King Faisal Specialist Hospital & Research Centre
Gen. Org.
SUMMARY

LOCAL PROBLEM
Sub optimal performance in immunizing our patients against influenza

DESIGN & IMPLEMENTATION
- Identify the best evidence based guidelines, in accordance with Government regulation, pertaining to Preventative care
- Identify a way to capture the preventative care workflow in the EMR

GOALS
- Identify the elements of preventative care that are evidence based & recommended according to age, gender, documented results and known chronic problems
- Utilize our EMR to help improve preventative care
- Provide proactive and preventative health management services to our patients

VALUE DERIVED
- Enterprise wide standardization of preventative care for Influenza resulting in a 304% increase in vaccines administered, which in turn help to drive down the employee sick days
- Improved alerts to minimize alert fatigue
- Inclusion of clinicians in the build and design decisions optimized the workflow and improved adoption
- Engaging leadership from the start, helped to drive accountability and utilization
Osama Al Swailem MD, MA
Chief Information Officer – Associate Professor

Salam Everyone, I am King Faisal Hospital & Research Center

Bachelor of Medicine & Surgery
King Saud University

Masters & Post Doctoral Fellowship
Columbia University

King Faisal Specialist Hospital & Research Center
2014 – Present Chief Information Officer
2008 – 2014 Director Medical Informatics
Salam
ABOUT SAUDI ARABIA

Population 29.897 Million

Literacy 81%

Language Arabic

King Salman bin Abdulaziz Al Saud

DID YOU KNOW
- Saudi Arabia is the 13th largest country in the world
- Saudi Arabia is the largest country in the world without a river
- Riyadh’s camel market is one of the largest in the world and sells about 100 camels per day
- Jeddah is a 3000+ year old city and houses the tomb of Eve (Arabic: خواء Hawa), the mother of mankind
Newspaper: Al Riyadh
Date: 10 November 1970
KFSH&RC FACTS & FIGURES

MISSION  Provide the highest level of specialized healthcare in an integrated educational and research setting
VISION   To be a world-leading institution of excellence and innovation in healthcare

Est 1975  Kingdom of Saudi Arabia  9.4M Population Served
Riyadh, Jeddah & Madinah  31 Smart Centers

CY2018

1,846 Beds  31,741 Admissions  1,297,497 OP Visits
1,472 Transplants  56,932 OR Hours  13,687 Employees

68 Nationalities
95,382 ER Visits
KFSH&RC RANKINGS

#1
Out of 141 centers in the UK & USA in the volume of Pediatric living donor liver transplants

#1
Out of 257 centers in the UK & USA in the volume of Pediatric living kidney transplants

TOP 4%
Out of 272 centers in the USA reporting to Center of International Blood & Marrow Transplant Research

56th
Out of 71 centers in the USA in the volume of lung transplants

TOP 10%
Of heart transplants worldwide

RESEARCH
17 Citation Average

EDUCATION
Graduate 1 out of 5 Consultants in the Region
KFSH&RC ACHIEVEMENTS

HIMSS EMRAM 7
Ambulatory
Riyadh & Jeddah

HIMSS AMAM 6
Riyadh & Jeddah

JCIA
Joint Commission
International Accreditation

CAP
Laboratory Accreditation
College of American Pathologists

HIMSS EMRAM 6
Inpatient
Riyadh & Jeddah

CBAHI
Saudi Healthcare Accreditation
Riyadh & Jeddah

MAGNET
American Nurses Credentialing Center

ISO 27001
Information Security
Salam Everyone, I am King Faisal Hospital & Research Center

Bachelor of Science in Nursing
Master in Health Information System Management

George Mason University

King Faisal Specialist Hospital & Research Center
2018 – Present  Director Application & Health Informatics
2008 – 2018    Head of Health Informatics
KFSH&RC EMR JOURNEY

Phase 1
- Laboratory
- Radiology
- Registration
- Scheduling
- Nursing Documentation

Phase 2
- OR Surgical
- Pharmacy
- Medical Records
- Emergency
- Physician Documentation
- Clinical Pathways

Phase 3
- Infection Control
- Document Imaging
- Mobile Solution
- Outreach
- Web Connect
- Synoptic Reporting

Phase 4
- Critical Care
- Anesthesia
- Staff Scheduling
- Smart Rooms
- Infotainment
- Dashboard
- Patient Room Link
- RTLS
- IP Telephony
- Nurse Call
- Hand Hygiene
- ID Access
- BMDI
- Capacity Management

CY2002

class CY2002

CY2010

class CY2010

CY2013

class CY2013

CY2017

class CY2017

CY2018

class CY2018

Enterprise Business
Process Management
Zero Harm

= New Module Implementation
KFSH&RC EMR JOURNEY

CY2019
- HW Upgrade
- SW Upgrade

CY2020
- Oncology
- Organ Transplant
- Women’s Health
- VNA Imaging
- Revenue Cycle Management

= New Module Implementation

Phase 5
KLAS EMR SATISFACTION

Overall EMR Satisfaction
All Clinicians (n=73,115)

- All Organizations (n=159)
- Cerner Deployments (n=29)
- Non-US Health Systems (n=11)
KFSH&RC EMR GOVERNANCE

Acquisition → Project Mode → Maintenance Mode

Health Informatics Committee – HIC → Project Administrative Committee – PAC → Clinical Advisory Group – CAG

Medical Advisory Committee

Patient Safety Committee

Patient Health Information Management Committee

Physician Informatics Governance Committee

Clinical Decision Support Committee

Medication Process Taskforce

Nursing Informatics Council
CHANGE CONTROL – PROCESS WORKFLOW

New Request
- Department Identify Care Need
- Send Requesting Memo to HITA
- Assign to Build Team
- Analyze Requirements & Current Workflow
- Build Application in Build Domain

Align/Map to Existing Orders
- Build New Orders in Build Domain, if Required
- Send to Requester for Review
- Make Required Changes
- Approved
  - Yes
  - Make Required Changes
    - HITA Approval?
      - Yes
      - Request Implemented
    - No
      - Change Moved to CERT Domain
        - Validated in CERT Domain
          - Education and/or Training Material Developed
            - End User Training
              - Change Moved to PROD

Approved
- Send to Requester for Review
- Make Required Changes
  - Request Implemented
Salam Everyone, I am King Faisal Hospital & Research Center

Diploma in Nursing, ITIL Certified

King Faisal Specialist Hospital & Research Center
2002 – Present Sr Health Informatics Analyst
Preventative Care is a Pillar of Family Medicine

- Use the EMR to help us provide preventative care
- Multi disciplinary team used to implement evidence based expectations

ENABLER: HEALTH MAINTENANCE

- Adult/Travel Vaccines
- BMD Screening
- Mammogram Screening
- Diabetes Screening
- Fecal Occult Blood Screening
- Lipid Screening
- Obesity Screening
- Pap Smear
- Tobacco Counseling
## DESIGN STRATEGY

### CORE FACTORS
- Ease of Use
- Integration with our EHR
- Analytics to Measure Success & Opportunities
- Multi-Disciplinary Involvement

### RULES
**Does patient qualify for expectation?**
- Gender
- Age
- Documented Problems
- Documented Procedures
- Documented Diagnosis
- Documented Results
- Orders

### EXPECTATION
**Addressed during Patient Visit**
- System Generated
- Added Manually

### SATISIFIER
**Expectation Completion**

**Satisfaction Periods:**
- Orders = 14 days
- Results = defined period

**Manual satisfiers:**
- Done Elsewhere = satisfied
- Postponed = not satisfied
- Refused = not satisfied
- Cancelled = removed
IMPLEMENTATION METHODOLOGY

Formation of multidisciplinary team: Family Medicine Department Physicians & Nurses, Health Informatics, Information Technology, User Support, Training, Application Development & External Partners/Vendors

Developed the Health Maintenance Tab (HMT) within the EMR to incorporate government regulations & Family Medicine Department best practice and evidence based guidelines

Avoid Alert Fatigue by utilizing real time ‘static’ notifications: upon opening of patient chart, based on patient age, gender, documented results or known chronic problem/diseases

Interoperability with the current EMR utilizing existing solutions

Training & awareness campaigns targeting Clinicians on the importance of Preventive Medicine

Frequent reporting to ensure utilization and adoption
INTENDED OUTCOMES

- Promote preventative healthcare outcomes
- Standardization through the creation of preventive workflows within the EMR for targeted patients
- Utilization of best practice guidelines supported by Government Regulations
- Streamline the identification of patients who require screening
- Develop a clinician friendly solution
- Improve awareness of the importance of preventive medicine
- Advanced analytics
ADOPTION

Buy-in from management through reinforced compliance

Awareness campaign and training of physician and nurses in groups and individual sessions

Training materials and pocket reference cards

Moved the Health Maintenance Tab as the first view in the EMR

Running quarterly reports to check compliance & utilization

Having super users in the department for encouragement and support
HEALTH MAINTENANCE EXPERIENCE

SEHATY Notification ➔ Appointment w/ FMD ➔ MD Checks HMT ➔ Expectation Alert ➔

OPTION 1
MD Orders Test / Vaccine

OPTION 2
Test / Vaccine Done Elsewhere

OPTION 3
Postpone Test / Vaccine

OPTION 4
Cancel Test / Vaccine Permanently
Disease related decision support is built into the HMT around age; gender and documentation for:

- Screening for Preventative Diseases
- Vaccination
- Recontracting

Future Development
- Chronic Disease Management
- Pediatric Clinic
- Well Baby Clinic
SEHATY PATIENT PORTAL

- Patient able to view targeted screening based on age, gender, documented results or known chronic problem/diseases
- When last screening was performed
- Recommended frequency of screenings
- Active status of received Vaccines
- Immunization Chart
  - Immunizations given by KFSH&RC
  - Historical Vaccines given outside of KFSH&RC
Salam Everyone, I am King Faisal Hospital & Research Center

Bachelor of Medicine & Surgery – Aberdeen, Scotland UK
Fellow of the Royal Australian College of General Practitioners
Fellow of the Royal College of Physicians, UK
Master in Business Administration (Distinction) – Maastricht School of Management
Certified Professional in Healthcare and Information Management Systems

King Faisal Specialist Hospital & Research Center – Jeddah
2006 – Present Chairman & Consultant Family Medicine
2009 – Present Chairman Integrated Clinical Information Systems Committee
Case Presentation

Population Health Realizations by Increasing Influenza Vaccination
FAMILY MEDICINE

- 55,000+ Employees & Eligible Dependents
- Primary & Secondary Health Care Services
  - Scheduled Clinic
  - Walk-In Clinic
- Tertiary Care Patients with Chronic Diseases
- Pre Marital Screening
- Pediatrics Care
- Occupational Health Services
- Support Service & Follow-up Treatment for ER

Nursing Clinic
- Pre Employment Screening
- Annual Re-Contract – All Employees
- Travel Medicine Clinic
- Well Baby Clinic
- Diabetic Clinic
- OB Screening Clinic
- Driver Assessment Clinic
- Nutrition Clinic

Occupational Health
- Food Handlers
- Needle Stick Injuries
- Tuberculosis Contacts & Converters
- Fit Testing
- Ergonomic Assessment of Workplace
LOCAL PROBLEM

ISSUE

Sub optimal performance in immunizing our patients against influenza

GOALS

- Identify the elements of preventative care that are evidence based & recommended according to age, gender, documented results and known chronic problems
- Utilize our EMR to help improve preventative care
- Provide proactive and preventative health management services to our patients
WHAT IS INFLUENZA

A contagious infection caused by viruses that infect the upper, and occasionally the lower respiratory tract

Can cause severe disease that may cause patients to be admitted to hospital and can also result in death

According to the Centers for Disease Control (CDC), since 2010 in the US there have been up to 960,000 hospitalizations and up to 79,000 deaths every year

People who are otherwise fit and well can also catch influenza and pass the virus onto sick patients

In some states in the United States it is mandatory for healthcare workers to get the influenza vaccine

1. https://www.cdc.gov/flu/about/keyfacts.htm
WHY KFSH&RC PRIORITIZED THIS ISSUE

Seasonal influenza occurs in the coldest time of the year, in the Northern and Southern hemispheres respectively, but it occurs all year around in the subtropics and tropics (e.g. Saudi Arabia) ⁴

Saudi Arabia has millions of pilgrims coming from all over the world, all year around, with the potential to bring infections

Being a tertiary care hospital, all of our patients are vulnerable to infectious diseases

Global strategy to decrease the chance of a Pandemic ⁵

⁴ https://www.who.int/bulletin/volumes
⁵ https://www.who.int/influenza/spotlight
MASS GATHERING MEDICINE

DEFINITION

Health effects/risks of mass gatherings and the strategies that contribute positively to effective health services delivery during these events.

KSA MASS GATHERING

- The Lancet Conference on Mass Gatherings Medicine
  October 23–25, 2010
  Jeddah, Saudi Arabia
- Hajj Pilgrimage occurs over 5 days during the final month of the Islamic calendar and attracts 2–3 million visitors
- Hajj Pilgrimage stretches the capacity—including that for shelter, provision of food and water, waste management, physical security, and health care.
- Umrah (Lesser Pilgrimage) CY2018 saw 18.3 million performers throughout the year – 6.8 million external

6 https://en.wikipedia.org/wiki/Mass_gathering_medicine
MAJOR HAJJ PILGRIMAGE HEALTH RISKS

HEALTH RISKS
Influenza viruses
Coronaviruses
Pneumococcal sepsis
Tuberculosis
Meningococcal sepsis
Polio
Yellow fever
Gastrointestinal infections
Acute gastroenteritis
Food poisoning
Cholera, typhoid & dysentery
Viral diarrhoea
Viral hepatitis B, C, D and E
Arbovirus infections
Parasitic
Fungal
Blood-borne disease
HIV
Bacterial
Zoonosis
Brucellosis
Leishmaniosi

HEALTH RELATED DISORDERS
Skin milia
Heat hyperpyrexia
Heat Stroke

PREVENTION
Vaccination (before travelling and at port of entry)

ADVICE
Health education leaflets and posters
General education about hygiene, hydration, shelter from direst heat and seeking and accessing health services

SPECIAL PRECAUTIONS
Sterile shaving blades should be used for the head-shaving ceremony
Pilgrims with comorbidities or on immunosuppressive agents are more likely to acquire and succumb to infectious diseases
As new infectious disease threats emerge, recommendations are updated on a regular basis

### HEALTH MAINTENANCE TAB

#### Pending Expectations

<table>
<thead>
<tr>
<th>Expectation</th>
<th>Date Due</th>
<th>Status</th>
<th>Action</th>
<th>Reason</th>
<th>Priority</th>
<th>Last Satisfied By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza Vaccine</td>
<td>14/10/2019</td>
<td>Low Near Due</td>
<td>Influenza Order</td>
<td>Done Elsewhere</td>
<td>Refused</td>
<td>ALGHAMDI, FARI</td>
</tr>
<tr>
<td>PPD</td>
<td>16/10/2019</td>
<td>High Near Due</td>
<td>PPD Order</td>
<td>Done Elsewhere</td>
<td>Refused</td>
<td>ALHAMOUD, HANADI</td>
</tr>
<tr>
<td>Herpes Zoster Vaccine</td>
<td>04/09/2019</td>
<td>Low</td>
<td>Herpes Zoster Order</td>
<td>Done Elsewhere</td>
<td>Cancel</td>
<td></td>
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<tr>
<td>Prevnar 13-valent</td>
<td>04/09/2019</td>
<td>Low</td>
<td>Prevnar 13-valent Order</td>
<td>Done Elsewhere</td>
<td>Cancel</td>
<td></td>
</tr>
</tbody>
</table>

#### Recently Satisfied Expectations

<table>
<thead>
<tr>
<th>Expectation</th>
<th>Status</th>
<th>Satisfy Type</th>
<th>Administration Date</th>
<th>Satisfy Reason</th>
<th>Priority</th>
<th>Last Satisfied By</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhoid Vaccine</td>
<td>Other Satisfier</td>
<td>Order</td>
<td>22/06/2015</td>
<td></td>
<td>Low</td>
<td></td>
<td></td>
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<td>Typhoid Vaccine</td>
<td>Satisfied</td>
<td>Result</td>
<td>22/06/2015</td>
<td></td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A Vaccine</td>
<td>Canceled</td>
<td>Manual</td>
<td>15/01/2018</td>
<td>Immune - Blood test</td>
<td>Low</td>
<td>Carbonel, Marbel...</td>
<td></td>
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<tr>
<td>Hepatitis A Vaccine</td>
<td>Other Satisfier</td>
<td>Order</td>
<td>22/12/2010</td>
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<td>Hepatitis A Vaccine</td>
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<td>Result</td>
<td>22/06/2015</td>
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<tr>
<td>PPD</td>
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<td>Result</td>
<td>16/10/2018</td>
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<td>High</td>
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<td>Influenza Vaccine</td>
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<td>17/01/2019</td>
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<td>12/10/2016</td>
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</tbody>
</table>
VALUE DERIVED

Administration of Flu Vaccine by Family Medicine

2,304 – Avg Before HMT
9,299 – Avg After HMT

304% INCREASE
VALUE DERIVED
+ Influenza Tests
VALUE DERIVED

Tamiflu Dispensed

2176    2909    4255    7192    9004    8332    8552

After HMT
Joint Commission Recommendation
Provide a safer environment for Health Care Personnel and Patients through Influenza Vaccination.

Key Points for Practice (AFP Editors)
Vaccination should be offered by the end of October, although vaccine administered in December or later is likely beneficial in most influenza seasons.

CDC Recommendation
Routine annual influenza vaccination is recommended for all persons aged ≥6 months who do not have contraindications. Optimally, vaccination should occur before onset of influenza activity in the community.

KFSH&RC Standards
- Flu vaccinations are given annually between October and March
- Flu vaccines also given during Hajj period annually
LEARNINGS

SUCCESS

- Enterprise wide standardization of preventative care for Influenza
- Improved alert monitoring to minimize alert fatigue
- Inclusion of clinicians in the build and design decisions optimized the workflow and improved adoption
- Engaging leadership from the start, helped to drive accountability and utilization

CHALLENGE

- Change management
- Facility specific workflows while using the same tools
- Post go-live support of two remote facilities

OPPORTUNITY

- Improving documentation compliance
  o Cost
  o Incidence Levels
  o Mortality & Morbidity
KEY TAKEAWAYS

Whoever saves one life - it is as if he had saved mankind entirely

*Surah Al Ma’idah 5:32*

- Aligns with KSA Vision 2030
- Aligns KFSH&RC Mission & Vision
- Ability to benchmark KFSH&RC healthcare delivery model
- Strengthen relationship with Partners
- Staff development & growth
- International & National brand recognition