8% vs. 0.7%; p=0.044). No major bleeding complications were reported. Length of stay was significantly longer in patients that developed a PE (13.4 vs. 5.4; p=0.000). Compliance with the new risk assessment and adapted order forms was 100% post-intervention.

Conclusion/lessons learned

Our results suggest that our bundle of interventions was successfully implemented and helped to reduce the incidence of pulmonary embolism following surgery, the implemented interventions was expanded at the level of organization.
Complications of Supracondylar Humeral Fractures in Children at Level One Trauma Center

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**Problem**

Supracondylar humeral fracture is the most common pediatric elbow fracture.

**Background/context**

Supracondylar humeral fracture is the most common pediatric elbow fracture. The type of the fractures will influence on complications severity. The aim of this study is to discover this association and evaluate it in a level one trauma center.

**Methods**

The data was retrospectively collected from medical records of patients aged 14 years and below who presented to the emergency department with a supracondylar humeral fracture between 2007 and 2012. The data included mechanism of injury, type of fracture, pre-and post-operative examinations, time from injury to surgery, type of surgery, duration of immobilization and the presence of complications. Assessment of these complications was done preoperatively, postoperatively and at last follow-up. Association between complications and types of fractures was determined using the Fisher exact test.

**Results**

A total of 125 patients’ records were reviewed, 6 cases of type I (4%), 47 types II (38%) and 72 types III (58%). The overall complications rate in the last follow up was higher in type III than in type II (14% vs. 4%, respectively). However no statistical significance was found between both types (P-value= 0.16). Stiffness was noted to be the most common complication in type III (n=7) (10%). Other complications associated with type III, were nerve injury and deformity. While in type II, the only complications seen at the last follow up was infection and stiffness, which were equally seen in 1 patient for each complication (2%).

**Conclusion/lessons learned**

Complication rate significantly changes depending on type of fracture. Type III was more associated with complications compared to type II. Since the complications differ between types of fractures, special attention should be given to each type.
Effectiveness of Educational Intervention on Ventilator-Associated Pneumonia Prevention Strategies on Critical Care Nurses’ Practice

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Problem
Ventilator Associated Pneumonia (VAP) is a patients’ safety issue in critically ill patients receiving mechanical ventilation.

Background/context
Ventilator Associated Pneumonia accounts for up to 47% of all infections among ICU patients receiving mechanical ventilation. VAP prolongs the length of ICU stay, increases health care costs, and increases risk of death in critically ill population. Implementing ventilator associated pneumonia prevention strategies could reduce the risk of VAP in critical care units. Many VAP prevention strategies have been developed. Findings regarding adherence to and implementation of the VAP prevention strategies have been inconsistent and were affected by lack of training, inadequate infection control program, and lack of knowledge among health care providers of such strategies. There are 33 potentially effective measures for preventing VAP where nurses play an essential role. However, the extent to which they are actually adopted in the daily practice has not yet been established. In particular, little is known about nurses’ knowledge of VAP prevention strategies and the extent to which critical care nurses are adhering to these strategies. Thus, the aim of the study was to examine the effectiveness of educational intervention on ventilator-associated pneumonia prevention strategies on critical care nurses’ practice.

Methods
A quasi experimental design (pre/posttest) was utilized. A sample of 192 nurses working in various ICUs participated in the study. Participants completed a multiple-choice questionnaire consisted of nine nursing-related interventions identified based on a review of evidence-based guidelines for preventing VAP. The questionnaire addressed the recommended intubation route, the frequency with which the ventilator circuits are replaced, the types of humidifiers and the frequency with which they are replaced, the suctioning systems and their replacement frequency, endotracheal tubes with subglottic aspiration, kinetic versus standard beds, and the position of the patient.

Results
A statistically significance improvement in nurses’ practice after receiving the educational intervention on VAP prevention strategies.

Conclusion/lessons learned
Critical care nurses must use evidence-based prevention strategies to minimize the risk of VAP in mechanically ventilated patients. Targeted educational intervention to increase nurses’ knowledge regarding the CDC guidelines for VAP prevention will be beneficial. Focused educational interventions should be more widely employed for prevention of VAP in the ICU settings and can lead to remarkable decreases in cost and patients morbidity attributed to VAP.
Improving Reporting Errors Behaviour Among Healthcare Providers in Ministry of Health Hospitals

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**Problem**
Reporting of medical errors is a widely recognized for initiating patient safety improvement initiatives, MOH hospitals safety culture survey revealed that the majority (67.4) of staff did not report any adverse event in the last 12 months.

**Background/context**
We know little about the probability of error reporting in the Saudi Ministry of health hospitals. Thus, an online survey has been conducted to assess the use of medical staff for reporting system either paper-based or electronic system in Saudi MOH hospitals. The survey results revealed the majority of hospital staff did not report the adverse events they committed or observed the aim of this improvement project is to increase the current percentage of non-reporting errors to 50% by November 1, 2017, and to 75 percent by December, 31, 2017 in two piloted hospitals.

**Methods**
Quality improvement team at MOH level had been formulated to address the issue of not reporting adverse events among MOH hospitals staff. The Quality improvement team started to analyse the results of the Electronic Patient Safety Culture survey, and found the majority of the hospital staff did not report any adverse event in the last 12 months. Then, the improvement team conducted several sessions using quality tools such as brainstorming and cause-effect techniques exploring the possible factors causing hospital staff not to reporting medical adverse events. The team decided to test the change idea of simplification and standardization the occurrence variance report (OVR) format in two selected pilot hospitals using PDSA cycle. The impact of project had been assessed using process and outcome measures.

**Results**
Simplification and standardization of the occurrence variance report (OVR) format in the two-piloted hospital had led to an increase in the reporting behaviour among hospitals staff as showing the figure below comparing with the baseline.

**Conclusion/lessons learned**
Creating safe work environment and safety climate as well as a blame-free culture for reporting errors are necessary, but it is not sufficient to improve hospital staff reporting behaviour without making changes in the reporting process, including standardizing and simplifying the forms used for the reporting the adverse events such occurrence variance report (OVR). Before spreading these initiatives to all hospitals, further testing in more hospitals is recommended.
Prevalence and Predictors of Antibiotic Prescription Errors in The Management of Respiratory Tract Infections in An Emergency Department

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Background/context
Respiratory tract infections (RTI) are the most common diagnoses reported in the emergency departments (ED). Unnecessary use of antibiotics (ATB) for treatment of several infections resulted in substantial effect on patient care and health care costs. Our aim was to assess the prevalence and predictors of ATB-related prescription errors among patients who diagnosed with (RTI) in emergency department at KAMC. And to identified cost effectiveness of appropriate and inappropriate treatment of (RTI).

Methods
A cross-sectional study was conducted in Emergency Department (ED) at King Abdulaziz Medical City. Patient characteristics (age, sex, weight, allergy, diagnostic test (Chest X-Ray, cultures, type of microorganism) and prescription characteristics (class, dose, frequency and duration).

Results
Sample with equal sex distribution constituted of 3185 cases: adults (>15 years) = 55% and pediatrics (<15 years) = 44%. The two main infections were upper respiratory infection (URTI) (pediatrics = 70%, adults = 57%) and lower respiratory infection (LRTI) (pediatrics = 42%, adults = 29%), with significant age group differences (P= 0.05). Around 31% complained of tonsiopharyngitis and 22% of Pneumonia. Broad-spectrum coverage ATBs were prescribed for 74% of the cases. Three main ATB categories were prescribed in both age groups: penicillin (pediatrics = 43%, adults = 26%), cephalosporin (pediatrics = 29%, adults = 19%), and macrolide (pediatrics =26%, adults =38%) with significant age group differences in all three, P= 0.001, P= 0.001, and P= 0.010, respectively.

Prevalence of inappropriate ATB prescriptions with at least one type of error was 46.9% (pediatrics= 65% and adults = 32%). Errors were in ATB selection (2%), dosage (22%), frequency (3%), and duration (32%). Dosage and duration errors were significantly predominant among pediatrics (P= 0.001 and P= 0.0001, respectively). Selection error was higher among adults (P= 0.001).

Age stratification and binary logistic regression were applied. Significant predictors of inappropriate prescriptions were associated with: cephalosporin prescriptions compared to penicillin, broad-spectrum ATBs in adults. Inappropriate ATB prescriptions with LRTIs significantly higher in pediatrics (81%) versus adults (29%) (P= 0.001) and URTI observed in 58% of the pediatrics and 34% of the adults.

Conclusion/lessons learned
Prevalence of ATB prescription errors in this emergency department was generally high and was particularly common with cephalosporin, narrow-spectrum ATBs prescriptions.
Reducing Pre-Analytical Laboratory Sample Errors in King Abdullah Specialist Children's Hospital (KASCH)

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Problem

During the daily monitor and review of the Safety Reporting System (SRS— an electronic web-based voluntary incident reporting system), the increase in number of rejected lab samples in the pre-analytical phase was noticed. Sample rejection prevents sample analysis, leads to new sample request causing patient discomfort especially for difficult vein patients, prolongs the turnaround time (TAT) and cause the delay in diagnosis and treatment of critical patients.

Background/context

This was launched by Quality and Patient Safety Department (QPSD) with collaboration of Nursing Services and Laboratory Department in King Abdullah Specialist Children's Hospital (KASCH), the first specialized Children's Hospital in the Kingdom of Saudi Arabia with a capacity of 600 beds, occupying 192,000 m2, over 10 levels. It is understandable that, though, in healthcare practice such kind of errors can happen, however, as a healthcare institution aiming to be the Center of Excellence, we are obliged to continuously search for best practices to minimize such waste in the process that jeopardizes quality of care and avoid reoccurrence of similar events.

Methods

Quality and Patient Safety Department (QPSD) has raised an SRS alert to Nursing Services in KASCH in regards reported rejected lab samples. The number of rejected lab samples from 1st January to 31 October 2017 were 192. The top reported events were related to; wrong transportation, destroyed specimens, using wrong specimen container and no/incorrect label. In response to this alert, Nursing Department performed and discussed the Cause and effect analysis using the 4M’s: Manpower, Materials, Machinery & Methods. Three common themes were identified 1) Incorrect techniques in securing samples (urine or Pediatric containers), (2) conflict advice received by staff in relation to the type of blood tube to be used for a request test & (3) unnecessary blood extraction for patients transferred from King Abdulaziz Medical City (KAMC) requiring blood screen & type. Two PDCA cycles were conducted in KASCH ER due to high volume of specimen collection. Meeting was conducted with stakeholders in order to resolve the challenges. The action plan involved the following; change of urine specimen containers, staff re-education and awareness of specimen collection, monitor the compliance of vacutainer not to be opened during blood collection, poster signage were placed near pneumatic tube system to remind the staff regarding what to be placed in the capsule and discrepancies related to specimen tube in the Laboratory online manual were identified and corrected to be reflected in the Hospital Information System Best care.

Results

Following the implementation plan started in December 2017, the number of reported rejected lab samples has dropped dramatically in January 2018 to 5%.

Conclusion/lessons learned

The educational program for all staff involved was relevant and important as can be seen in the decrease of sample errors and the resulting quality improvement. Detection, identification, and monitoring of the error and implementing strategies to improve pre-analytical quality reduces error numbers and thereby improves patient safety and health system outcomes.
Improving First-Case Starting Time in Main OR

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Problem
The average delay time of the first case at KAMC is 62 minutes, this has a negative domino effect on the operating room turnover. Identifying the causes of all delays will help in establishing an effective method to start all cases on a timely manner.

Background/context
Frequent delays of first cases in the operating room have a negative domino effect on patient flow and resource utilization at KAMC. In order to void this in the OR, it is a critical that all first cases commence and are performed on their schedule timings.

Methods
During the project, the team worked with main OR to collect, validate and analyze data. The team collected the data from the health information system, and used observations, process mapping and historical data analysis.

The department of surgery document all cases of delay in excel sheet, after analysing the data the team came with a Pareto Chart of all causes of the delay.

After the analysis, the team decided to implement 3 major interventions:
1. Moving the nurses shift from 7 AM To 6 AM.
2. Make sure all patients consents are completed and documented 1 day before the surgery.
3. Introduce 3 types of standards to measure the impact of the project, which are: time of arriving to holding area, time of entering the OR and the Skin-Cut time.

Results
For data validation, the team observed 22 morning cases (39% out of the morning surgeries that week) over 5 working days Sunday until Thursday, the team were randomly assigned to 4 or 5 morning surgery for both Main and Day Care, the team found an average of 2 minutes’ difference between the observed time and system time which was not significant. Therefore, we concluded that the system data is valid.

After implementing all solutions, the project achieves its goal by 65%. The average skin cut time for the week before improvement was 9:14 AM, and after implementing the proposed solutions it was dropped to 7:53 AM (Figure 1).

Conclusion/lessons learned
1. Transferring the nurses shift from 7:00A.M. to 6:00A.M. allowed the morning shift staff to have sufficient time for handover and familiarize them self about all the morning cases.
2. Completion of patients consents one day prior the surgery Insured to minimize the wasted time of signing all consents.
3. After implementing all solutions, the team found a relation between starting the morning surgery and turnaround time.
Inter- and Intra-Patient Cyclical Variability in Hemoglobin (Hgb) Responses in Patients on Hemodialysis and Online

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Problem

Variability in Hgb response to standard anemia management guidelines in hemodialysis patients.

Background/context

The use of erythropoiesis-stimulating agents (ESAs) have revolutionized anemia management in dialysis patients. The protocols of anemia management that requires frequent Hgb measurement and therapy adjustment often lead to considerable hemoglobin cycling. More than 90% of patients are experiencing this cycling.

Methods

This is an observational prospective study on stable chronic dialysis patients. Baseline Hgb and iron studies were performed during the monthly anemia management rounds and repeated after a one-month cycle. ESA and IV iron dose adjustments were made according to a standard protocol.

The variability in Hgb change and its relation to gender, type of ESA, dialysis modality, vascular access type, ESA and IV iron therapy adjustment and baseline hematological parameters were analyzed.

Results

Of 222 patients included, 77.3% were on hemodialysis (HD) and Darbepoetin was in 31.9% and Erythropoietin (EPO) in 68.1% of the patients. Over the observation period, the ESA dose was unchanged in 40.8%, withheld in 8.3%, reduced in 18.8% and increased in 26.6% while the Hgb level rose in 56.4%, dropped in 8.5% and was unchanged in 35.5% of the patients. However, the overall frequency of patients with hemoglobin levels in the recommended range did no change (64.7% and 63.2%, respectively (p= 0.83).

Neither the magnitude nor the direction of ESA dose adjustment nor the change in Hgb level or its direction were affected by the ESA type, the dialysis type, the vascular access type or IV iron therapy given. No differences were noted between the HD and HDF groups in any of the parameters measured except that HD group required higher darbepoetin dose (56.6 ± 43 mcg versus 35.5 ± 30 mcg) in HDF group (p=0.031). No differences were noted between the patients using permcaths as vascular access and those with native grafts in any of the parameters measured except that the former group required higher darbepoetin dose (13915 ± 9635 iu and 10150 ± 8877 iu respectively p= 0.02).

Conclusion/lessons learned

Hgb level change was not always predictable by the ESA dose adjustment magnitude or direction. We observed similar hematological parameters findings and IV iron usage in HD and HDF groups. However, the HD group required higher darbepoetin dose. Similar hematological parameters findings and IV iron usage were observed in patients using Permcaths as those with native grafts. However, the Permcaths group required higher epoetin dose.
Failure of Adverse Drug Reaction Awareness Campaign and Back To The Drawing Board

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King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

Problem
Under-reporting of adverse drug reactions (ADR) at our institution. The problem was known to the ADR team, as numbers of ADRs being reported were not representing even a close number of national and international incidences of ADRs. In addition, the number, diversity, and complexity of patients seen at our institution indicate a much higher incident.

Background/context
An institutional mechanism for monitoring adverse drug reactions (ADR) is vital for the detection and prevention of harm related to drugs, and is a valuable tool in detecting drug safety issues in addition to drug product quality issues, traditionally the mechanism has relied on spontaneous ADR reporting form practitioners. At NGHA-Riyadh our ADRs are monitored and analysed through a spontaneous reporting system, depending solely on healthcare providers to report suspected ADRs, where a main limitation of this mechanism is underreporting. Awareness campaigns have been described to improve reporting and increase ADRs vigilance.

Methods
We organized an awareness campaign which included presentations on the importance of ADR reporting and its contribution to the knowledge we have about the safety of drugs, the process and guidance on how to report ADRs within the institution and other topics related to ADR detection and analysis, the campaign was also supported by representatives from the Saudi Food & Drug Authority Pharmcovigilance centre. In addition, the event included awards to top reporters and a competition with incentives to winners who answered ADR related questions correctly.

Results
Compared to the pre-campaign the post-campaign period showed no improvement in the total number of ADRs being reported after the first and second quarters of conducting the campaign and in comparison to the same period of the previous year, nevertheless, a slight change in the types of ADRs being reported and the type of practitioners involved was noticed.

Conclusion/lessons learned
Campaigns require hard work, organization, time and financial assets, with little or none what so ever affect in improving spontaneous reporting. A better understanding of the barriers to ADR reporting and developing other means for improving reporting should be explored with more efforts sought in proactive detection of ADRs from electronic health care systems and ADR trigger identification.
Effect of Patient Safety Educational Intervention on Nurses Performance in Primary Health Care

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Problem
Patient safety and error prevention are healthcare issues that have gained increased recognition recently. Hospitals with poor work environments are associated with negative outcomes for nurses and patients.

Background/context
Improving patient safety in primary health care setting is crucial. Patient safety is a priority for health services in all countries and is the foundation of good patient care. Providing safe health care depends on highly trained nurses. Effective nursing education and maintaining a healthy work environment are known factors that have a direct influence on patient outcomes. Therefore, the aim of the study was to examine the effect of patient safety educational intervention on nurse’s practices.

Methods
A quasi-experimental design (pre-post-test) was used. The study was conducted at two primary health care units at Menoufia Governorate, Egypt. A purposive sample of 36 staff nurses working in the two units was included. Nurses received the educational intervention about patients’ safety in the primary health care units for 6 months. The Hospital Survey Patient Safety Culture tool (HSPSC) was used to identify the best patient safety culture indicators. Universal Precaution Questionnaire was used to measure nurses’ practices. Patient’s adverse events questionnaires were used to assess the reported adverse events in the designated units.

Results
The main findings of this study illustrated that, there was a statistically significant improvement in the mean score of nurse’s practices (3.8±0.4) post intervention compared with (2.9±0.8) pre-intervention. There was a significant decline of the rate of the reported adverse events from 20% pre-intervention to 5% post intervention. Also, there was a positive significant correlation between nurses’ practice and safety culture of work. Also, there was a statistically significant improvement in the mean score in patient safety culture (1.8±0.5) appropriate post intervention compared with (3.6±0.4) inappropriate pre-intervention.

Conclusion/lessons learned
Nurses’ who received patient safety educational intervention has improved in performance. Continuous in-service educational programs on quality and safety including safe work environment decreases the rate of adverse events and maintain safer clinical practice. The findings of the study suggested that patient safety educational interventions must be included in all curriculums taught to nurses.
Electronic Consent Versus Paper Consent in Endoscopy Procedures in King Abdulaziz University Hospital, Jeddah

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Problem

Most patients faced difficulties in understanding informed consents before heading to the procedure. In order to make patients more knowledgeable and oriented about the procedures, quality of informed consent needs to be visualized to reach a better understanding by doing video assisted informed consent.

Background/context

The effectiveness of informed consent with video assistance has showed to improve patients’ satisfaction and comprehension.

According to a study conducted by Zhang Y, et al, 2017, among eighty Chinese patients who were enrolled to undergo unilateral phacoemulsification surgery for cataract, were assessed whether providing a video assistance along with verbal informed consent improved their satisfaction. They found adding video-assisted informed consent had a good impact on patients’ satisfaction and reduced the time with their ophthalmologists.

Methods

This is a case control study that was conducted among 20 patients. The data were collected in December 2017 at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. Data were obtained using structured questionnaire from two different groups. First group signed the consent form without watching the video, while the second group signed after watching the video. Data analysis was done using the Statistical Package of Social Sciences (SPSS), Version 21 (SPSS Inc., Chicago, IL).

Results

Ninety percent of the patients undergoing endoscopy believed that the procedure was explained to them thoroughly after watching the video. However, only 40% thought the doctor’s explanation was sufficient. Also, 90% of people did not need a re-explanation of the procedure or complication after watching the video. To add more, complications that may result from the operation were known to 70% of patients, in contrary to, 10% of people knew the complication without watching the video. In addition, 100% of people knew how long the procedure might take after watching the video.

Conclusion/lessons learned

Video assisted informed consent showed promising results, but the study had small sample size, due to shortage of time. We hope to target a larger population, and to use video assisted informed consent in multiple procedures locally and internationally. Our aim is to use media in obtaining consents for different procedures at a wider scale.
Patient Satisfaction Reflecting the Safe-Quality Nursing Care Practices in Gynecology/Antenatal and Postnatal Wards in PMBAH, Medina

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Problem
Patient satisfaction reflecting the safe-quality nursing care practices in Gynecology/antenatal and postnatal wards in PMBAH, Medina

Background/context
A smile is a curve that sets everything straight. Satisfaction is an enjoyment feeling when the demands meet the expectations. From the context of hospital care, patient satisfaction is measured by the piquant of patient experience when receiving services in the facility.

The services that nurses offered to a patient are include but not limited to providing a physical and psychological comfort, respecting patient and patient’s family dignity and privacy, giving education regarding medications and offering overall supports which related to the patient condition.

Methods
This study was performed in the gynecology/antenatal and postnatal wards in December 2017 with a total number of 215 mothers were interviewed in regards to the services that they had received during the admission period.

The data collection was received and tabulated using the MS Excel software in determining the level of patient satisfaction towards the services provided by nurses in the respective wards.

Results
Patients who had undergone Lower Segment Caesarean Section (LSCS) rated 60% for the room cleanliness, spirometer management, umbilical baby care education and Enoxaparin management which carried the lowest value compared to other nursing care items. Meanwhile, they rated 100% satisfied when nurses offered sufficient time for them to express their needs and preferences in the nursing care together with the expected outcomes.

In addition, they also marked 100% satisfaction when they had the Identification Band during the admission time and when they received instructions regarding medication and follow-up care.

Normal Spontaneous Vaginal Delivery (NSVD) mothers rated 70% satisfaction in the baby care, umbilical care management and vaccination education. Moreover, remarkably LSCS & NSVD mother rated 90% agreed that they satisfied with the hearing test which performed on their babies.

Conclusion/lessons learned
The study revealed that patient satisfaction has raised the standards in the nursing clinical outcomes where the nurses acknowledged the needs of the patients when they are in the facility. In conclusion, ongoing monitoring of patient satisfaction is needed for the improvement in nursing care services in general.
Nursing Quality Indicators: A Priority Setting

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Problem
Nursing quality indicators and priorities weren’t clearly structured within Nursing Services and the definitions available in the Book of Measures required updating so it was in accordance with internationally recognized indicators.

Background/context
Quality indicators are quantitative measures that are used to monitor and evaluate the quality of important patient care processes and outcomes. Our organization is on the journey to become a data driven organization, which is why it was important for Nursing Services to establish priorities to drive improvements with patient care and enhance the patient journey. Nursing leadership teams together with the nursing quality team established and prioritized nursing quality indicators (NQI) through the use of a prioritization matrix. These priorities included falls, hospital acquired pressure incidents (HAPI), pain, early rescue measures and medication administration.

With evidence based and internationally recognized indicators we are able to support MNGHA’s vision to be recognized as an internationally acclaimed center of excellence enhancing individual and public health status. If you can’t measure it, you can’t manage it, if you can’t manage it, you can’t improve it.

Methods
A multidisciplinary team consisting of the Associate the Executive Director of Nursing, Directors of Clinical Nursing and the nursing quality team collaborated with the Data and Business Intelligence Management (DBIM) team to review the current book of measures and the development of NQI dashboards. A thorough literature review was conducted and performance measures were developed for the NQI’s. The development of each performance measure included a definition of the measure, the rationale for the measurement, development of formulae with numerators and denominators with a mathematical representation, the identification of the data source (either from our clinical information system (BestCare) or from our Safety Reporting System (SRS) as well as the target to be achieved. Dashboards were developed based on these performance measures, providing data rich information to be used to drive improvement of patient care. Whilst this process was transpiring we also subscribed to the National Database of Nursing Quality Indicators (NDNQI) in June 2017 and we are able to utilize the electronic dashboard for monitoring our performance with international benchmarks.

Results
By clearly defining what the nursing priorities were, Nursing Services were able to develop and establish processes for Nursing Quality Indicators that reflect the quantity and/or quality of Nursing Care. Along with these Indicators clear priorities for 2018 were established and a strategy developed on how to progress in the monitoring, measurement, reporting and achievement of these priorities. Data is available from the organizational dashboards as well as the NDNQI dashboards and can be accessed by all levels of nursing leadership; Nurse Managers, Directors of Clinical Nursing and the Associate Executive Director have access to unit level and hospital wide performance and this promotes ownership of quality by every Nurse within the department.

Conclusion/lessons learned
Nursing as a profession has a responsibility to measure, evaluate, and improve the quality of nursing practice. The knowledge of how to use these indicators and their importance for the assurance of quality nursing care was incomplete and fragmented. With this project the nursing leadership team was able to see the results of nursing performance at the unit level. Each clinical director of nursing was able to review and discuss these results with their unit managers team on a monthly basis and were able to create action plans based on the results of these indicators that is either patient or unit specific.
The Impact of Patient Safety Culture on Dental Providers’ Satisfaction

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Problem

The problem is studying the relationship between the patient safety culture and job satisfaction of dental care providers. Literature review revealed there is scarcity in discussing dental safety issues. The dental staff with patients will be affected, the safety climate and other organizational factors as well.

Background/context

Healthcare is potential to breed injuries and hurts. The study significance comes to extend the empirical knowledge in assessing the safety attitudes within dental care sector. Since safety is not a practice, it is a matter of life or death. It has been found the study of patient safety in dental domain is still in its infancy. There is a little awareness about safety measuring tools to evaluate and improve the safety measures. On other hand there is scarcity in grasping the difference of patient safety in dentistry from other healthcare specialties.

This research has been implemented in number of dental specialized centres in private sector at Riyadh city, Saudi Arabia. All the dental staff working there were targeted (dentists, dental assistants, dental technicians, secretary, pharmacists, and janitors). The patient safety measures and its importance.

Methods

This is a cross-section descriptive study; it tries to take a snap shot of safety attitudes within the study population (all workers in dental departments). Data collection and sampling was in December 2017 by using a vigorous and worldwide safety attitudes questionnaire. The survey items were: Teamwork climate, safety climate, and job satisfaction, perceptions of management, stress recognition, and working conditions.

Results

The dental workers reported the dental patients to be in an imperative safety environment. Their job satisfaction was significantly predicted to their perceptions to patient safety culture. Teamwork factor and perceptions of management were positively related to safety attitudes. The eligible working conditions are explained their significance in prevailing safety measures. The dental workers had a poor awareness to stress recognition criteria. This predicts that stress of dental practices may precipitate some medical errors.

Conclusion/lessons learned

The findings revealed, as far as the patient safety culture is addressed the job satisfaction will be there. Teamwork climate should be maintained. The management's high accountability to patient safety concerns is the corner stone for establishment safety atmosphere. That is the blame-free climate. So, more chances to tell and report any dental error. This will open the gate of learning and assigning better preventive measures. Robust collaboration and communication across members of dental team along with administration are beneficial and productive.

At the end, regulating patient safety programs should be highlighted, and a great dedication should be implemented by policymakers of dental healthcare institutions.
Impact of PICU Patients Transfer Process Standardization on Reducing Transfer Time Delay

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Problem
Evaluating current PICU patient transfer process timeline revealed a delay in transferring patients from PICU to ward. The need for timely efficient ICU bed utilization process is supported by the fact of increase demand for critical care services and avoid unnecessary stay for patients who no longer need ICU.

Background/context
This improvement journey took place in Pediatric ICU, KAMC, Riyadh- which is composed of 20 beds serve critically ill medical-surgical pediatric from ER, OR, HDU and pediatric wards. Multidisciplinary medical teams are involved in the daily patient care including physicians, nurses, respiratory therapist, dietician, clinical pharmacist.

Methods
All patients transferred from PICU to pediatric ward were included in the process evaluation.

A checklist was created to monitor transfer process steps which included:
1. Transfer decision.
2. Bed allocation.
3. Contacting receiving team.
4. Receiving team evaluation, writing transfer order.
5. Patient transfer.

Continuous data collection was performed, analysed on monthly basis by a dedicated team. The goal was to decrease total transfer time to 4 hours from transfer decision to physical transfer.

Several PDSAs were implemented in relation to transfer process steps:

<table>
<thead>
<tr>
<th>Targeted step</th>
<th>Intervention</th>
<th>Intended improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer decision</td>
<td>PICU staff meeting</td>
<td>Early decision before 08:00 AM.</td>
</tr>
<tr>
<td>Bed allocation</td>
<td>Bed management meeting</td>
<td>Early bed allocation.</td>
</tr>
<tr>
<td>Contacting receiving team</td>
<td>Educating PICU physicians.</td>
<td>Early contact receiving team (08:30-09:00 AM).</td>
</tr>
<tr>
<td>Writing transfer order</td>
<td>Meeting pediatric division heads and chairman.</td>
<td>Writing transfer order within hour after informed.</td>
</tr>
<tr>
<td>Physical transfer</td>
<td>Educating PICU nurses.</td>
<td>Facilitate patient preparation.</td>
</tr>
</tbody>
</table>

All interventions were translated to a standard time-related process map followed by involved medical teams.
Results

Monthly average transfer time was used as a measure of interventions impact. It was decreased from 455 minutes on Aug 2016 to 261 minutes on May 2017. Figure 1.

Conclusion/lessons learned

Having a standard transfer process, early transfer decision with facilitated communication have a significant impact on the transfer process time. Much more attention should be paid to all process steps to reach the intended improvement (all or none). Stakeholders and leaders play a great role in executing interventions needed to improve. To sustain the improvement, approved departmental policy and procedure was developed and the standard transfer process map is included in PICU rotating resident orientation logbook.

Figure 1: Monthly average transfer time (minutes) throughout the project in relation to the applied PDSA: Aug 2016 – June 2017.
Knowledge toward Prescribed Medications for Dialysis Patients at King Abdulaziz Medical City: A Cross Sectional Survey Research

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Problem

Patient counselling among pharmacists varies from attitude and knowledge perspective, in addition different factors might affect the outcome, and as a consequence it will affect patient and medication safety.

Background/context

Chronic Kidney Disease (CKD) is a progressive medical condition that ended by dialysis and its increasing annually in Saudi Arabia. There are many evidences that the pharmacists’ knowledge will affect the quality of counselling and hence will improve patient compliance. The present study assesses quality of pharmacist counselling by assessing both knowledge and attitude towards dialysis patients, it will also assess the impact of pharmacist current position, and years of experience on their attitude and knowledge.

Methods

A cross sectional survey distributed to outpatient pharmacists, clinical pharmacy residents, and discharge counselling pharmacist working at King Abdulaziz Medical City-Central Region. Institutional Review Board approval granted from KAIMRC in August 2015. The research team constructed the survey that contains three major sections, participant demographics, pharmacist attitude measures (medication appropriateness review, accepting to dispense medication to any caregiver and drug information resources used), and pharmacist knowledge measures (most common medication prescribed for dialysis patients, and dose adjustment). The survey validation and reliability done on five pharmacies were Cronbach’s Alpha was 0.72. The data was compiled in excel sheet and exported into SPSS (IBM Statistics Program version 22) to run the statistical analysis using Non-parametric Chi-square test.

Results

Total of 85 quesitonsnaires distributed with response rate of 66.65%. More than 42% of the hospital pharmacists show optimal attitudes toward the dialysis patients. More than 31% of them choose the right answer to the questions that asses their knowledge about the prescribed medication to dialysis patients. Total of 71.2% of them usually seek drug information resources for the newly prescribed medication (Up-to-date and Micromedex Databases). Total of 66.7% of the pharmacy practice residents, 91.7% of the discharge counselling pharmacists, and 55.6% the outpatient pharmacists check patient’s laboratory results prior dispensing medications (p-value 0.001). Outpatient pharmacists with more than 10 years of experience tend to review the patient’s laboratory related findings before they dispense the medications (p-value 0.003).

Conclusion/lessons learned

Generally, most of hospital pharmacists show good attitudes toward the dialysis patients and limited knowledge about some medications prescribed for haemodialysis patients.
Knowledge and Attitude of Primary and Specialized Physicians Toward the Use of Complementary and Alternative Medicine in Medical Practice

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Problem
The use of complementary and alternative medicine (CAM) for treatment purposes in Saudi Arabia is a common practice by the public. Studies have found that using these products is not always a safe practice. Research has showed that many of CAM products could result in fatal adverse effects either when used alone or combined with conventional medicine. Health institutions are currently working on increasing the awareness of these adverse effects and the proper utilization of CAM. However, addressing the knowledge gap among healthcare professionals is still an area of demand. Thus, this study aims to assess the knowledge and attitude of primary and specialized physicians at King Abdulaziz Medical City KAMC about CAM.

Background/context
King Abdulaziz Medical City is a tertiary care centre located in Riyadh. It provides all types of care to all National Guard soldiers and their families thus it was an ideal environment to collect the research data as it has all health specialities. Our research team is a group of medical students supervised by Dr. Hind Al Modaimegh who is a Cardiology Clinical Pharmacy Specialist with an interest in the research field and patient care.

Methods
This is a cross sectional study based on an interview structured questionnaire that was validated through pilot testing and distributed among physicians in the following fields at KAMC; Internal Medicine, Family Medicine, Surgery, Pediatrics, and Obstetrics and Gynecology. We included physicians from both genders, any nationality, and excluded all physicians who have not been practicing for more than one year. The minimum sample size required was 231. All the data were entered and analysed by SPSS software version 21. A confidence interval of 95% was used and a P value less than or equal 0.05 is significant.

Results
The research team was able to interview 220 physicians from different specialties and occupation with a response rate of 95.5%. The overall results were that the majority of participants (73.7%) had a poor knowledge about CAM. Also, it was found that there is no correlation between the level of knowledge and the specialty (P=0.26). Unlike Saudi physicians who believe in the beneficence of CAM, non-Saudis tend to have a more negative attitude toward this practice (P= 0.023). Resident and newly practicing medicine physicians had more positive attitude toward CAM compared to physicians with long history of practice (P= 0.037). Almost 50% of our participants have obtained some knowledge about CAM from websites, books, and EBM articles. 81.1% of the physicians insisted on the importance of receiving formal education about CAM.

Conclusion/lessons learned
In conclusion, we recommend that education about CAM to be given in the form of seminars, lectures, or part of the medical school curriculum. We also emphasize that this education should not be given to certain medical specialties as our result showed that the knowledge and attitude toward CAM does not have a correlation with specialty.
Early Extubation Failure in Very Low Birth Weight Infants: Clinical Outcomes and Predictive Factors

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Problem

• What was the problem? Safety of early extubation (within 3 days of life) in sick preterm infants.
• How did you know it was a problem? Increased rate of re-intubation within few days with a subsequent increased rate of morbidity and mortality.
• Who was being impacted by the problem? Sick preterm infants with birth weight of ≤1500 gram
• The study was performed in the department of Neonatal Intensive Care at King Abdulaziz Medical City- Riyadh- KSA.

Background/context

Mechanical ventilation (MV) and surfactant are life-saving therapeutic measures for respiratory distress syndrome in premature infants. Prolonged MV is potentially harmful; therefore, early extubation is desirable while avoiding extubation failure. The objective of this study was to identify the clinical outcomes and the potential predictive factors of early extubation failure (EEF) in very low birth weight (VLBW) infants.

Methods

A retrospective study of VLBW infants admitted to the neonatal intensive care unit (NICU) over fifteen years. Neonates were intubated and mechanically ventilated on the first day of life, and early extubated within the first 3 days. EEF was defined as the need for re-intubation within 3 days of the first extubation. A composite outcome of mortality or any major morbidity (grade 3-4 intraventricular haemorrhage or periventricular leukomalacia; stage 3-4 retinopathy of prematurity, moderate-severe bronchopulmonary dysplasia or stage 2-3 necrotizing enterocolitis) was assessed.

Results

In total, 394 infants were extubated early. Of those, 347 (88%) had early extubation success (EES), whereas 47 (12%) had EEF. Incidence of the composite outcome was significantly higher in the EEF group than the EES group, even after adjusting for confounding factors. Logistic regression indicated that birth weight< 1000 g (p< 0.01), administration of ≥2 doses of surfactant (p< 0.01) and administration of ≥ 2 inotropic agents (p< 0.01) were all significantly associated with EEF. The area under the curve (AUC) for the combination of these three factors (AUC= 0.77) indicated significantly higher predictive value (p < 0.01) for EEF in VLBW infants, compared with individual factors (AUC= 0.59 for ≥ 2 inotropic agents, AUC = 0.64 for birth weight ≤ 1000 g and AUC = 0.66 for ≥ 2 doses of surfactant) (Figure).

Conclusion/lessons learned

EEF is associated with poor clinical outcomes in VLBW infants. The combination of birth weight and the requirement for surfactants and inotropic agents can predict EEF.
Influence of In Vitro Fertilization on Neonatal Outcomes of Very Low Birth Weight Preterm Infants

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Problem

- What was the problem? Safety of In Vitro Fertilization (IVF) in infants who are born with prematurity.
- How did you know it was a problem? Worldwide, this topic has been explored in limited societies. However, in our community, such data do not exist and might be different due to biological factors, therefore this was the first study conducted in Saudi Arabia to explore the safety of this prevalent fertility treatment on morbidity and mortality of preterm infants.
- Who was being impacted by the problem? Preterm infants, their families and our health system.
- The study was performed in the department of Neonatal Intensive Care at King Abdulaziz Medical City- Riyadh- KSA.

Background/context

In Vitro Fertilization (IVF) has become widely accepted treatment for infertility. However, there are increasing concerns for risk of adverse outcomes such as preterm birth and birth defects among IVF children. Furthermore, prematurity remains an important risk for many adverse neonatal outcomes. Thus, parents presented with a preterm birth following IVF are subjected for double burden. Currently, clinical outcomes of premature infants born after assisted and natural reproduction have been described in limited studies with conflicting results. Therefore, it is important to explore a wider range of relevant and accurate information to facilitate counselling of affected families. The purpose of this study was to assess the impact of IVF on neonatal outcomes and duration of stay in neonatal intensive care unit (NICU) among very low birth weight (VLBW) preterm infants who were admitted to our NICU over Fifteen years (2000 – 2014).

Methods

This was a cohort study of VLBW preterm infants admitted to NICU over fifteen years. Clinical data for eligible infants were abstracted from medical records. We assessed neonatal outcomes, including composite outcome of mortality or severe morbidity (severe brain injury, retinopathy of prematurity, bronchopulmonary dysplasia and necrotizing enterocolitis), risk for major birth defects, survival without severe morbidity, and the duration of NICU stay. Multivariable logistic and linear regressions were used to investigate the association between neonatal outcomes, duration of NICU stay and IVF conception after adjusting for confounders.

Results

A total of 1533 infants were eligible for data analysis. Of these, 236 were born following in vitro fertilization (IVF group) and 1297 were born following spontaneous conception (SC group). The rate of antenatal steroid use was higher, and the rates of caesarean section and multiple births were more frequent, in the IVF group than in the SC group. Regression analysis revealed no statistically significant differences between IVF and SC groups in terms of composite outcome of mortality or severe morbidity, risk for major birth defects, survival without severe morbidity, or duration of NICU stay (Table).
## Conclusion/lessons learned

Among VLBW preterm infants, IVF had no detectable influence on neonatal outcomes and duration of NICU stay. These findings can help provide guidance in professional counselling of affected families.
Complications of Mechanically Ventilated Patients in Intensive Care Units of King Abdul-Aziz Medical City

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Problem

Mechanical ventilation is considered as one of the important life saving device in acute care situations. Even though its use is crucial, it is not free from complications which may extend from treatable to life-threatening complications. This study is to know complications associated with mechanical ventilation in King Abdul-Aziz Medical City (KAMC).

Background/context

Mechanical ventilation provides artificial respiration to patients who require oxygenation and removal of carbon dioxide by means of an artificial airway. It is also used to protect airway in those patients who are airway compromised. While Mechanical ventilation is opted for life saving purpose, it can cause detrimental effects also. Even though many studies have been conducted throughout the world regarding Ventilator associated Pneumonia as one of life threatening complication of mechanical ventilation (MV), there lies a paucity in data regarding other equally important complications of MV where negligence can make the life of the patient fatal. So the aim of this study is to determine the complications and outcome related to Mechanically Ventilated Patients in ICUs of KAMC.

Methods

A quantitative retrospective study conducted in various intensive care units of King Abdulaziz Medical City, Riyadh. A total number of 190 patients which includes both male and female of age between 18 and 70 who were admitted in various adult ICUs considered. Data like diagnosis, date and time of intubation and mechanical ventilation, duration of mechanical ventilation, modes and settings of ventilator, complications associated with mechanical ventilation, blood gas values, vital signs, date of extubation and length of ICU stay etc. were collected from electronic medical records.

Results

Out of the total population 114 (60%) constitute males & 76 (40%) females. The majority (n= 25, 13.2%) was diagnosed with COPD, burns (n= 16, 8.4%) cardiac arrest (n=15, 8.4%), ARDS (n= 15, 7.9%), shortness of breath (n= 15, 7.9%) respectively & the major reason for intubation was desaturation (n= 34, 17.9%) & loss of consciousness (n= 22, 11.6%). There were very few complications present in these patients in which the main complication was VAP (n= 15, 7.9%), atelectasis (n= 7, 3.7%) and pneumothorax (n= 4, 2.1%).

Conclusion/lessons learned

Even though there were a very few complications in mechanical ventilation, this study revealed ventilator associated pneumonia (VAP) as the major complication. Furthermore, this study found proportionate increase in length of hospital stay with an increase in complication.
Epidemiology and Management of Brucellosis at King Abdulaziz Medical City, Riyadh

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Problem
Brucellosis, a zoonotic disease caused by various species of the genus Brucella, has a world-wide distribution. In Saudi Arabia there was some evidence that brucellosis does occur in sheep, goats, cattle and humans. Our poster describes surveillance conducted during the period in 2015 to determine epidemiology and clinical management.

Background/context
Population covered by NGHA hospital in Riyadh is (700,000) surveyed for the development of brucellosis.

Methods
The database of brucellosis 2015 in public health section, infection prevention and control department was utilized to extrapolate the following variables age, gender, treatment, mode of transmission.

Results
Total of (228) cases were reported. The majority of cases were above 31 years (146). The majority of cases male (164). Regarding to the treatment, 163 (71%) were treated and 65 (29%) not treated, because of they are ineligible treatment at NGHA, no show on the appointment, they followed in private clinics, did not answered our phone and provided incorrect phone number. (214) of cases had a brucellosis because of unpasteurized dairy products.

Conclusion/lessons learned
There is a significant number of brucellosis cases reported in National Guard population, therefore is a need of aggressive public health campaign to prevent or minimize infections. Our program should partner with national effort in the Control and prevention of brucellosis in animals and humans in Saudi Arabia, working along with MOH.
Burden of Community-Acquired Infections at Tertiary Care Setting: A Point Prevalence Survey

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Background/context

Unlike healthcare-associated infections (HAIs), community-acquired infections (CAIs) are not traditionally the focus of hospital surveillance. The National Healthcare Safety Network (NHSN) surveillance modules classify infections diagnosed in the first 2 days of admissions as present on admission (POA). The objective of the current study was to identify the burden, types, and causative organisms of POA infections at a tertiary care setting.

Methods

PPS was conducted on May 11 2017 in 6 MNGHA hospitals located in different regions of Saudi Arabia. The records of all admitted patients at 23 intensive care units (ICUs) and 93 wards during the PPS day were reviewed by 28 trained infection control professionals. Active HAIs meeting the POA definition of NHSN were recorded. Early (within 2 days) diagnosis of SSI, post-discharge clostridium difficile infection, and infections developed in patients transferred from another hospital or readmitted after recent (within 2 days) discharge were not considered POA.

Results

Out of 1666 patient records reviewed, 126 (7.6%) POA infections have been identified among 115 patients. While 85% (107/126) of the POA infections were diagnosed in wards, the point-prevalence was not significantly different between wards and ICUs (7.3% vs 9.2%, respectively, p= 0.346). The point-prevalence was significantly higher (p< 0.001) among paediatric patients (17.5%) compared to both infants (3.0%) and adults (6.6%), with no gender difference (p= 0.376). The most common types of infection were pneumonia (19.8%) and skin and soft tissue infections (19.8%), followed by urinary tract infections (15.1%), upper respiratory infections (9.5%), gastrointestinal infections (7.9%), bone and joint infections (7.1%), and all other infections (20.6%). Organisms were identified for 80 (64.3%) infections with the most common were Escherichia coli (23.5%), viruses (19.4%), staphylococcus aureus (13.3%), and pseudomonas spp. (8.2%). Approximately 70.6% of the patients had one or more comorbidity and 49.2% had an inserted device at the time of diagnosis.

Conclusion/lessons learned

We are reporting a high community contribution to the infection burden at a tertiary care setting, especially among paediatric patients. The finding may show the importance of involving the community in any strategies aiming to reduce the impact of hospital infections such as antimicrobial use and bacterial resistance.
Awareness of Patient Safety Culture Among Health Care Workers In Primary Healthcare Centres, Dammam 2016

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PhMinistry of Health

Problem

Very little is known about patient safety culture in Saudi Arabia. Some data are available about Saudi hospitals but no data were available about primary health care centers. We need to quantify the extent to which primary health care centers’ culture support patient safety.

Background/context

Patient safety is an important component of health care quality. Safety culture plays an important role in the approach towards greater patient safety in health care settings, with a continuous need to improve quality of health care, there is an increased recognition of the importance of a culture of patient safety. Development of positive patient safety culture (PSC) improves patient safety in primary healthcare centers. There is a need to quantify the extent to which primary health care centers’ culture support patient safety, in order to identify opportunities for improvement of patient health care and in the planning of effective patient safety measures among health care workers in primary health care setting.

Methods

A survey was conducted to measure patient safety culture among healthcare workers (HCW) in primary healthcare centers in Dammam in 2016. Agency for Healthcare Research and Quality (AHRQ) Medical Office Survey on Patient Safety Culture self-administered questionnaire was used to conduct a cross-sectional survey. All HCW in all government PHC in Dammam region were requested to participate in study. PSC dimensions were calculated as average score of the items per dimension. AHRQ 2014 data was used to conduct international comparison.

Results

A total of 411 respondents participated in study with response rate 82%. Overall rating on patient safety culture for the study was 47.8%. The dimension “Teamwork” had highest positive response rate 84.7% and dimensions: “Communication about error”, “Communication openness” and “Work pressure and pace” had lowest positive score, with each scoring below 50% average 49.1%, 41.9% and 35.1% respectively. 47 out of the survey’s 58 items had a lower percentage positive response in Dammam’s compare to AHQR 2014.

Conclusion/lessons learned

Our findings indicate that an effective patient safety culture should be initiated and implemented in primary healthcare centers in Dammam. Further research is required for more assessment of PSC in PHCs.
Universal Newborn Hearing Screening (UNHS): A Basic Non-invasive Method In Detecting Hearing Loss

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Problem

Early identification of hearing loss and subsequent aural rehabilitation offered to those who have permanent hearing impairment is vital to ensure an individual's normal development in language, learning and psychosocial domains.

Background/context

Hearing loss occurs in approximately 1 to 3 per 1000 newborn infants in the well-baby nursery population (Erenberg et al, 1999). Methodologies for screening that have been implemented in Prince Muhammad Bin AbdulAziz Hospital in Medina, involve the use of automated transient evoked otoacoustic emissions (ATEOAE) and automated distortion product otoacoustic emissions (ADPOAE) which performed by trained nurses.

Infants with known risk factors or failed the initial screen on two separate occasions are referred to the Audiology Clinic for the automated auditory brainstem response (AABR) and diagnostic auditory brainstem response (DABR).

Methods

23 nurses in the postnatal ward performed the ATEOAE and ADPOAE on 1845 newborn infants post 12 hours of life from May 2016 to December 2017. The initial screen using the ATEOAE was performed once on infants if the result indicated 'PASS' in which case the patients would be discharged without further testing.

Nonetheless, the ATEOAE would be repeated after a short time interval if the finding showed 'Refer' thus, the ADPOAE test would be performed if the second screening remained unchanged. If all attempts of rescreening continued to show 'Refer', the AABR and DABR would then be performed by the audiologist.

Results

The data indicates that 71.1% (n = 1312) of infants showed a 'Pass' result following their first and or second screen in the postnatal ward. In contrast, 28.9% (n = 533) had a 'Refer' result with only 0.6% (n = 3) patients were positive having permanent hearing impairment which required an audio logical rehabilitation.

We wished to reduce the referral rate to Audiology since some of the samples were affected by the non-ideal test conditions such as extraneous background noise, the presence of middle ear effusion and also a logistical constraint as the machine was shared throughout the hospital.

Conclusion/lessons learned

Infants who had ‘Refer’ result in the initial hearing screen were mostly found having satisfactory hearing after appointments with the audiologist.

Poor test procedures contributed to the high referral rate to the audiology. Therefore, assigning fulltime screener in a designated soundproof room for the specific task is recommended.
Central Line Associated Blood Stream Infection, Prevention Through Behavioural Change for Higher Reliability

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Background/context
Patients with central venous access devices are at high risk to develop Central line associated bloodstream infection (CLABSI) which is one of the common hospital acquired infection across intensive care units (ICUs)

Methods
We started an interdisciplinary team and a multi-faceted approach based on process mapping to drive changes and standardize practices. The aim was zero CLABSI by end of 2015. The CLABSI team, as part of the Armstrong Institute fellowship program in 2014 implemented multiple strategies to reduce CLABSI rates through habit change. These strategies included: an inter-disciplinary team, review/update policies and procedures, education and competency training for central line insertion and maintenance bundles, insertion carts standardization, learn from defect tools and sharing data with frontline staff. To simplify the process, standardize supplies, insertion carts, and use of Curos were introduced.

Results
There was a reduction in femoral line use. Maintenance bundle compliance increased from 80% to 90%. The CLABSI rates decreased from 5.5 to 1/1000 device-days, in the pre- and post-intervention periods, respectively (P= 0.014). Medical, Surgical and Pediatric ICUs had no CLABSI for > 365 consecutive days.

Conclusion/lessons learned
There was a significant reduction in CLABSI rate and neonatal ICU who had the highest CLABSI Rate during 2017 implemented CUSP project to reduce CLABSI rate and managed to maintain CLABSI free for more than 300 days.
Pattern of Dermatological Disease Encountered in Hematology Ward, A Retrospective Analysis of Dermatology Consultation In Hematology Ward In Tertiary Care Center In Saudi Arabia

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Background/context
Dermatology is primarily based on outpatient services; however, dermatologists play an integral role in the care of inpatients in multidisciplinary teams. Dermatological manifestations are very common in hematological patients which could result from infection, malignant condition or chemotherapy. The aim of this study is to identify the most common dermatological problems encountered in the adult hematology ward at King Abdullah Specialist Children Hospital (KASCH).

Methods
This was retrospective chart review of 78 dermatology consultations generated on electronic health records for all inpatients in hematology wards between January 2016 to December 2017 at KASCH. Data was described using mean ± SD for continuous variables. P-value <0.05 was considered significant.

Results
During the study period, a total of 1391 inpatient were referred to the Dermatology department. 403 (28.9%) were from the internal medicine department and 78 (5.6%) were from the hematology department 6 of which was rejected by dermatology. Almost all referral requests were replied on the same day or the next day with only two requests were replied after three days. Females were more (n= 40; 51.3%) than males (n= 38; 48.7%). The average age of patients ± SD was 40.7 ± 19.8 years ranging from 15 to 95 years. The majority of patients were Saudi with 5 (6.41%) patients non-Saudi. Patients were diagnosed with a diverse hematological disease outlined in Table 1. A total of 98 differential diagnoses were made by dermatologists with only 26 being confirmed by a skin biopsy in Table 2. The diagnoses were changed in 12 cases after skin biopsy. Multiple types of dermatitis were diagnosed in hematological patients like stasis dermatitis and contact dermatitis. The source of infection was not specified in most of the infection cases and was treated empirically.

Conclusion/lessons learned
Hematology inpatients complain of various dermatological disorders and cutaneous manifestations with graft versus host disease and morbilliform drug eruption being the most common dermatological conditions. A future study is recommended for a longer period with a large sample size to draw more valid conclusions based on a bigger population.
Improving Hand Hygiene Compliance In Emergency Unit at Prince Mohammed Bin Abdul-Aziz Hospital and Corona Centre (PMAH) In Riyadh

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Problem
The data analysis indicated that the hand hygiene compliance rate among hospital staff is low putting both patients and healthcare providers at risk. More specifically, the hand hygiene compliance rate in emergency unit was the lowest (reaching 46-60%) throughout the years 2016/2017.

Background/context
The project conducted in emergency department at PMAH, 500 beds tertiary hospital in Riyadh. Hand hygiene considered to be the first step in all infection control programs, and the primary effective measure to prevent health care-associated infections (HCAIs). Those infections are common serious problem in hospitals worldwide since they might significantly affect the quality of care by increasing length of stay, healthcare costs, and mortality and morbidity rates along with many other risks to both patients and healthcare providers. The overall aim of this project was to increase the compliance hand hygiene among emergency staff to 90% over three month’s period.

Methods
Multidisciplinary team has been formed to address the issues of low compliance with hand hygiene practice. The Team used different quality tools including brainstorming, fishbone diagram process mapping. Two interventions were tested using PDSA cycles: The impact of displaying visual reminders and providing of nurses and physicians pocket-size hand disinfectants on working in Emergency department (triage area and ACU). Data collected daily by direct observation of 20 opportunities /day, during day shifts, and presented on run chart.

Results
As the run chart shows, the compliance of emergency staff with hand hygiene had noticeably improved as result of the project interventions reaching 75% compared with the baseline less than 46% and progressing well towards achieving the project 90% compliance, see the chart below.

Conclusion/lessons learned
Although the aim to reach 90% compliance was not reached, the project resulted in a very good increase from 0% compliance as the lowest rate, up to 75% compliance rate. The plan is to sustain and improve the results by expanding the team to help in testing other change ideas in all emergency areas, and once the goal of 90% is reached we will implement and spread the changes throughout other wards.
Improving Bed Utilization by Moving Autologous Stem Cell Transplant To Outpatient Setting


King Abdulaziz Medical City, Riyadh, Saudi Arabia

Problem
Hematopoietic Stem Cell Transplantation (HSCT) requires the administration of conditioning chemotherapy resulting in myeloablation and pancytopenia. Thus, recipients of HSCT at King Abdulaziz Medical City– Riyadh (KAMC-R) were admitted to undergo this intensive therapy and monitoring due to heightened risk of infection and bleeding. With expansion of the program, we frequently encountered delays in admission due to scarcity of beds.

Background/context
The HSCT program at KAMC-R was inaugurated in 2010 to treat a variety of malignant and benign diseases. The program progressively expanded and a total of 300 patients have received transplants to date with a median of 22 day admission. The oncology day care unit (DCU) at KAMC-R is well established and was considered as feasible preference to host HSCT cases. Our aim was to perform HSCT as an outpatient for selected patients to enable us to continue program expansion.

Methods
A multidisciplinary team including physicians, nursing staff, pharmacist, and other support services gathered multiple times to brainstorm ideas to ensure the safety of the new initiative. The potential risks and benefits of the new practice were explored through numerous cycles of PDSA to test the set of the initiatives. Several interventions and changes have been made to achieve the goals such as; Modifications of the oncology day care unit settings, changes in the chemotherapy preparative regimens, developing patient educational materials and alert card, initiation of emergency beds in the stem cell transplant inpatient unit. After stringent patient selection criteria, the date for go alive was set for January 2017.

Results
The objectives of this quality improvement project were met through safely performing outpatient ASCT for selected group of patients. The first case of Multiple myeloma patient underwent outpatient HSCT was in the first week of January. The patient received his conditioning regimen followed by stem cell infusion in the DCU, and was later followed daily including weekends. He was subsequently admitted to the hospital on the 7th day following stem cell infusion due to fever and suspected infection. This pilot case permitted us to save 11 inpatient days resulting in a reduction of the total cost of the procedure by approximately than 40,000 Saudi Riyal per case. It is estimated that in 2018, we will perform approximately 20-25 cases in the outpatient DCU with significant cost reduction to the program.

Conclusion/lessons learned
Outpatient HSCT for selected patients appears to be feasible and safe at our institution. Although the project is in its early stages, the initial outcome is encouraging and allowing for future program development and expansion. Multiple steps have been taken in consideration to sustain this plan on the long run.
Improving Bed Utilization by Moving Bone Marrow Harvest Procedure To Outpatient Setting


King Abdulaziz Medical City, Riyadh, Saudi Arabia

Problem
Bone Marrow Harvest (BMH) is a medical procedure used to collect stem cells necessary for hematopoietic stem cell transplantation (HSCT). It is typically performed in the operating theatre under general anesthesia and requires post-operative monitoring for potential side effects. At the inception of the HSCT program, donors were admitted for a median duration of 2-3 days in order to perform BMH. However, with program expansion, the scarcity of inpatient bed availability was a frequent cause of delayed procedures.

Background/context
Progressive expansion of the HSCT program at King Abdulaziz medical city-Riyadh (KAMC-R) with 98 transplant cases performed in 2017. Furthermore, adult donors for pediatric recipients were performed by the adult HSCT team thus further increasing demand. Our aim of this quality improvement project was to explore the possibility of performing BMH as an outpatient procedure without compromising efficacy thus avoid delays and enhance access of our program to new referrals. The oncology day care unit (DCU) at KAMC-R is well established and was explored as a feasible preference to host this new initiative.

Methods
A multidisciplinary team was formed and a pathway of the necessary steps for this new initiative was generated. Representatives from the medical, nursing, quality as well as stem cell laboratory were involved and supervised by the leadership of the program. The potential risks of this initiative were explored through several cycles of PDSA. Order sets and processes were modified to be more compatible with the outpatient setting.

Results
The project was executed over one year during which a total of 13 BMH procedures were performed in the outpatient setting. During the first PDSA cycle, one donor was successfully collected through the Oncology DCU. We encountered a logistic challenge with patient registration so the program was held for three months until the issue was resolved. In the second PDSA cycle, three patients underwent the procedure as outpatients. In the third cycle, a modification of the checklist led to successfully complete BMH procedures for 9 patients without any major adverse events. All donors were discharged from the clinic on the same day without major adverse events. We estimate the cost saving to the institution of around 8000–10000 S.R per case accounting to a total of 104,000–130,000 since the inception of the program. Such resource saving coupled with other factors permitted us to serve more patients in a timely fashion where the number of HSCT cases completed in 2017 have doubled compared to the previous year.

Conclusion/lessons learned
Performing BMH in the outpatient setting is feasible, safe and cost effective. Such initiative enabled us to increase program capacity thus further enhancing the program efficiency leading to improved access for serve the population. Other on-going initiatives are underway as well.
Reducing Interruptions During Administration of High Alert Medications

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Problem

It is widely known that latent failures such as distractions and interruptions increases the risk of medication error in healthcare. Nurses were experiencing many interruptions during medication administration times and narcotic counting at handover. It was observed Nurse B often went missing during the medication administration time, and so waiting for them to return was delaying administration of medication to the patient. Risk for medication error was noted to be high at time of observation, as call bells were being answered, telephone calls taken, physician requests taken, family and sitter interruptions, and patient interruptions all noted during administration time. Preventative initiative rather than Re-Active.

Background/context

This project involved all members of multidisciplinary team and was initiated in King Abdulaziz Medical City (KAMC), Riyadh. Liver step down unit ward 32, 11 beds then progressed to King Abdulaziz Specialist Children Hospital (KASCH), Organ Transplant unit/Ward 50 24 beds. Nurses involved in administering high alert medication were observed for any interruption throughout the process – from preparation to administration. It should be noted this was a proactive initiative and in line with Joint Commission International - International Patient Safety Goals - Improve the Safety of High-Alert Medications (IPSG 3).

Methods

Nurse A and Nurse B will wear Red Vests during narcotic counting at handover times and during High Alert Medication Administration. The Vest states in English and Arabic (orientation to patient and family on admission) that he/she is giving medication and to please do not interrupt. Nurse A and B will stay with each other all throughout the process from medication room to patient’s bedside until procedure is finished and documented. All Nursing and multidisciplinary Teams on the unit aware of the initiative and the impact of this intervention on enhancing patient safety. When needed, the patient and family to be informed regarding the meaning of Red Vests. Nurses and others will not interrupt those wearing Red Vests for any reason and will filter and manage phone calls, call bells, physicians needs related to the two administering nurses during this time. ‘NARCOTIC COUNT IN PROGRESS’ poster placed on Medication Door during Handover time. We have responded pro-actively to observed risky behaviors especially answering a call or question during medication administration times.

Results

Observation has shown that interruptions during medication administration has been reduced. The reduced flow of traffic in and out of medication room has enhanced the safety of the narcotic count. We have achieved ZERO high alert medication administration errors in 2017 by implementing this change. This initiative was adopted by all inpatient units in KASCH on 21st January 2018.

Conclusion/lessons learned

We noticed a lot of interruption during medication administration especially during high alert medication administration and narcotic. To prevent any occurrence of high alert medication administration error, we started pro-actively this project and since the implementation we did not report any high alert medication error. The impact this patient safety initiative has on promoting safe patient care is tremendous. Medication administration errors involving high alert medications are a significant cause of patient harm in healthcare. Due to the success of this project in Ward 50, KASCH, it has been spread throughout the entire hospital to ensure all our patients benefit from the positive impact this project has had in terms of preventing patient harm from high alert medications.
Strategic Planning In Implementing Pediatric Early Warning System and Its Impact On Nurses Compliance Toward Safe Nursing Care

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Problem
In last JCIA accreditation visit in 2015, it was recommended to introduce alert tool for registered nurses to recognize patients at risk for clinical deterioration and to provide immediate needed assessment and care in a timely manner.

Background/context
• Evidence showed that Pediatric Early Warning System improves safe patients’ hospitalization by alerting registered nurses to recognize early signs and symptoms of deterioration in patient clinical condition.
• This project took a place in all pediatric in-patient units.

Methods
Nursing services– KASCH in collaboration with Pediatric department introduce electronic alert system for registered nurses. Multiple PDSA cycles used for this initiative. Implementation plan put in place to train more than 600 nurses in 12 units. There were four modules used for training:
• Unit-based training which 45 minutes in-service was.
• Simulation based training.
• Awareness campaigns.
• PEWS manual for Nurses.
Between November 2016 until May 2017, more than 70 training sessions were conducted. An audit tool was created to monitor nurses’ compliance to PEWS protocols during the roll-out and control phases with complete audit methodology. The process measures that were monitored are timely assessment of PEWS score, registered nurse escalation of PEWS score 5 and above if clinically indicated and MD review for the patient in a timely manner.

Results
During the roll-out phase compliance rate for PEWS timely assessment was 91% and 88% in following escalation protocols. After the complete implementation of PEWS on June 2017, collected data for the control phase from March till December 2017 showed compliance rate of 92% to PEWS timely assessment and 95% in escalating in a timely manner utilizing PEWS protocols. High compliance rate to PEWS protocols have positive impact on patient safety through early detection of deteriorating patients and early intervention and it improves communication amongst health care providers.

Conclusion/lessons learned
Pediatric Early Warning Signs implementation in KASCH went successfully and showed high compliance rate and proper utilization of the tool. Training modules were adopted by MNGHA-Dammam to support nursing staff in PEWS implementation for the year 2018.
The Power of the Process Map to Improve Communication Among Healthcare Providers

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Problem

Healthcare providers are skillful in their scientific arena. However, discussions about the processes, intention for re-designing services or developing new ones are carried out on traditional ways; where several meetings held and drafted minutes are distributed post adjournment which lack any visual aids that could be explained on one or two pages if a process map was used and called discussions reduced to the minimal.

Background/context

At the Department of Oncology, meetings usually take place by multi-disciplinary team from other practices, however, the attendees reflect the process within the capacity of their service boundaries verbally that they are willing to describe/develop. At the end, these meetings end with memorandum where the agreement drafted on narrated type of sequenced communication which usually hindering the immediate proper understanding of the processes. The main goal is to orient and train the staff on using the different types of process map.

Methods

The process map as quality improvement tool has been presented by Quality Specialist at general departmental meetings, some task force committees and one-to-one training sessions. Using the Survey Monkey’s tool, a six survey questions were sent out to evaluate individuals’ perceptions that they involved directly or indirectly at one of the activities where the process map used as a tool of communication.

Results

The following table shows the perception of the participants at which extent that the process map tool when used has improved the communication in their working area:

<table>
<thead>
<tr>
<th>Choices</th>
<th>Answered</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>visual understanding of the whole processes in a simple professional way</td>
<td>39</td>
<td>75 %</td>
</tr>
<tr>
<td>helpful on identifying and communicating problem in more effective way</td>
<td>38</td>
<td>73 %</td>
</tr>
<tr>
<td>Helped me to understand my role among the team</td>
<td>32</td>
<td>61.5 %</td>
</tr>
<tr>
<td>provides the required documentation process activities</td>
<td>24</td>
<td>46 %</td>
</tr>
<tr>
<td>Started developing process map at my working area</td>
<td>19</td>
<td>36.5 %</td>
</tr>
<tr>
<td>I feel NO improvement</td>
<td>3</td>
<td>5.77 %</td>
</tr>
</tbody>
</table>

• Total Participants are (52)

Conclusion/lessons learned

Our study revealed a positive input on the majority of respondent who gets exposed to training on the process map. Integrating visual aids on conducting meetings and delivering ideas would facilitate communication easier and within short period of time. Clinical practice guidelines and patient navigation pathways are vital processes where they could be reflected in process maps. Future plan; to provide hand on training to help trainees develop an actual process maps for real project.
Bacterial Contamination of Healthcare Workers’ Mobile Phones In A Tertiary Care Center In Saudi Arabia

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Problem

Mobile phones provide healthcare workers (HCWs) with faster communication and quick access to information, hence, they are usually kept near-at-hand. Some hospitals are even using mobile phones instead of pagers. There are currently no guidelines on mobile phone cleaning and handling in the medical field. Whenever HCWs use their mobile phones, they may transmit organisms from their hands to their mobile phones. As a result, HCW’s mobile phones serve as reservoirs for these microorganisms that could be easily transmitted back to the HCW’s hands. In this way, mobile phones may facilitate the transmission of nosocomial infections.

Background/context

Our study was conducted in King Abdulaziz Medical City (KAMC)-Riyadh. KAMC-Riyadh is a 962 bed tertiary care center located in Riyadh City, Saudi Arabia, which is affiliated with King Saud Bin Abdulaziz University for Health Sciences. In this study, we aimed to determine the degree of bacterial contamination of HCW’s mobile phones in KAMC-Riyadh and to identify the microorganisms colonizing these mobile phones. Also, we wanted to estimate the effect of various factors (e.g. gender, position, department of the owner and age of the mobile phone) on bacterial contamination of the mobile phones.

Methods

Samples were collected from mobiles of HCW’s at King Abdulaziz Medical City, Riyadh. A swab taken from the mobile phone and a questionnaire was answered by each subject. The swabs were sent to the lab for culture, carrying a serial number to indicate the questionnaire.

Results

Of the 400 mobile phone samples, 171 (43%) showed bacterial growth. Different variables were examined. The number of male HCWs sampled was 167, 90 of them (54%) showed positive growth, while only 81 (35%) of the 223 samples taken from female participants showed positive growth (p-value= <0.005). In addition, samples were taken from phones that are frequently cleaned (226 samples) show 10% less growth than mobile phones that are not frequently cleaned (p-value = 0.049). The most commonly isolated organisms were Coagulase Negative Staphylococci, which were isolated from 121 (30%) phones of the mobile phones sampled.

Conclusion/lessons learned

More than one third of the HCWs mobile phones were contaminated by bacteria. The results support the claim that HCWs’ mobile phones may serve as vectors for transmission of nosocomial infections, and that cleaning mobile phones may reduce this risk. We recommend that mobile phone cleaning guidelines are put forth and implemented. Furthermore, the use of mobile phones should be restricted in high-risk situations.
Should We Recommend Stethoscope Disinfection Before Daily Usage as an Infection Control Rule?

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Problem

Many studies have shown that contaminated medical equipment act like vector for cross-infection. Infection control programs are effective in decreasing hospital-acquired infection rate, however, the implementation of such programs is hindered by poor compliance of health care workers.

Background/context

Different studies have shown that contaminated medical equipment have been shown in different studies to act like a vector for cross-infection.

Nosocomial infections occur at a rate of 5-10 per 100 hospital admissions each year. It was believed that contaminated medical equipment and health care staff have been implicated as vectors for the transmission of pathogenic organisms.

Our study was conducted in King Abdulaziz Medical City (KAMC)-Riyadh. KAMC-Riyadh is a 962-bed tertiary care center located in Riyadh City, Saudi Arabia. We studied the degree of contamination of diaphragms of stethoscopes at our institution.

Methods

A questionnaire was distributed among health professionals before taking their stethoscopes and swabbing the diaphragm of the stethoscope using a sterile cotton swab moistened with sterile normal saline. The samples were incubated on a blood agar plate for 48 hours at 37°C. The positive growths were subsequently identified using standard microbiological procedures. The collected samples and the given questionnaires were matched through serial numbers.

Results

The total number of health care workers (HCWs) involved in the study was 151, wherein 54.3% are females. Physicians were 79/151 and their stethoscopes were found to be the most contaminated (68.3%). The total number of contaminated stethoscopes was 72/151 (47.7%). Coagulase-negative staphylococcus was isolated from 66 diaphragms from 71 (92%).

Conclusion/lessons learned

Nosocomial infections carry a higher level of morbidity and mortality. This study showed that there is lack of god compliance with routinely disinfecting the health care workers stethoscopes. We recommend that the significance of disinfecting diaphragms of stethoscopes should be clarified to health care workers.
Bronchial Asthma Pathway

Adel Al Othman, Mohammed Alqahtani, Imad Hassan, Mufareh Alkatheri, Salih Binsalih, Mishael Firm

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Problem

Bronchial Asthma (BA) Protocol has been done and implemented in the Bestcare medical record system. Although it is available to all staff in KAMC to follow. However, still Physicians are not compliant with it. Patient receives variable level of medical care during their admission and may impact their care and length of stay.

Background/context

Compliance with (BA) guidelines remains poor despite of a substantial body of evidence indicating that guideline-concordant care improves patient outcomes.

The aim of this study was to compare the relative effectiveness of a general educational and a targeted emergency department intervention on improving physician’s concordance with BA guidelines. Some reports used to standardize the level care, delivered to such patients, this will affect positively, their condition and speed of recovery and discharge.

Methods

Data based on BA guidelines and protocols was collected by a Knowledge Translation Committee monitor from a retrospective patient chart review. Moreover, on-going audit to follow compliance of physician in following the pathway protocol, through the Bestcare (Patient Electronic Medical record). We check all admitted patient on daily basis to ensure who was put on protocol, targeted too one of the emergency Medical Acute Unit (UMA), where a clinical pathway form for the initial management of BA patients was introduced.

Results

A total of 57 eligible patient records were reviewed to measure concordance to BA guidelines over the study period. Data collected during educational intervention periods to compute rates of patients implemented on protocol and those treated with individual regimen shows as following:

39 (68.4%) out of 57 were put on BA protocol and still 18 (31.5 %) weren’t put on the Protocol.

Conclusion/lessons learned

Those who had the protocol had less hospitalization (shorter length of stay), FEV is better and clinical improvement, and hospital costs would be reduced. We recommend more educational training for the new residents to follow the protocol.
Impacts of Long–Term Indwelling Urinary Catheter

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Problem

Patients using long-term indwelling urinary catheter since their admission in ER without a justification in many cases. So, as result they might experience multiple recurrent catheter problems. Our management approaches the need to avoid catheter-related problems.

Background/context

The aim was to determine effectiveness of our management intervention in prevention of adverse outcomes such as (catheter-related urinary tract infection, urinary retention, monitoring urine output bed sores etc.).

Methods

To review patient electronic medical chart in the Bestcare system, to determine the indication of Foley catheter insertion. Furthermore, to review the latest result of urine culture for the patients after the date of placing the Foley’s catheter.

Results

A total of 426 eligible patient records were reviewed to measure concordance to Foley catheter guidelines over the study period. In addition, data for patient put on protocol and those treated with individual regimen shows as following:

303 (71%) out of 426 were successfully removed Foley catheter post our intervention and 123 (29 %) have contraindication to non-removable of Foley catheter.

Conclusion/lessons learned

Those who had the protocol had less hospitalization (shorter length of stay), decrease in UTI and other acute infections and clinical improvement. We recommend more educational training for the new residents to follow the protocol.

Also, we recommend that if the result shows a negative outcome, and there’s no contraindication. We ask the treating physician to remove the catheter.
Diabetic Ketoacidosis Pathway

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Problem

Diabetic Ketoacidosis (DKA) Protocol has been done and implemented in Bestcare medical record system although it is available to all staff in KAMC to follow. However, still Physicians are not compliant with it. Patient receives variable level of medical care during their admission and may impact their care and length of stay.

Background/context

Compliance with (DKA) guidelines remains poor despite of a substantial body of evidence indicating that guideline-concordant care improves patient outcomes.

The aim of this study was to compare the relative effectiveness of a general educational and a targeted emergency department intervention on improving physician’s concordance with DKA guidelines. Some reports used to standardize the level care, delivered to such patients, this will affect positively, their condition and speed of recovery and discharge.

Methods

Data based on DKA guidelines and protocols was collected by a Knowledge Translation Committee monitor from a retrospective patient chart review. Moreover, on-going audit to follow compliance of physician in following the pathway protocol, through the best care (Patient Electronic Medical record) we check all admitted patient. On daily basis to ensure who was put on protocol, targeted too one of the emergency Medical Acute Unit (UMA), where a clinical pathway form for the initial management of DKA patients was introduced.

Results

A total of 43 eligible patient records were reviewed to measure concordance to DKA guidelines over the study period. Data collected during educational intervention periods to compute rates of patients implemented on protocol and those treated with individual regimen shows as following:

34 (79 %) out of 43 were put on DKA protocol and still 9 (27%) weren’t put on the Protocol.

Conclusion/lessons learned

We conclude that implementation of a DKA pathway reduced practice variation and was associated with shorter LOS and a trend toward decreased cost and clinical improvement. Some processes of care were improved but many require additional interventions. We recommend more educational training for the new residents to follow the protocol.
Clinical Pathway for Community-Acquired Pneumonia

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Problem
Community Acquired Pneumonia (CAP) Protocol has been done and implemented in the Bestcare medical record system although it is available to all staff in KAMC to follow. However, still people (Physicians) are not compliant with it. Patient receives variable level of medical care during their admission and may impact their care and length of stay.

Background/context
Compliance with (CAP) guidelines remains poor despite of a substantial body of evidence indicating that guideline-concordant care improves patient outcomes.

The aim of this study was to compare the relative effectiveness of a general educational and a targeted emergency department intervention on improving physician’s concordance with CAP guidelines. Some reports used to standardize the level care, delivered to such patients, this will affect positively, their condition and speed of recovery and discharge.

Methods
Data based on CAP guidelines and protocols was collected by a Knowledge Translation Committee monitor from a retrospective patient chart review. Moreover, on-going audit to follow compliance of physician in following the pathway protocol, through the Bestcare (Patient Electronic Medical record) we check all admitted patient. On daily basis to ensure who was put on protocol, targeted too one of the emergency Medical Acute Unit (UMA), where a clinical pathway form for the initial management of CAP patients was introduced.

Results
A total of 103 eligible patient records were reviewed to measure concordance to CAP guidelines over the study period. Data collected during educational intervention periods to compute rates of patients implemented on protocol and those treated with individual regimen shows as following:

87 (84.4%) out of 103 were put on CAP protocol and still 16 (15.5%) weren’t put on the Protocol.

Conclusion/lessons learned
Those who had the protocol had a less hospitalization (shorter length of stay), O2 saturation and vital signs is better, safer and effective in reducing the duration of intravenous antibiotic therapy and Clinical improvement, and hospital costs would be reduced. We recommend more educational training for the new residents to follow the protocol.
How To Manage Venous Thromboembolism Risk In Hospitalized Medical Patient

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Problem
Venous thromboembolism is a significant cause of illness and death worldwide. Large bodies of evidence support the heightened risk status of hospitalized medical patients, and that prophylactic measures significantly reduce the risk of thrombosis, yet these patients often fail to receive adequate prophylactic therapy.

Background/context
This abstract briefly summarizes our understanding of venous thromboembolism risk in hospitalized medical patients. We describe our approach to the use of thrombo prophylaxis, through which we aim to minimize the disease burden of this under-recognized and preventable pathology.

Methods
We use DVT protocol through Knowledge Translation Committee which involves:
• Daily checking of the total patients on DVT prophylaxis dose, through patients’ medical records in the Bestcare system.
• Scoring patients that are eligible for prophylactic therapy but not receiving the dose, based on DVT Prophylaxis guidelines.
• Contact the treating physicians to remind them to start giving the patient the recommended dose.

Results
Out of the 1073 patients enrolled in 6 medical wards (19, 20, 22, 23, 24, 25) at KAMC over the 2017 year we found:
• 62 patients %6 are sub optimal were successfully switched to optimal DVT Prophylaxis by our KTC intervention.
• 51 patients %5 absent dose were managed to be on present dose, the following detailed diagram demonstrate the KTC intervention during 2011-2017:

Conclusion/lessons learned
Improved use of DVT prophylaxis: 45% to 73% to 79% to 82% to 86% to 89%. KTC interventions led to a further improvement and safer use of prophylaxis.
Also, to improve the rate of DVT prophylaxis in acute medical conditions were at high risk for developing VTE. However, only a small fraction of these patients didn’t receive appropriate VTE prophylaxis. Corrective measures were necessary given for preventing VTE morbidity and mortality in these high-risk patients.
Incidence and Outcome of Surfactant Therapy in Premature Neonates in ICU of KAMC

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Problem
Surfactant deficiency is one of the major complications that happen with the preterm neonates. It plays a major role in increasing the rates of mortality and morbidity among preterm neonates. Assessing the outcome of surfactant therapy in premature neonates is the main goal of this study.

Background/context
Lung surfactant plays a key role in adequate pulmonary function throughout life. Since Surfactant replacement therapy has been introduced in 1980s, it has proven its effect in premature neonates with surfactant deficiency. Since surfactant therapy is important in various respiratory conditions in premature neonates, this proposed study reviews the incidence, outcome and their clinical issues in surfactant replacement therapy. The study was done in KAMC, neonatal ICU.

Methods
The study was conducted in neonatal intensive care units of King Abdulaziz Medical City (KAMC), Riyadh. And study subjects include premature neonates undergone surfactant therapy in ICU. A sample size of 110 neonates from a population of 150 premature neonates in neonatal ICU of KAMC was selected.

Results
Out of the total number of 109 subjects, 69 were males and 40 were females. The mean gestational age was 30 weeks. The majority (n=83, 76.15%) had Respiratory Distress Syndrome (RDS). Subjects were treated with surfactant replacement therapy with either surfanta (50.5%) or Infasurf (49.5%). The mean APGAR scoring at 1 and 6 minutes was statistically significant (P = 0.001). Vital signs such as temperature (sd-0.58, P=0.017), respiratory rate (sd-15.86, p=0.001), and heart rate (sd-17.84, p =0.046) compared with improved and expired subjects and were statistically significant. Arterial blood gas in pre and post surfactant therapy was statistically significant with pH (p=0.001), Pco2 (p=0.001), and base excess (p=0.001).

Conclusion/lessons learned
The administration of surfactant therapy can improve the total outcome of premature infants with respiratory distress. This study favors early use and benefits of surfactant therapy which has proven by many other relevant articles published earlier. This study shows good results after administration of surfactants like survanta and infasurf.
Improving Breast Cancer Patients Care and Quick Access to The Breast Oncology Clinic

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Problem
Breast cancer patients were experiencing delayed diagnosis due to improper assessment or lost between clinic timing or between different specialties (Genecology, General Surgery or Medical Oncology). We reviewed our patients from their first presentation to the hospital until receiving their active treatment. Median time was 120 days.

Background/context
The median time between presentation and treatment was too long comparable with ASCO guidelines of quality assessment. We initiated a quality improving project to decrease this time dramatically. Aim was to reduce the time to access breast oncology clinic to less than 60% over one year time period and to sustain it.

Methods
We used an FOCUS-PDCA multidisciplinary approach and based on Fishbone diagram we identified the root causes of the problem, categorization, and contributing factors. We implement three improvement cycles. First, we designed outpatient breast clinic for all breast disease and to act as opportunistic screening, and filter BC cases with fast track to radiological and pathological assessment. Second, we improved OPD documentation to ensure accurate tracking of patients who proven to be malignant. Third, the clinic is moderated by oncology specialist and surgical oncology specialist as well in the same time. We implemented a department-wide standard of care to provide an early assessment of the patient once arrived and we activated quick booking in the same week to malignant proven patient. In the meantime, the breast clinic is supervised by rotational scheduled oncology consultant as reference in case of any enquires.

Results
Median time to access to breast oncology clinic was reduced to 25% between the pre-and post-intervention periods in the first six months then to 30% in the next 6 months, respectively. We are checking every 3 month for sustained action and we have generated electronic indicator from the time patient checked in until pts receive treatment, guided by hospital electronic confirmation. The Action plan initiated January 2015, we check every three months, 6 months, one year, two years, and three years were 0%, 25% 30%, 50% and 60%, respectively. On December 2017, the median reductions was 60% and have continued to improve and we are monitoring it. intervention during 2011-2017:

Conclusion/lessons learned
A strong and inverse relationship between patient delay in diagnosis and start their treatment in breast cancer patients and outcome. Our intervention did reduce the time to transfer to oncology clinic and start treatment.
The Knowledge of Infant CPR Among Mothers In KAMC

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Problem
Cardiac arrest is one of the leading causes of death globally. Cardiac arrest in neonates may not be noticed timely. It may be due to the unawareness of the mother regarding the arrest. Earlier studies conducted within the kingdom shows a lack of awareness of chest compressions among parents of neonates and infants. So, the purpose of this study was to find out the knowledge of infant CPR among the mothers in King Abdulaziz Medical City (KAMC), Riyadh and conduct CPR awareness programs based on results shown in this study.

Background/context
Cardiac arrest is a condition characterized by a sudden inability of the heart to transfer blood to the body which leads to loss of breathing and consciousness. The incidence of cardiac arrest is more common in infants while compare to other pediatric age groups. Since there is an increase in mortality rate in infant cardiac arrest, early identification of the pre-arrest scenario and its management is very important. So this study is to see the knowledge of infant CPR among mothers with an infant and their willingness to learn infant CPR in KAMC.

Methods
The study was conducted in the department of Pediatrics, Obstetrics and Gynecology in King Abdulaziz Medical City (KAMC). The subjects included were all women who had an infant in King Abdulaziz Medical City. It was a quantitative, cross-sectional prospective study design. Data was collected and documented using suitably structured questionnaire and entered in Microsoft Excel sheets and subsequently uploaded and analyzed in SPSS software version 22.

Results
The total number of females participated in this study was 255 (n=255) with a mean age of 30 years old. Out of the total subject participated in this study, 230 (n=230) which constitute (90.2%) had poor knowledge about infant CPR while comparing to 25 (n=25), which adds small population (9.8%) had good knowledge. Even though 228 (89.4%) out of 255 mothers did not attend the CPR, so far, the majority (n=205), (89.91%) of them wanted to attend or were willing to attend the course.

Conclusion/lessons learned
Although there was a high level of motivation to attend infant CPR course among mothers. Mothers' level of knowledge about infant CPR was inadequate, even among the educated mother in King Abdul-Aziz Medical City. As a result, we suggest that there must be infant CPR courses given to mothers in the King Abdul-Aziz Medical City.
Bed Blocker Prediction Score: Prospective Validation Study

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Problem

How can we identify bed blockers (long stay patients) from the first day of admission? How can we predict or forecast them earlier to prioritize service and to prevent delay in discharges?

Background/context

This study was done at King Abdul-Aziz Medical City—Western Region and was applied to all adult new admissions in medical and oncology units for the period from 1-Oct-2017 to 30-Nov-2017. Total patients involved was 471 patients. Data was collected on daily basis during the initial screening and assessment for new admissions. There was no intervention through this study. It was based on initial screening and assessment using a scoring tool which considered as part of case managers daily duties.

Methods

Study was designed in 2 phases, expectation phase and actual phase.

Expectation phase was based on total score for each patient during initial assessment. Patients were divided in 3 categories, non-bed blockers (<10 points), potential bed blockers (10-14 points) and bed blockers (>=15 points).

Actual phase was based on actual length of stay for those patients and they were categorized to 3 groups as expectation phase.

Method of calculation was to find percentage and total actual number of each category compared to expectation value in order to measure the accuracy of prediction tool. Average score was 9. Average length of stay was 14.

Results

276 actual of 289 expected as non-bed blockers with accuracy 95.5%. 67 actual of 76 expected as potential bed blockers with accuracy 88.2%. For bed blockers, expectation was 106 but the actual was of 128 with accuracy 82.2%.

Conclusion/lessons learned

• Validated score can help in early identification and forecasting bed blockers with excellent accuracy.
• Reducing length of stay.
• Synchronizes efforts of all multidisciplinary teams involved in plan of care.
• Expedite preparedness patient/family for future needs and coming over any suspected obstacles may arise during admission period.
• Help case manager to screen environmental, social, economic status and predict future needs for patients.
Implementation of Virtual Tumour Board to Improve the Process of Cancer Care, Feasibility and Satisfaction Assessment

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Problem
Tumour Board is highly recommended in the oncology field, however, it needs expertise and highly trained faculty which is not applicable in remote hospitals.

Background/context
Tumour board (TB) meetings facilitate multidisciplinary (MDT) cancer care and are associated with overall improved outcome. However, shortages of oncology staff, lack of experience, and non-implementation of international guidelines may affect the outcome of these TB and treatment decisions as well. To improve our quality care, we participated in regional and international virtual tumour board (VTB). Our aim to study feasibility and satisfaction of participating in VTB and adapt guidelines to our treatment policies.

Methods
This retrospective study was conducted including cases submitted in VTB (September 2015 to December 2017) to assess the impact of VTB program on comprehensive multidisciplinary evaluation (MDE) (all required specialists and key topics discussed), rate of completed VTB, rate of technological failures/mishaps, and its effectiveness in quality cancer care. It was implemented through videoconference technology between King Fahad Hospital Medina Munawara and Saudi Lung Cancer Society (SLCS) monthly VTB in Riyadh. Gastrointestinal VTB with Royal Marsden Hospital (RMH) United Kingdom and Mayo Clinic USA. VTB was conducted by go-to-meeting application. Our cases needed to be discussed were submitted one week before the meeting date and then we present them during VTB.

Results
Twenty cases were submitted from our department in this period. 5 cases (25%) in regional SLCS VTB and 15 cases (75%) in the international GIT VTB (10 cases 50% with RMH UK and 5 cases (25%) with Mayo clinic GI team. The frequency of SLCS Meeting was monthly and stopped in summer time, we participated on 8 out of 9 times only (88%), there was in no failure in schedule (0%) and only 5%we had communication problems. 10% had longer Case presentations and 15% lack of time for discussion. Regarding international VTB scheduled time failure was 15% with USA and 5% with UK group. Prolonged presentation 5%, and 8% in US and UK respectively. Both regional and international were highly accepted and score of satisfaction was recorded only for the international by the organizing company after each meeting and it was overall 4/5. Utilization rate of recommendations was 90% in both VTBs.

Conclusion/lessons learned
Implementation of VTB is feasible and highly accepted in the oncology field and very needed to be disseminated to decrease practice variation and ensure application of guidelines.
MERS-CoV Exposure Management In Health Care Sitting: One Year Experience

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Problem

With all our efforts to minimize health care workers (HCWs) exposure to MERS-CoV cases we are still facing good number of exposed health care workers with every confirmed MERS-CoV case.

Background/context

The Middle East Respiratory Syndrome Corona Virus (MERS-CoV) has been identified in a Saudi patient in 2012. Since the first reported case, over 1600 cases have been confirmed by Real time-PCR worldwide and over 700 deaths.

NGHA experienced the risk of exposure to confirmed MERS-CoV cases since 2012. Many HCWs been exposed to confirmed cases with or without personal protective equipment’s which had led to infect them with MERS-CoV.

Methods

Epidemiological study methodology by contact tracing applied for all four confirmed MERS-CoV cases during 2017 in our hospital.

The data collected by reviewing medical record of confirmed cases and interviewing the potential exposed HCWs. We were documenting the exposure pattern, identifying what protection health care workers had applied and whither they had developed any symptoms. All exposed health care workers were tested for MERS-CoV by real time PCR. We have conducted daily follow up till health care workers were fully cleared.

Results

We confirmed four cases admitted to our hospital during 2017 that all led to have a total of 324 exposed HCWs, 152 (46.92%) were unprotected exposes.

27 (8.3%) of the exposed HCWs developed acute respiratory illnesses (ARI) symptoms, but with negative MERS-CoV PCR test result.

Looking to the Job categories; almost half of the exposed HCWs were nurses (50.6%), Physicians represent less percentage (21.3%), (12.04%) for respiratory therapist and other HCW represented (16.06%).

Conclusion/lessons learned

We noticed there is significant number of exposed HCWs to confirmed MERS-CoV cases despite the all efforts of training and education. There is clear failure in early suspicion and identification of MERS-CoV cases due to not applying the MOH Case definition. Also, we noticed incompliance of following standard precautions and utilization of proper personal protective equipment’s (PPE’s). We think training and education of HCWs will not be enough to minimize risk of exposures and we have to implement a new approach such as accountability strategies.
An Audit of Internal Medicine Consultations and Surgical Co-Management at A Medical City in Saudi Arabia

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**Problem**

The internal medicine (IM) consultation service reviews patients when requested by other specialties. This ‘reactive’ service depends on other specialties recognizing the need for consultation and following IM recommendations in a timely manner. ‘Proactive,’ peri-operative, co-management may improve quality of care, outcomes and patient satisfaction.

**Background/context**

Co-management of general surgery (GS) patients was piloted at King Abdulaziz Medical City, Riyadh (KAMC; a 1500 bed tertiary hospital).

**Methods**

Intervention: Co-management of all medical issues in referred GS patients except drains, antibiotics, oral intake and anticoagulation. These remained the responsibility of GS. Of the GS patients referred, patients selected for co-management included those whom IM felt would benefit and those for whom GS wanted co-management. All others were managed by IM consultation.

A prospective audit of IM consultations was conducted from 18/09/16-10/11/16. This included co-managed patients. Besides standard demographic data, indication for referral, time from referral to review; data was collected on ASA grade, duration of hospital stay, reported clinical incidents (SRS), complications, CCRRT activation, admission to ICU, all causes mortality at 30 days post-op and hospital re-admission within 30 days of surgery.

**Results**

A total of 222 patients (158 Surgical, 18 Obstetric, 18 Gynecological, 28 from other medical specialties) were referred to the IM consultation team covering KAMC. The biggest single referrers were GS (63 patients; 28.4%). The most common indications were type 2 diabetes mellitus, hypertension, electrolyte abnormalities, AKI and anticoagulation. Co-management was formally requested by GS for 2 patients. Whilst 3 other GS patients could potentially have benefitted from co-management this was only recognized on retrospective case review because iatrogenic complications occurred (i.e. hyponatremia and acute kidney injury). As only 2 patients were co-managed it was not possible to perform any meaningful statistical analysis on the data.

**Conclusion/lessons learned**

Co-management was underutilized so the impact of this intervention could not be determined. It was probably underutilized because it is a relatively novel concept and it still required recognition of the need for co-management by GS and IM. The audit identified a cohort who developed iatrogenic complications and could have benefited from pro-active co-management. Whilst co-management of all surgical patients is desirable, it is not feasible or sustainable in view of limited resources. Better selection of patients for co-management could be achieved with the use of a risk prediction tool (e.g. Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity).
Does My Child Really Need A CT Scan? A Retrospective Review of Use of CT Scan In Minor Head Trauma, A Tertiary Trauma Centre Experience

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Problem

Head injuries in children are one of the common causes for emergency department visits. The majority of these cases fall under minor head trauma category with peak age of presentation at 0-4 and 15-19 years. Despite that, most of these cases did not require investigations, CT-head has been widely used to exclude serious brain injuries. There is established fact that unnecessary use of medical imaging increases the risk of radiation related complication, like cancer. This is particularly a concern for pediatric age group.

Background/context

There are various validated tools to review the need CT head in minor head trauma. Pediatric Emergency Care Applied Research Network (PECARN) rule is one the establish tool and has been widely reported to be successful in minimizing unnecessary CT scans in minor head trauma without missing serious cases who need investigation and further management. In our center, King Abdullah Specialized Children Hospital (KASCH)Riyadh, Saudi Arabia, we retrospectively looked our current practice of use of CT scan in minor head trauma and the role of PECARN rule in decreasing unnecessary imaging.

Methods

A Retrospective review was conducted on all patients under the age 14, presented to the emergency department of KASCH between April 2015 to April 2017.

The clinical data was collected from the patient’s chart reviewing the mechanism of injury while two pediatric radiologist independently reported the CT-head blindly.

Results

588 children presented to the ED with head trauma where 208 (35.4%) could be classified as minor head trauma as per PECARN clinical decision rule. All of these children had CT head performed.

Only 17 patients out of 208 (8.2%) had some positive findings on CT-head which were mainly insignificant. Only 3 patients (1.4 %) needed an admission for observation, while none of the patient required any surgical intervention.

Conclusion/lessons learned

Our study concludes that unnecessary imaging and subsequent radiation risk can be easily avoided by using validated clinical decision-making tools like PECARN rule. As a result of this study, we have started an education and awareness campaign among healthcare workers and families to decrease the use of CT head in minor head trauma. We are also in process of implementing PECARN rule to help physician in decision making and anticipating a just use of imaging which will result in better patient care and appropriate use of resources.
Qualifications and Management Skills of Personnel Working In Healthcare Quality Departments In Saudi Arabia

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Problem
Qualifications, experience and work-related skills affect performance and reflect on quality of patient care. No previous studies have been conducted in Saudi Arabia to assess qualifications and skills of staff working in quality departments.

Background/context
Quality of care and patient safety are high priority of healthcare management. Achievement of this goal relies on good performance of all personnel working in the healthcare system, with a major influence of quality staff. Ensuring relevant qualifications, experience and continuous education of quality staff is vital for success of healthcare and patient safety.

Methods
Self-administered anonymous questionnaire was distributed through google forms to staff working in healthcare quality departments in Saudi Arabia. It included questions on demographic data, qualifications, work experience and leadership and management skills.

Results
Total number of participants was 382. More than half (59.4%) were Quality Director/ manager and the remaining were members of quality department and/or Patient Safety/ Accreditation/ Clinical Risk Management. Average age was 40.85 (±8.3) years. Most participants were males (61.5%). There were 47.1% Saudi, 35.6% other Arab nationalities and 11.3% Asian. They represented hospitals of MOH (59.4%), private sector (19.9%), Armed forces (3.9%), university (2.4%), National Guard (1.8%), KFSH&RC (1.3%) and security forces (1.0%). Qualifications in quality was distributed as follow: 32.5% CPHQ, 24.9% master in quality, 21.7% diploma in quality, 7.9% bachelor in quality, 6.0% CPPS and 4.2% Doctorate in quality. Median years of experience in healthcare quality was 6 years. Majority of the participants attended CBAHI accreditation (73.8%) and 38.5% attended JCI. Self-reported skills as strong/very strong was 75.1% for leadership, 83.5% for communication, 70.7% for training/presentation, 82.2% for team facilitator, 84.8% for team leader, 79.1% for critical thinking, 68.8% for creativity, 79.1% for resilience. Most of the participants (70.2%) agree/strongly agree that they influence decision making process and 80.4% are aware of just and fair culture in healthcare.

Conclusion/lessons learned
Qualification degrees in healthcare quality departments in Saudi Arabia are variant. CPHQ (online degree) was the highest. There is need to establish training degree programs in quality and/or Patient Safety/ Accreditation/ Clinical Risk Management. Along with all required stakeholders, the national accreditation, CBAHI, can play a role in ensuring continuous education among staff working in healthcare quality departments. Leadership, training, critical thinking, creativity and resilience skills should be enhanced. Managers in healthcare should support and involve quality department in leadership decision making.
The Impact of Participation In International Quality Program (QOPI) On Improving Cancer Care

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Problem
Cancer care is associated with high risk of mortality and morbidity due to the disease and its treatment. American Society of Clinical Oncology (ASCO) developed a quality oncology practice initiative program (QOPI) that ensures patient safety via assessing physician practice and compliance with certification standards at the level of oncology outpatient clinic. We participated in this program aiming to assess our practice, benchmarked against other oncology centers and to improve our performance to meet QOPI standards.

Background/context
This project took place at Department of Oncology, King Abdulaziz Medical City (KAMC). KAMC is a tertiary, referral hospital with more than 1500 beds.
Oncology Department has six sections (medical oncology, hematology, stem cell transplant, radiation oncology, gynecology oncology and palliative care). We provide inpatient and outpatient service. Our data management and tumor registry office provide the required data for the project.

Methods
• A multidisiplinary team performed three consecutive PDSA cycles. We scored 64%, 68% in cycle one and two. Prior to cycle three, we reviewed our previous cycle report, identified the unmet measures, reviewed learned lessons and an action plan was set.
• We performed another QOPI team orientation to our electronic health record system (EHRS), and we standardized certain terms that address QOPI questions.
• We nominated team super users who are very competent (EHRS) and peer-to-peer support was created.
• We emphasized on documentation of certain parts of patient history, psychological assessment and treatment plan for chemotherapy and symptoms if there were any.
• We established double check system for charts to be reviewed by two team members before submission.
• We had two meetings with ASCO-QOPI team before our 3rd round to review the plan.
• Data for predetermined modules were abstracted from charts that were selected according to QOPI selection criteria.

Results
Our plans and procedures made significant difference, as we exceeded the benchmark score in fall of 2017 which was 93%. This made our practice eligible for certification, and we are preparing for on-site visit to assess practice compliance with certification standards.

Conclusion/lessons learned
Our result surpassed the set expectation by QOPI certificate eligibility, but we are still working on our electronic medical system (EHRS) to improve our documentation so we can assure safe practice on sustainable basis.
Promoting the Early Mobilizing and Reducing The Length Stay for Post-Surgery Patient In Pediatric ICU AT King Faisal Specialist Hospital, Riyadh

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Problem

We are in the Pediatric Intensive Care Unit (PICU) at King Faisal Specialist Hospital & Research Centre in Riyadh (KFSHRC) facing many challenges in regards transferring post-Surgery patient at early stage. 77% of post-surgery patient were transferred late on the following day. Every delay in transferring patient from PICU will impact PICU bed utilization with more surgery cases cancellation and prolonged mechanical ventilation.

Background/context

Improving length of stay has proven to have a better impact on utilization of resources and less OR cases cancellation as well as improving patient outcomes. This quality improvement project had been conducted at King Faisal Specialist Hospital & Research Centre in Riyadh (KFSHRC) in Pediatric Intensive Care Unit (PICU) aiming at decreasing LOS by adopting early transfer project for post-op and optimizing the utilization of PICU bed and avoid OR cancellation.

Methods

Quality team has been formed consisting of Intensivist, nursing staff, respiratory therapist, case manager, social services. Using the Pareto chart and fishbone cause analysis, the team has been identified the major causes of delaying the patient discharge from the PICU as following: lack of having clear process for transferring the post-surgery patient, no family member available during the transfer, and lack of staff compliance with early mobilization policy. The Model for Improvement (MFI) has been adopted for this project. The outcomes measure was the length of stay for post-surgery patient in PICU, process measure was percentage of MD who compliance for writing the Discharge order before 0900 AM, and the balancing measure was the readmission rate for the post-surgery patients. Several PDSA cycles had been run to test some change ideas as follows: PDSA #1: Call family early, PDSA #2: Write the Transfer Order for post-op extubated patient, and PDSA #3: Early extubation for intubated Post-op patient.

Results

We have collected data for 49 patients representing 20 patients before the interventions and 29 patients after the interventions as shown on the run chart below. As a result, 66% of post-op patient had been transferred on the same day and the Length of Stay median hours reduced from 23 to 7 hours.

Conclusion/lessons learned

We have managed to reduce the median length stay hours from 23 to 7 hours and improve the early transfer at the same day from only 23% of post-op patient were transferred at the same day to 66% of post-op patient has transferred at the same day. We will continue the testing step for further improvements and to maximize the utilization of PICU bed. Overall achievements are mindset of the team has changed, all the multidisciplinary team are engaged, and zero readmission rate within 24 hrs.
ISMP Self-Assessment Tool for Medication Safety Process Improvement

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Problem
Initially there was no systematic tool to review the medication safety process within King Abdulaziz Medical City (KAMC) where every department worked solely in preventing medication errors and recommending improvements. This stirred the Medication Safety Program within KAMC to utilize the ISMP’s Medication Safety Self-Assessment tool.

Background/context
KAMC is a tertiary care hospital with a 1500 bed capacity in Riyadh region alone. The ISMP is a non-profit organization that takes initiatives in medication safety improvement and had developed a self-assessment tool that would facilitate identifying opportunities for improvement, and provide institutions with a benchmark to compare experiences with the aggregate experiences of demographically similar hospitals. We have adapted this tool since 2011 as a tool of self-reflection on our process and here we report our results.

Methods
A multidisciplinary team from medication safety team, pharmacy, nursing, medical and other stakeholders involved in the medication use process meet yearly. The tool is first sent to all members to read and review before starting the annual assessment process. A team leader is assigned to fill in the demographic information, coordinate the meetings and collect data. Members review key elements with their respective department involved and select a score which is further discussed in the main meeting to verify the final score. The team leader submits the scores through the ISMP website and receive a final report. The report is reviewed and a list of prioritized medication error-reduction efforts (for those that have greatest impact on medication safety and are easy to implement) are sent to stakeholders for their action and implementation. Finally, there would be a timeframe for follow up on implementation, and the score would be graded based on implementation in the following year.

Results
KAMC weighted score increased proportionally over the last three years. The main core elements that contributed significantly to this increase over the past three years and contributed to medication errors mitigation were in the following areas: formulary management, medication device procurement, management support, and automation within the medication use process. While in contrast to aggregate data from other similar institutions revealed that we scored low specifically in areas of unit dose repackaging of less than a full tablet and sufficient access to Automatic Dispensing Cabinets.

Conclusion/lessons learned
Tools such as the ISMP Medication Safety Self-assessment are comprehensive tools that allow health institutions to reflect objectively on their medication safety processes, systematically review them and track progress and improvement over the years.
Nurses Responsibilities Regarding Medication Safety, In ELMEK NIMER University Hospital

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Problem
There are four areas regarding client safety in which nurses are at legal risk: (1) failure to monitor client status, (2) medication errors, (3) falls, and (4) use of restraints. "Failure to monitor is a basis for liability that nurses must be particularly aware of the client’s condition by frequent assessment of all clients and adherence to policy guidelines regarding assessment of clients with special needs.

Background/context
A medication safety incident is defined by the National Patient Safety Agency as any unintended or unexpected incident which could have or did lead to harm for one or more patients. These incidents can occur at each stage of the process involved in the delivery of medicines to patients.

Methods
Descriptive cross sectional design was used in this study. The sampling was selected by simple random sampling technique. Forty-four (44) nurses were selected by using simple random sample, the data was collected by questionnaire designed by researcher based on reviewing of literature, it composed of (18) closed questions, analyzes by SPSS, and presented in form of tables.

Results
In related to knowledge of nurses about definition of pt safety the result illustrated that more than half (52%) define patient safety as avoid hazard. According to knowledge about safe preparation of drug this result illustrated that more than half (53 %) of nurses prepared drug at bed side of patient.

Conclusion/lessons learned
Most of nurses had poor knowledge about prevention of medication error. Half of them prepared drug at the patient bed side, about half of nurses known and used of three checks always, about more than two third known and used of six right usually.
Sustained Reduction in the Rate of Surgical Site Infections Post Cesarean Section

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Background/context

Caesarean Section (CSEC) is the most commonly performed major abdominal operations among women in both developed and developing countries. Because of the often emergent nature of CSEC deliveries patients are at an increased risk of developing complications, including surgical site infections (SSI). Surgical site infection is one of the major complication in terms of patients’ clinical outcome, suffering as well as financial burden on the healthcare system. The rate of SSI for CSEC at our facility was significantly higher than US National Healthcare Safety Network (NHSN) benchmark of 1.84% for calendar year 2015. The purpose of this project was to bring the rate of CSEC SSI below the NHSN mean and sustain the improvement for a longer period.

Methods

SSI surveillance was conducted using CDC's National Healthcare Surveillance Network (NHSN) definitions. Denominators were collected at the end of the month via a report from the Labor & Delivery operating room census. Events were declared after 100% case review by an Infection Control Practitioner and validation by the Infection Control Coordinator. The data was analyzed quarterly. At the end of year 2015, a thorough review of basic practices was carried out and actions were taken to ensure compliance to standards required for prevention of SSI post CSEC. These practices included: minimizing the number of individuals in the operating room during the procedure, adherence to appropriate technique for surgical scrubbing before surgery, adherence to the hospital policy on antimicrobial prophylaxis especially giving antibiotics within one hour of incision and ensuring continuous supply of alcoholic chlorhexidine solution to be used as skin antiseptic for skin antisepsis.

Results

The percentage of SSI was reduced from 2.4% (2015) to 1% (2017). The rate of SSI for the year 2015 was 2.4%. The mean SSI rate in 2016 and 2017 post-implementation phase is 1.0%. There were no substantial changes in the patient population risk factors over this time period.

Conclusion/lessons learned

Monitoring of basic standards combined with appropriate and timely corrective actions can result in a substantial and sustainable reduction in cesarean section SSI. With simple and basic steps, we demonstrated a significant reduction in CSEC infections and achieved the goal of a rate below the NHSN Mean for a sustained period of time.
Assessment of The Knowledge of Sitter of Patient on Isolation

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Problem

Non compliance of sitter in patients on isolation.

Background/context

Patient sitters are very important extra set of helping hands in a healthcare setting. They usually accompany high-need patients. KAMC supports the concept of patient-sitter with an in-place appropriate policy and procedures elaborate the essential role of sitters toward isolation precautions. Healthcare workers (HCW) are responsible to educate sitters on basic infection prevention measures. For instance, hand hygiene technique, appropriate usage of alcohol hand-rub gel, explain certain hand hygiene moments and appropriate usage of personal protective equipment. The purpose behind this study is to evaluate and validate the knowledge of sitters taking care of isolated patients about infection prevention measures.

Methods

93 adult patient sitters from both genders were participated in this descriptive observational study which was conducted at King Abdulaziz Medical City-Riyadh. Participants from different units were selected, Medical, Surgical wards, and Emergency department. The data has been collected by using a questionnaire designed by the study researchers.

Consisted of three sections:
Section1: Questions covering socio-demographic characteristics designed to assess knowledge about type of isolation.
Section 2: Questions aimed to explore the participant's knowledge and attitude toward hand hygiene.
Section3: Questions that assess the participants knowledge and attitude toward personal protective equipment (PPE).

Results

68% of sitters declare that they received education on hand hygiene (HH) technique as method showed in.
28% of sitters have the knowledge of the proper selection of HH action as.
51.6% received education on the appropriate usage of personal protective equipment (PPE).
23.7% of sitters found compliant with the appropriate usage of PPE.
65.6% of sitters lack the knowledge about the isolation type of their patient.
98.9% of sitters agreed on the importance of HH effectiveness in prevention of infection.

Conclusion/lessons learned

Our study result shows significant defect in education level provided by HCWs about infection prevention measures to the patient sitters. This defect resulted in low level of knowledge and compliance to the measures. We found high attitude toward HH importance represented by 98.9% among the sitters. We believe investing more efforts to educate the sitters and improve education strategies will lead to better compliance to our policy and improve patient’s safety.
Does the Utilization of Hand Hygiene Champions Influence The Hawthorne Effect?

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Problem
The Hand hygiene compliance is very high and we believe there is Bias in Data. Non compliance of sitter in patients on isolation.

Background/context
The WHO guidelines on Hand Hygiene have been adopted at KAMC since 2007 to improve practice and reduce transmission of pathogenic microorganisms to patient and healthcare workers. The hand hygiene auditing compliance was performing by infection preventionist till the first quarter 2017 when an agreement between infection control department and nursing services to refer the auditing of hand hygiene compliance to the nursing champions whom are choosing on yearly basis in purpose to minimize bias, create transparency and credibility to the data collected, and to reduce Hawthorne effect. (is a type of reactivity in which individuals modify an aspect of their behaviour in response to their awareness of being observed).

Methods
Infection prevention and control team conducted a full hand hygiene training to each champion, include education, auditing, and calculation of hand hygiene compliance, the Audit covered areas where patient care is undertaken regularly during day and night shift including week end, 50 opportunities per ward per month 200 opportunities per quarter, Each session should be ± 20 minutes, more than one session will be required to achieve the 50 opportunities in an individual ward, these additional sessions should be undertaken at an alternative time and date.

Results

![Hand hygiene compliance (%) over time at all hospital locations of KAMC-Riyadh (Jan 2016 to Sep 2017)](image)

Conclusion/lessons learned
We have approximately the same result, whether auditing have been taken by infection preventionist or by Hand Hygiene champions, therefore the Hawthorne effect still vague and needs a further observation methodology.
Positive Impact of Sedation Standardization on PICU Patients’ Outcome

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Problem
Accidental extubation events were reported in PICU, three events in 6 months period (Jan-Jun of 2017) occurred, root cause analysis identified sedation as an issue.

There is lack of standardized practice of sedation strategy for PICU patients, which may lead to increase mechanical ventilation days and its associated complications.

Background/context
Pediatric Intensive Care Unit in KASCH is 20-bed capacity. Sedation and analgesia are necessary components for our patients, especially those requiring mechanical ventilation, to reduce pain, and agitation, and facilitate mechanical ventilation. Providing patients with adequate sedation will avoid under or over sedation, and its complications such as increased ventilation days, self extubation, etc. as proven in several studies.

The aim of this project was to develop and implement guidelines for sedation management in PICU and evaluate the impact of these as a part of quality and patients’ safety program.

Methods
This project used a pre-post design for data collection. All PICU ventilated patients receiving continuous sedation infusion were enrolled over three months for baseline data collection.

Guidelines for sedation and analgesia management for critically ill children including algorithm and assessment tools, has been implemented. In addition to key outcome variables (length of stay, ventilation time, sedation duration, successful extubation rate, unplanned extubation rate), process measures data (Sedation boluses use average, Percentage of patients under sedated, Percentage of patients over sedated) were evaluated.

Patients’ data post implementation will be collected, and analysed in quarterly per year basis.

Results
The decrease of sedation boluses requirement average prior to implementation from 8.2 Bolus/patient/day, to 5.2 post implementation, with remarkable decrease in percentage of high pain score (above 4) per day from 19.86% to 13.3% (attached graph) approached significance. As well, there were observed decrease in sedation assessment average by bedside nurses.

Decrease length of stay (LOS) is noted in results, from average of 15.6 days in per-implementation to 13 days post implementation, without apparent impact on ventilation duration.
Conclusion/lessons learned

The sedation standardization project demonstrated better pain and sedation control by achieving target comfort level with less sedation boluses, which has positive impact on patient’s outcome in PICU. This standardization reflected also on bedside nurses’ work as the sedation assessment become less frequent, and more organized overall. The importance of the findings of this project is indicate that guidelines can be used to manage the PICU patient’s comfort and pain without compromising quality of care.
Impact of Mock Code Simulation Program in Improving Pediatric Residents’ Resuscitation Skills

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Problem
Before 2015, Pediatric residents weren’t involved in Code Blue events, this resulted in majority of them (84%) according to screening done in 2015 graduated without running a code during their training. This will hugely impact the leadership skills of graduated residents during their first experience encountering Code Blue event. Senior residents become Code leader in 2016. With low rate of paediatric code blue, 9 codes in 2016, their chance to run a code is less likely.

Background/context
KAMC-CR is one of the leading Academic Medical institutions in KSA. Pediatric residency program in KASCH recruits 20-25 pediatric residents yearly. Mock code simulation provides them with practice and improves their competency of leading Pediatric Codes, which will lead to improve patients’ safety. Impact on clinical outcome was demonstrated in many studies that observed increased survival rates correlated with increased number of mock codes.

Methods
Our goal was to help physicians and teams learn. We are conducting surprising simulation mock code sessions with real settings. Each pediatric resident will lead one session during second year, and one during third year of residency.

Data collected in each code for team leader including knowledge assessment, and Critical Recourse Management (CRM) score. Scores were analysed to evaluate the improvement after the second session. Other data related to team members’ performance also collected, including: CPR initiation time, first Epinephrine dose timing, etc. to evaluate the system of resuscitation and identify latent safety threats.

Results
Pilot group of six pediatric residents involved in Mock simulation twice, with 12 (±3) month interval, revealed improvement in both knowledge and CRM results (chart 1). As well, data showed the adherence to AHA guidelines was 33% in pediatric codes for team leaders not involved in simulation, and 100% for those underwent for simulation. Other data showed CPR initiation time by first nurse responder improved from average 58 second in first opportunity to reach 30 second in fifth opportunity.
Conclusion/lessons learned

Results showed improvement in Pediatric Residents' performance in Mock Code by second session. This simulation sessions also have positive impact on other team members' performance and patients' safety including AHA guidelines adherence and CPR initiation time.

Regular Mock Code implemented, since 2017, and expanded to be training educational program targeting Pediatric residents, and Pediatric Wards Nurses. Currently, weekly base session is held. Data is collected for physicians, nurses, and other mock code team members to assess the improvements and evaluate the any potential gaps need to be improved.
Percutaneous Image-guided Placement of Peritoneal Dialysis Catheter: KAMC Experience

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Problem
Surgical insertion of peritoneal dialysis catheter is frequently delayed resulting in delays in patient management, need for temporary dialysis and prolonged hospital stay with unnecessary costs. Surgical insertion often requires general anesthesia, which also adds to patient's risks.

Background/context
Peritoneal dialysis (PD) catheter insertion is traditionally performed using open surgical or laparoscopic techniques in King Abdulaziz Medical City (KAMC). Percutaneous PD catheter insertion is a minimally invasive procedure done under local anesthesia or moderate sedation. This technique proved to provide comparable results in terms of catheter survival and dysfunction rates with lower incidence of catheter related peritonitis and leak. Percutaneous insertion by interventional radiologists offers more flexible scheduling and efficiency compared to surgical approaches that require operating room booking and general anesthesia.

Methods
Percutaneous PD catheter insertion program was initiated in Aug 2015 in collaboration with nephrology team. From August 2015 to October 2017, a total of 58 consecutive patients underwent percutaneous PD catheter insertion. The data is compared to the surgically placed PD catheters between January 2014 to June 2015 (27 patients) in terms of technical and clinical success of insertion, waiting times, length of stay, rate of catheter dysfunction/migration/infection.

Results
Waiting time for Percutaneous PD catheter insertion was 1-2 days compared to 2 weeks for surgical insertion. Method of insertion for the surgically placed catheters was open (n=19), laparoscopic (n=7) and fluoroscopy guided (n=1). Percutaneous insertion was successful in 57 patients (98%) with 2 procedure related complications including abdominal wall bleeding (n=1) and early catheter infection (n=1). Dialysis was successfully initiated in 55 patients (94%) with percutaneous PD and 25 patients (93%) with surgical placement. There was no difference in the rate procedure related complications between the two methods.

Conclusion/lessons learned
Percutaneous image-guided placement of peritoneal dialysis catheter is an effective alternative technique to open surgical and laparoscopic techniques. The KAMC PD unit has adopted this technique as the preferred method of insertion to sustain and expand the peritoneal dialysis program. The vascular interventional radiology unit developed a training program of IR staff and fellows to further disseminate this technique to other institutions.
Developing A Model for Resources Allocation in Pharmaceutical Care Department of A Tertiary Care Hospital: Give Me Five Model

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Problem

Pharmacy resources have been allocated based on workload statistics like number of patients, number of orders processed, number of medications prepared, etc... without considering the medication errors encountered inside the pharmacy. When the error interventions inside the pharmacy were studied, they were found distributed in a pattern that can be utilized for allocation of resources like staffing, technology and training.

Better allocation of resources would impact the staff and patient safety through improving resources allocation and consequently the efficiency of error prevention and detection.

Background/context

Error passes by layers of protection. Retrospective analysis of error detection and intervention in pharmaceutical care department of Prince Mohamed Bin Abdulaziz Hospital - Medina - KSA is suspected to affect the allocation of pharmacy resources in a way that would improve medication safety. The idea is applicable to other entities inside the healthcare firm.

Medication error prevention strategies are being developed and improved continuously. Yet, there is not much publication about the analysis of medication error encounters that take place inside the pharmacy.

Methods

Errors discovered and intervened at five steps of medication processing were retrospectively analysed.

The five steps are:-

1. Medication order
2. Medication reconciliation
3. Refilling Daily inpatient medications
4. Refilling outpatient prescriptions
5. Release at the checkpoint

Results

133 errors were intervened by investigator in (60) days period. They were distributed among the five domains. The results were:-

Medication order (56%), verification at checkpoints (21%), refilling daily inpatient medications (10%), refilling outpatient prescription (7%) and finally medication reconciliation (6%).

Further analysis of the errors at these steps would help to test for the efficiency of the staff performing them and to re-allocate staff, training and other resources according to the finding of this analysis.
Conclusion/lessons learned

A. In-pharmacy error detection system at different domains in the continuum of medication order processing can be an effective tool for resources allocation including staffing, training needs as well as other resources.

B. More investigation, taking into consideration the analysis of organization reported medication related incidents; is advised to identify needs pertaining to error detection for specific type of orders, medications or disease conditions.

C. An educational 3D model is developed to educate the staff about (5) suggested safety issues to consider when processing medication order. The model was given a name of (GIVE ME FIVE) model.