



# Fourth Annual Report King Abdullah Fellowship Program July 2014 - August 2015



EMORY  
ROLLINS  
SCHOOL OF  
PUBLIC  
HEALTH

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# Acknowledgements



We would like to acknowledge the ongoing efforts, services and contributions of His Excellency King Salman bin Abdulaziz Al Saud, His Excellency Eng. Khalid bin Abdulaziz Al-Falih, the leadership of the Ministry of Health of the Kingdom of Saudi Arabia, the Saudi Arabian Cultural Mission, and the King Abdullah Fellows for making this fellowship program successful.

We would like to offer our special thanks for the support provided by:

- Dr. Abdullah Assiri
- Dr. Samar Alsaggaf
- Dr. Adel Bashatah
- Dr. Farid Awanes
- Dr. Abdulaziz Bin Saeed
- Dr. James Curran
- Dr. Carlos Del Rio

# Executive Summary

Since the first cohort's graduation in 2013, when a fellow was chosen by faculty and students to be the commencement speaker, the King Abdullah Fellowship Program (KAFP) has seen its students distinguish themselves, doing important work in research and in the field in the Kingdom of Saudi Arabia. The past year is no exception.

During the last school year, KA fellows took an active role in the life of the school. They have led the Saudi Students Association, the only organization of its kind at Emory. They also organized the school-wide celebration of Saudi National Day, which lasted two days. For this commemoration and cultural showcase, the main entrances, lobby, and primary walkway between the two school buildings were decorated with art, furnishings, and images from KSA. Hundreds of students, faculty, and staff enjoyed Saudi cuisine prepared by the students and attended cultural events that were scheduled throughout the week.

Of the 25 students who were matriculating, 19 studied in the Global Health department and 6 in Health Policy and Management. Five students in Global Health wrote and presented their thesis projects, one of which (on MERS-CoV) was nominated for the Shepard Award for best thesis. In Health Policy and Management, one of the fellows chose the Management concentration, which was a first.

As a program, we expanded our services by adding an additional English instructor to the team. The ratio of fellows to instructors was about 9 to 1, so everyone could easily take advantage of the support. We maintained our other services, such as English for KA Families, which was utilized in greater numbers this year compared to last. We also welcomed two alumni to the KAFP team as In-Country Directors; they play a crucial role in promotion and coordination.

In December, our staff traveled to Riyadh, where we presented a 2-week Rollins Application Workshop for 2015-16 candidates, who had been pre-screened. In collaboration with KAFP's in-country directors, we familiarized students with the basics of the curriculum, this program, and life in Atlanta. We guided them step-by-step through the application process, with hands-on help at every stage, including resume and personal statement composition and editing. Staff also familiarized them with visa issues and processes, and made a preliminary assessment of their English language ability and level of commitment to pursuing the program. Four KAFP alumni led enriching information sessions and answered candidates' questions.

This year, we welcome the fifth cohort of KAFP fellows. Their predecessors have published their research and have taken leadership roles in the public health field. We have no doubt that these students will follow in their footsteps. We continue to be excited by the opportunities this program affords for scientific collaboration, cultural exchange, and knowledge building among public health professionals in both KSA and the United States.



The Kingdom of Saudi Arabia (KSA) has made significant efforts to strengthen the healthcare infrastructure. The Kingdom faces public health concerns for infectious diseases (e.g., MERS-CoV, dengue, tuberculosis, hepatitis) and chronic diseases (e.g., diabetes, hypertension, obesity). Public health professionals play a critical role in combatting these diseases.

King Abdullah established an endowment to build human capacity in KSA, and in 2010, a Letter of Engagement (LOE) was signed between the MoH and the Rollins School of Public Health (RSPH). The LOE includes several areas of mutually beneficial scientific collaboration.

## Objectives

The primary objectives of the King Abdullah Fellowship Program are to:

- Strengthen public health capacity in KSA;
- Engage in collaborative research activities; and
- Promote bilateral exchange of students and researchers.

## Master of Public Health Education (2011 to present)

King Abdullah Fellows matriculate in the Hubert Department of Global Health (HDGH) and the department of Health Policy and Management (HPM). Fellows conduct their practicum assignments and thesis research in KSA.

## Collaborative Research

KAFellows engage in collaborative research as a part of their program and graduate from Rollins having produced publishable work on public health topics such as diabetes, tobacco, hepatitis, vaccine preventable diseases, and tuberculosis in KSA. RSPH faculty develop collaborative research or spend extended lengths of time in KSA performing program assessments.

## Exchange of students

In 2009, the first American Emory MPH student spent her summer in Riyadh working on a tuberculosis research project. And her manuscript was published in the Annals of Epidemiology. In May 2011, four American Emory MPH candidates traveled to Riyadh on a Global Field Experience (GFE) to work on diabetes and smoking control, antimicrobial resistance, and hepatitis projects, in collaboration with KSA counterparts. In 2014, Global Health student Angela Guo did her practicum under the supervision of KAFP alumnae Fatima Al Slail helping in the diabetes prevention area.

# 2014 – 2015 Academic Timeline and Program

## Previous Highlights

May 2010: Letter of Engagement to establish KAFP signed with Ministry of Health.

May 2013: Graduation of first King Abdullah Fellowship cohort in May 2013 (<https://youtu.be/bvWpYAibp9oI>)

Dr. Fatima Al Slail was then elected to give the commencement address at graduation. (<http://www.youtube.com/watch?v=oclsvBfPwnE>)

Sep 2013: KA Fellows establish the Saudi Student Association (SSA).

May 2014: Abdulaziz Aloufi (Global Health, Cohort 2012) receives Award for Exceptional Global Master's Thesis poster.

## 2014 – 2015 Academic Timeline

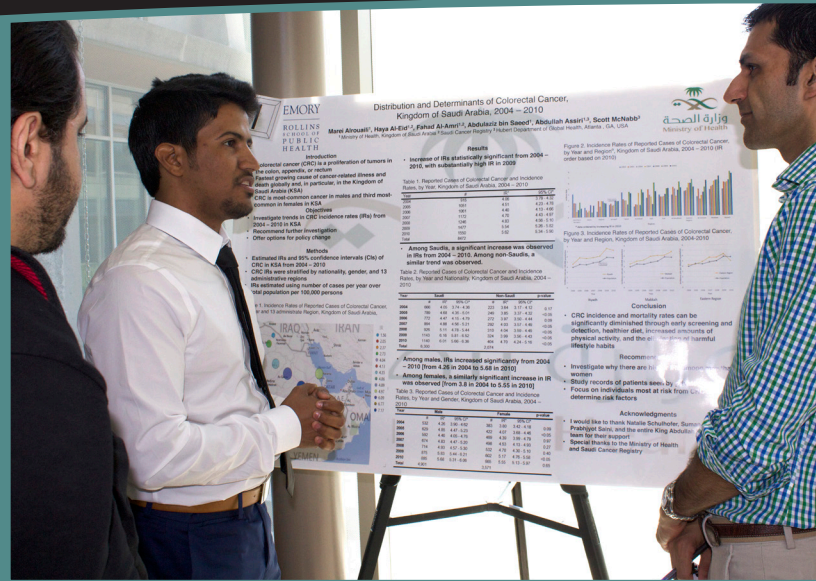
Sep 2015: Drs. Hisham Bashawri and Sulafa Alqutub join KAFP as In-Country Program Directors.

Rollins School of Public Health celebrates Saudi National Day.

Nov – Dec 2014: 50 candidates recruited and interviewed from the MoH.

Dec 2014 – Jan 2015: Application workshop and preparation is held in Riyadh.

Feb 2015: 2<sup>nd</sup> year Global Health students research and write their thesis projects.





# Highlights



March 2015: RSPH established an official Prayer and Meditation Room as well an Ablution Room which allows students to conveniently engage in his or her faith while on campus

Mar – Apr 2015: 12 accepted and enrolled into the HDGH for cohort of 2015

Mar – Aug 2015: Administrative and logistical support for arrival of cohort of 2015

Apr 2015: 2<sup>nd</sup> year Global Health students research and write their thesis projects

May 2015: 11 KAFP Fellows graduate  
A special commentary discussing the KAFP was published in the Journal of Epidemiology and Global Health, May 2015

Sulafa AlQutub and Hisham AlBashawri present at health conferences in Jeddah and Riyadh

Mohammed AlKhalawi published Evaluation of Tuberculosis Public Health Surveillance, Al-Madinah Province, Kingdom of Saudi Arabia, 2012 in the Journal of Epidemiology and Global Health (<http://www.ncbi.nlm.nih.gov/pubmed/25997657>)

Dr. Ghada Farhat joins the HDGH as Associate Professor and KAFP mentor.

May – Aug 2015: Cohort of 2014 traveled to KSA to complete practicums

Jul – Aug 2015: Cohort of 12 students arrived to Atlanta

Aug 2015: Cohort of 2017 began studies





# Program Support



Dr. McNabb serves as the program and academic advisor for the Fellows. From the time they arrive, the Fellows and their families receive social and academic support to adjust to life at Emory.

- Weekly meetings with Dr. McNabb to discuss academic and social issues
- Meetings with faculty, KAF staff, and instructors
- English language instruction and support
- Biostatistics, epidemiology, accounting, and data analysis instruction and support
- Transportation services during transition period
- Assistance with enrolling children in schools and daycares
- Cultural competency workshop for incoming and current students
- Administrative support for filing the necessary paperwork
- English classes for spouses and family members of Fellows
- Financial support for extracurricular activities inside and outside of Georgia

## English as a Second Language for Families

As in the previous year, we offered beginning level “survival” English classes to KA Fellows’ family members to aid in the smooth transition into American culture. Classes focus mainly on conversation practice, building vocabulary, and teaching the grammar points needed to construct proper English sentences in real world scenarios, allowing for confident engagement in everyday conversation.



Scott J.N. McNabb  
Ph.D., M.S.

Program Director

Research Professor  
Global Health,  
Epidemiology, and  
Biostatistics



Ghada Farhat  
Ph.D., MPH

Program Mentor

Associate Professor  
Global Health



Hisham Bashawri  
M.B.B.S., MPH

In-country Director  
Global Health



Sulafa Alqutub  
M.B.B.S., MPH

In-country Director  
Health Policy and  
Management



Lea Matar  
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ESL Instructor



Yasmin Zaki  
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Sorie Dumbuya  
BSc.

ESL Instructor



Suman Kundu  
Sc.D

Data Analysis, EPI,  
and BIOS tutor



Prabhjyot Saini  
MPH

Data Analysis, EPI,  
and BIOS tutor

# Lessons Learned and Recommendations

**Lesson Learned:** The candidates did not have sufficient time to prepare for and take the GRE and TOEFL tests.

**Recommendation:** Candidates should be required to take the GRE and TOEFL tests before the January workshop. In having candidates become familiar with the format and questions of these tests prior to the workshop, for those students who need to take the test again, there is the opportunity to ask questions and gain effective feedback from the KAFP team in January. Additionally, having scores available earlier will allow the KAFP team to more effectively evaluate candidates during the workshop.

**Lesson Learned:** The candidates need to have strong English language skills, both oral and written, in order to succeed in Emory's demanding academic environment.

**Recommendation:** An English placement test (developed and reviewed by KAFP ESL Instructors) should continue to be administered during the workshop in January. ESL instructors will evaluate this test and consider the score when making recommendations for admission. In addition, each candidate should be interviewed, and questions should be related to topics that candidates might encounter during their studies. Furthermore, students should plan to arrive in Atlanta by the beginning of June so as to take an intensive ESL class before the start of the academic semester. During the academic year, students should continue to take intensive ESL classes weekly with a KA ESL instructor.

**Lesson Learned:** The number of candidates available for initial screening by the MoH was less than in previous years.

**Recommendation:** Advertise the KAFP announcement year-round on the MoH website and/or the KAFP site.

**Lesson Learned:** Difficult to accommodate all the fellows' transportation needs at the beginning of the school year. A fixed schedule was not possible since all fellows did not arrive during the same time-period.

**Recommendation:** The KA Fellows will have a choice of visiting different places. A schedule will be developed for individual families or groups, on a case-by-case basis. Transportation will only be provided during the first two weeks of arrival.

**Lesson Learned:** Communication, event scheduling, and coordination have proven more challenging with the program's growth.

**Recommendation:** Adopt a centralized student data and program management system that is specific to KAFP.





The King Abdullah Fellowship Program continues to be successful due to the efforts of the Fellows and staff, as well as the commitment and ongoing support of the MoH, SACM, and Emory University.

Through this partnership, the program has grown, and Fellows are continuing the pursuit of a rigorous education in public health. Exposure to Emory's extensive knowledge base and the exchange of experiences will lead to the development of skills that will allow these students to make significant contributions to the advancement of public health.

The continuation of the program will allow stronger relationships to grow between public health experts in KSA and the United States.

# King Abdullah Fellows Cohort of 2013

## Health Policy and Management

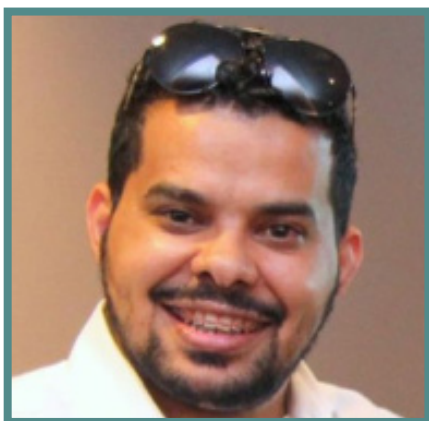


Hossam Alakhrass  
M.B.B.S., MPH

**Education:** Bachelor of Medicine and Surgery from MISR University for Science and Technology, Cairo

**Work Experience and Training:** Radiology Resident

**Practicum Title:** Perceptions of Care Providers in the Delivery of Newborns in the Kingdom

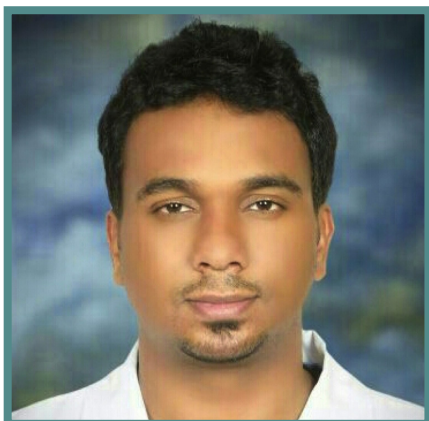


Mohammed Aldhafiri  
BSN, MPH

**Education:** Bachelor of Science in General Nursing

**Work Experience and Training:** MoH

**Practicum Title:** ED Quality Improvement Culture at Al Iman General Hospital in Riyadh, Saudi Arabia



Fahad Aldhuwayhi  
BSN, MPH

**Education:** Bachelor of Science in Nursing

**Work Experience and Training:** Nurse Specialist

**Practicum Title:** ED Lab Improvement Evaluation at King Saud Medical City in Riyadh, Saudi Arabia



Zaki Algasemi  
M.B.B.S., MPH

**Education:** Arab Board Family Medicine 2010  
Saudi Board Family Medicine  
Bachelor of Medicine and Surgery from King Abdulaziz University

**Work Experience and Training:** Medicine Department

**Practicum Title:** ED Triage Improvement Evaluation at King Saud Medical City in Riyadh, Saudi Arabia



Maryam Almoklif  
M.B.B.S., MPH

**Education:** Obstetric and Gynecology Arab Board 1, ECFMG Certificate, Bachelor of Medicine and Surgery King Abdulaziz University

**Work Experience and Training:** Obstetric and Gynecology Physician

**Practicum Title:** The Quality of Services in Specialized Maternal and Child Health Hospitals in Saudi Arabia



Ibrahim Alsumaih  
M.B.B.S., MPH

**Education:** Bachelor of Medicine and Surgery Dammam University, Dammam

**Work Experience and Training:** Quality Management Coordinator, Home Health Care supervisor, Surgical ER Resident.

**Practicum Title:** ED Clinical Pathways Improvement Evaluation at King Saud Medical City in Riyadh, Saudi Arabia



# King Abdullah Fellows Cohort of 2013

## Hubert Department of Global Health



Hassan Aldosari  
BSN, MPH

**Education:** Bachelor of Science in Nursing, Australia

**Work Experience and Training:** Nursing Director Assistant, and Head of Quality Department and Nursing Educator.

**Thesis:** Distribution and Determinants of MERS-CoV, Kingdom of Saudi Arabia, 2012 - 2014



Fahad Almutairi  
M.B.B.S., MPH

**Education:** Bachelor of Medicine and Surgery  
King Abdulaziz University, Medina

**Work Experience and Training:** Resident in pathology department

**Thesis:** Distribution and Determinants of Tuberculosis, Kingdom of Saudi Arabia, 2005 - 2012



Marei Alrouaili  
M.B.B.S., MPH

**Education:** Bachelor of Medicine and Surgery  
Dammam University, Dammam

**Work Experience and Training:** Physician and Administrator

**Thesis:** Distribution and Determinants of Colorectal Cancer, Kingdom of Saudi Arabia, 2004 - 2010



Alanoud Alsaiari  
M.B.B.S., MPH

**Education:** Arab Board of Family Medicine 2009  
Bachelor of Medicine and Surgery  
King Abdulaziz University, Jeddah

**Work Experience and Training:** Family Physician Associate Consultant

**Thesis:** Distribution of Meningococcal Disease Before and After the Polysaccharide Vaccine, KSA, 1994 - 2014



Sultan Alshamrani  
BSN, MPH

**Education:** Bachelor of Science in Nursing

**Work Experience and Training:** Staff Nurse and Nursing Supervisor

**Thesis:** Distribution and Determinants of Dengue Fever, Cities of Jeddah and Makkah, Kingdom of Saudi Arabia, 2007 - 2013



Mai Jamdar  
BSN, MPH

**Education:** Bachelor of Science in Nursing

**Work Experience and Training:** Health Educator

**Thesis:** Distribution and Determinants of Malaria, Kingdom of Saudi Arabia, 2002 - 2011

# King Abdullah Fellows Cohort of 2014

## Health Policy and Management



Nasser Alzayed BSN,  
MPHc 2016

### Education:

Bachelor of Science in Nursing

### Work Experience and Training:

Nursing Quality Coordinator



Husain Alzobaidi  
M.B.B.S., MPHc 2016

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Director of Primary Health Care Centers and  
Sectors, Jeddah



## Hubert Department of Global Health



Mohrah Al-Alawi  
M.B.B.S, MPHc 2016

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Epidemiology Resident, Communicable Disease  
and Vector Control Directorate



Khalid Alanazi  
M.B.B.S., MPHc 2016

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Infection Prevention Specialist



Yahya Alasseri  
M.B.B.S., MPHc 2016

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Resident in Public Health Department

# King Abdullah Fellows Cohort of 2014

## Hubert Department of Global Health



Ali Alghamdi  
M.B.B.S., MPH

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Service Resident at E.N.T Department



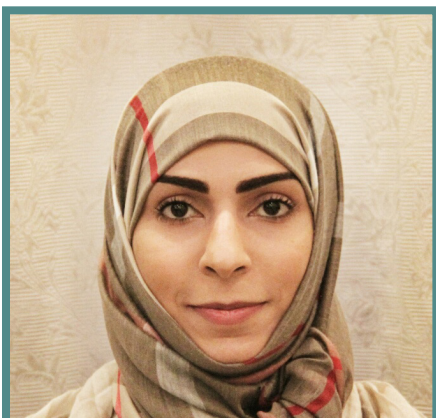
Naif Alraihan  
M.B.B.S., MPH

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Resident in Infection Control Department



Eman Alsaeed  
M.B.B.S., MPH

### Education:

Bachelor of Medicine and Surgery

### Work Experience and Training:

Resident



Yasser Bakhsh  
M.B.B.S., MPH

**Education:**

Bachelor of Medicine and Surgery

**Work Experience and Training:**

Epidemiology Resident, Communicable Disease  
and Vector Control Directorate



Shada Baoum  
M.B.B.S., MPH

**Education:**

Bachelor of Medicine and Surgery

**Work Experience and Training:**

Family Physician Specialist



Mashaer Fallatah  
M.B.B.S., MPH

**Education:**

Bachelor of Medicine and Surgery

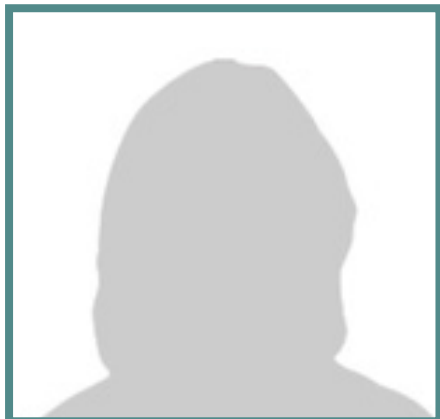
**Work Experience and Training:**

Resident



# King Abdullah Fellows Cohort of 2014

## Hubert Department of Global Health



Eiman Gaid  
M.B.B.S., MPH

**Education:**

Bachelor of Medicine and Surgery

**Work Experience and Training:**

Deputy of Infection Control Department



Zahra Gaw  
M.B.B.S., MPH

**Education:**

Bachelor of Medicine and Surgery

**Work Experience and Training:**

Resident



AbdulHameed Kashkary  
M.B.B.S., MPH

**Education:**

Bachelor of Medicine and Surgery

**Work Experience and Training:**

Resident



Razan Thabit  
M.B.B.S., MPH

Education:

Bachelor of Medicine and Surgery

Work Experience and Training:

Resident

## Introduction

- MERS-CoV is a novel virus that affects the Kingdom of Saudi Arabia (KSA) (>85% of cases have occurred there).
- It is important to analyze all reported case based information data to understand the distribution and determinants of morbidity and mortality

## Objectives

- Describe the epidemiology of reported cases of MERS-CoV by person, time, and place

## Methods

- Secondary analyses of laboratory-confirmed MERS-CoV cases reported to the KSA MoH by year, age, gender, nationality, and region

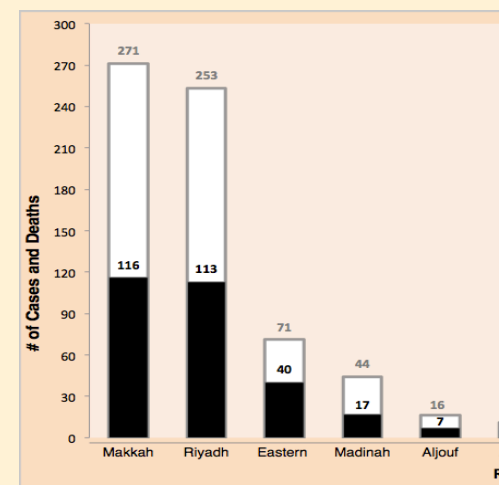
**Table 1. Demographic Characteristics of Reported MERS-CoV Cases and Deaths, Kingdom of Saudi Arabia, 2012 – 2014**

Characteristic	# Cases	# Deaths (%)	p-value
<b>Year</b>			<i>&lt;.01</i>
2012	5	3 (60)	
2013	136	76 (56)	
2014	552	231 (42)	
<b>Age</b>			<i>&lt;.001</i>
0 – 19 y	32	4 (12)	
20 – 39 y	201	37 (18)	
40 – 59 y	248	102 (42)	
≥ 60 y	212	167 (79)	
<b>Gender</b>			<i>&lt;.01</i>
Male	442	217 (49)	
Female	251	93 (37)	
<b>Nationality</b>			<i>&lt;.0001</i>
Saudi	449	243 (54)	
Non-Saudi	244	67 (28)	
<b>Total</b>	<b>693</b>	<b>310 (45)</b>	

## Results

- Total of 693 reported MERS-CoV cases in KSA
- Overall, 80% of cases were male
- Average age of patient was 40–59 years old
- Patients were mostly male (80%)
- Out of 693 cases, 310 (45%) died
- Average age of patients who died was 50 years old; those who died were mostly ≥ 60 years old (79%)
- Number of MERS-CoV cases increased in KSA across years; case fatality rate (CFR) decreased

**Figure 1. Reported Cases and Deaths by Region, Kingdom of Saudi Arabia, 2012 – 2014**



**Table 2. Reported MERS-CoV Cases and Deaths by Age, Gender, and Nationality, Kingdom of Saudi Arabia, 2012 – 2014**

Characteristic	# Asymptomatic or Mild Symptoms (%)	Severe Symptoms (%)
<b>Age</b>		
0 – 19 y	16 (50)	
20 – 39 y	57 (28)	
40 – 59 y	16 (6)	
≥ 60 y	2 (1)	
<b>Gender</b>		
Male	37 (8)	
Female	54 (22)	
<b>Nationality</b>		
Saudi	37 (8)	
Non-Saudi	54 (22)	
<b>Total</b>	<b>91 (13)</b>	



# nts of MERS-CoV, Kingdom of Saudi Arabia, 2012 - 2014

## G-CoV cases from 2012– 2014

reported in 2014

s 49.3 years old; 35.8% were

(64%) and Saudi (65%)

) resulted in death

who died was 59.3 years old;

tly male (70%), Saudi (78%),

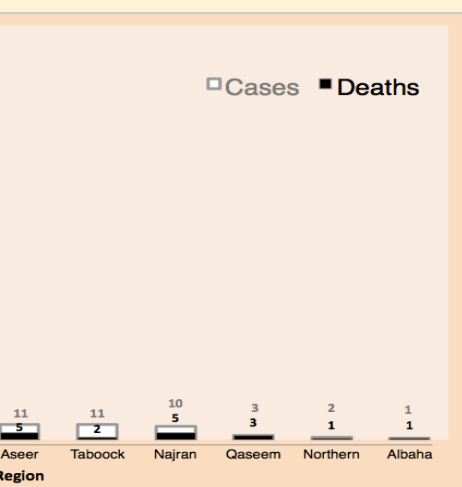
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the study period, while the

reased

ths of MERS-CoV, by Region,

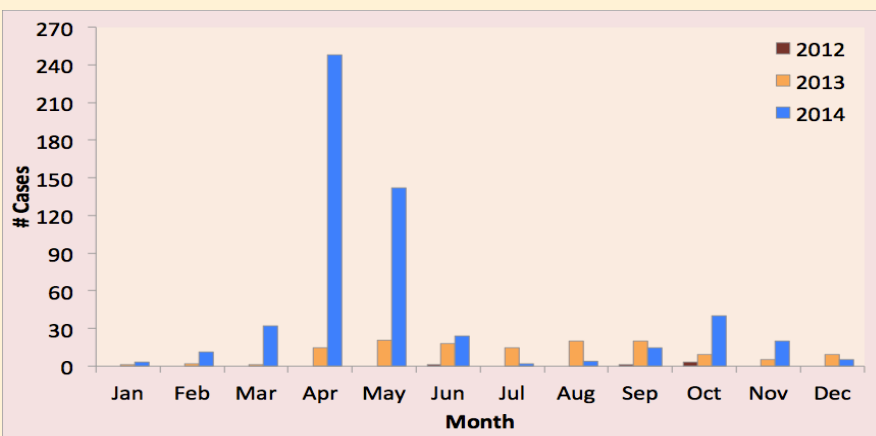
2014



## Severity, Kingdom of Saudi

ptoms and vived (%)	Severe Symptoms and #Died (%)	p-value
12 (37)	4 (12)	<.0001
107 (53)	37 (18)	
130 (52)	102 (41)	
43 (20)	167 (79)	
188 (49)	217 (43)	<.0001
104 (41)	93 (37)	
169 (38)	243 (54)	<.0001
123 (50)	67 (27)	
292 (42)	310 (45)	

Figure 3. Reported Cases of MERS-CoV, by Month and Year, Kingdom of Saudi Arabia, 2012 – 2014



## Discussion

- Despite decreases in the CFR, number of reported cases sharply increased and MERS-CoV remains a public health threat
- Significant increases of case reports in 2014 might be due to real increase, broadening of the case definition, or hospital-associated outbreaks
- CFR was very high, but there might be bias due to the greater attention paid to severe cases than asymptomatic/mild ones

## Recommendations

- We recommend:
  - Training for healthcare workers
  - Public health surveillance evaluation and strengthening (including adopting e-Surveillance),
  - Standardization of case reporting
  - Further studies addressing modes of transmission involving both human subjects and camels,
  - Monitoring compliance to current infection control protocols are also needed

## Introduction

- Tuberculosis (TB) remains a public health threat in KSA with challenges that limit its prevention and control.
- Laboratory diagnosis plays a key role in an effective TB program.

## Methods

- Estimated the TB incidence rates (IR) and 95% confidence interval (CI) stratified by nationality, gender, and administrative regions from 2005 – 2012
- Calculated proportion of TB cases, by age category, employment status, and nationality
- Assess laboratory capabilities by determining the proportion of laboratory-confirmed TB cases

Figure 1. Incidence Rates of Reported Cases of Tuberculosis, by Gender and Nationality, Kingdom of Saudi Arabia, 2005 – 2012

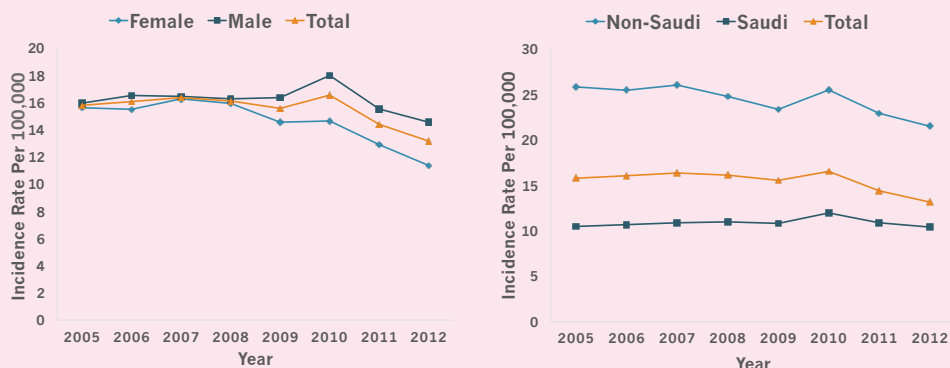


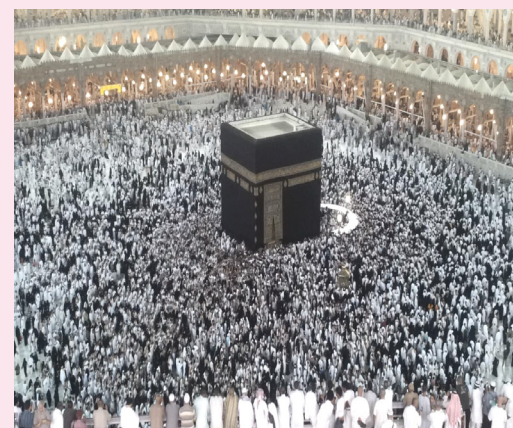
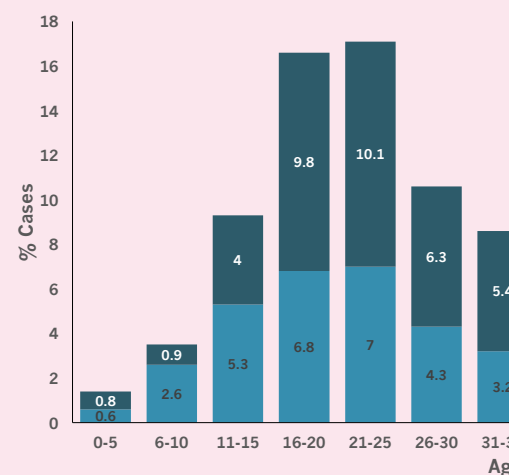
Figure 2. Number and Proportion of Reported Cases of Tuberculosis, by Nationality, Kingdom of Saudi Arabia, 2005 – 2012



## Results

- Total of 32,345 TB cases reported
- IRs significantly decreased (16.31) in 2005 to 13.6 (95% CI = 12.9-14.3) in 2012
- IRs for males and females were 16.5 and 15.5 respectively, but greater for males from 2009
- IRs of non-Saudis were 16.5 and Saudis during the study period
- Makkah region had greater IR than Riyadh and Jazan
- Proportion of laboratory-confirmed TB cases was 57%

Figure 3. Proportion of Reported Cases of Tuberculosis, by Age Group and Gender, Kingdom of Saudi Arabia, 2012

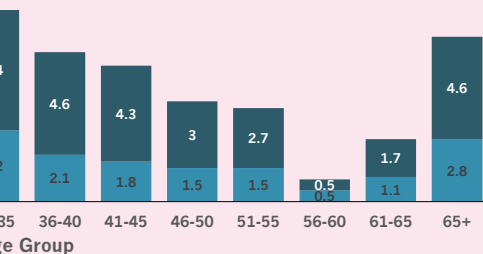


# of Tuberculosis, Kingdom of Saudi Arabia, 2005 - 2014

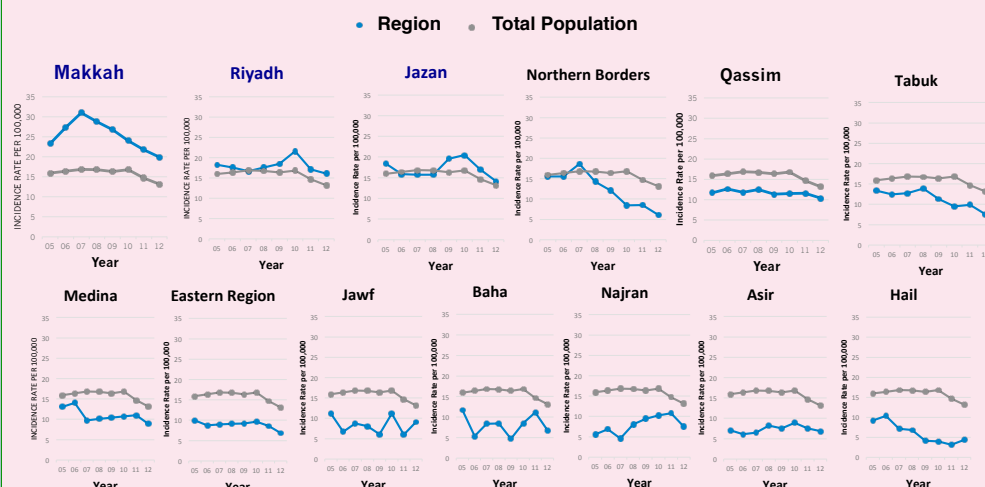
ported from 2005 – 2012  
 d from 15.8 (95%CI=15.29 –  
 e 12.74 – 13.58 ) in 2012  
 ere similar from 2005 – 2008,  
 9 – 2012  
 approximately twice those of  
 IRs than others, followed by  
 nfirmes cases of reported TB

ed Cases of Tuberculosis, By  
 dom of Saudi Arabia, 2005 –

■ Female ■ Male



**Figure 4. Incidence Rates of Reported Cases of Tuberculosis, by Region, Kingdom of Saudi Arabia, 2005 – 2012**



## Discussion

- Although the overall TB IRs significantly decreased from 2005 – 2012, it remains a public health threat in KSA
- TB IRs were greater among non-Saudis compared to Saudis, and greater among males than females
- IRs were highest in Makkah region, followed by Riyadh and Jazan

**Table 1. Culture and Smear Test Results for Reported Cases of TB, Kingdom of Saudi Arabia, 2005 – 2012**

Culture	Smear Test	#	Outcome	Final Outcomes		
Positive	Positive	874	Positive	Outcome	#	(%)
	Negative	627	Positive	Positive	18,429	57
	Not Done	82	Positive	Negative	8,474	26
Negative	Positive	93	Positive	Not done	5,505	17
	Negative	253	Negative	Total	32,435	100
	Not Done	26	Negative			
Not Done	Positive	16,753	Positive			
	Negative	8,195	Negative			
	Not Done	5,505	Not Done			

## Recommendations

- TB screening should be implemented for all non-Saudi workers at ports of entry
- Laboratory-screening should be evaluated throughout the country and strengthened



### Introduction

- Colorectal cancer (CRC) is a proliferation of tumors in the colon, appendix, or rectum
- Fastest growing cause of cancer-related illness and death globally and, in particular, in the Kingdom of Saudi Arabia (KSA)
- CRC is most-common cancer in males and third most-common in females in KSA

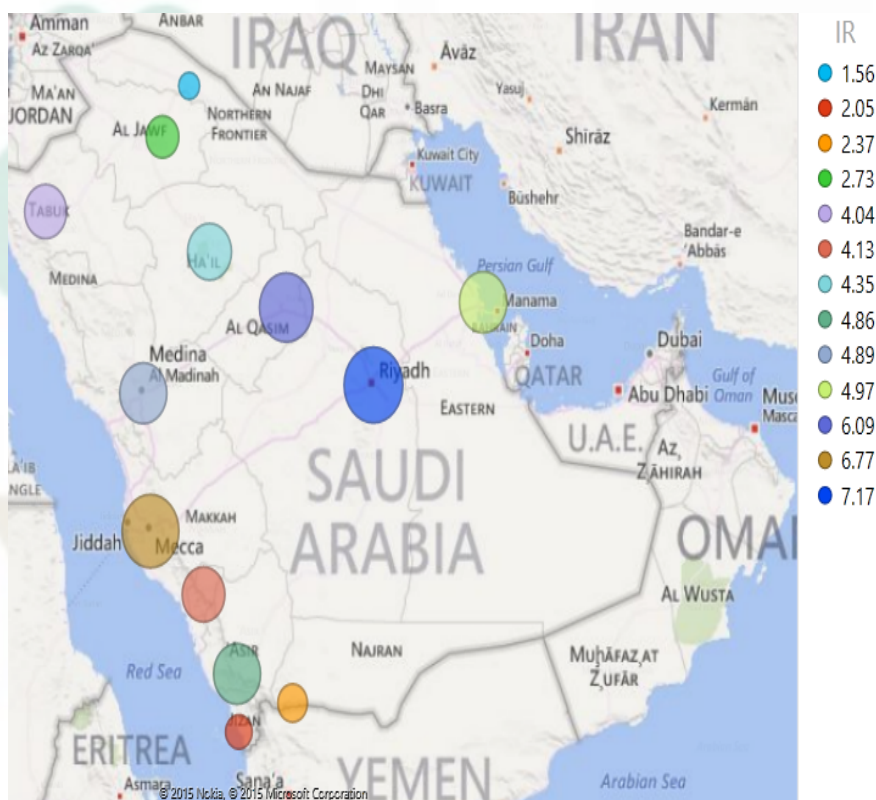
### Objectives

- Investigate trends in CRC incidence rates (IRs) from 2004 – 2010 in KSA
- Recommend further investigation
- Offer options for policy change

### Methods

- Estimated IRs and 95% confidence intervals (CIs) of CRC in KSA from 2004 – 2010
- CRC IRs were stratified by nationality, gender, and 13 administrative regions
- IRs estimated using number of cases per year over total population per 100,000 persons

Figure 1. Incidence Rates of Reported Cases of Colorectal Cancer, by Year and 13 administrative Region, Kingdom of Saudi Arabia, 2010



### Results

- Increase of IRs statistically significant from 2004 to 2010, with substantially higher IRs in 2010

Table 1. Reported Cases of Colorectal Cancer, by Year, Kingdom of Saudi Arabia, 2010

Year	#
2004	915
2005	1051
2006	1061
2007	1172
2008	1246
2009	1477
2010	1550
Total	8472

- Among Saudis, a significant increase in IRs from 2004 – 2010. A similar trend was observed among non-Saudis

Table 2. Reported Cases of Colorectal Cancer, by Year and Nationality, Kingdom of Saudi Arabia, 2010

Year	Saudi		
	#	IR <sup>a</sup>	95% CI <sup>a</sup>
2004	666	4.05	3.74 - 4.36
2005	789	4.68	4.35 - 5.01
2006	772	4.47	4.15 - 4.79
2007	864	4.88	4.56 - 5.21
2008	926	5.11	4.78 - 5.44
2009	1143	6.16	5.81 - 6.52
2010	1140	6.01	5.66 - 6.36
Total	6,300		

- Among males, IRs increased from 2004 – 2010 [from 4.26 in 2004 to 5.68 in 2010]
- Among females, a similarly significant increase was observed [from 3.8 in 2004 to 5.31 in 2010]

Table 3. Reported Cases of Colorectal Cancer, by Year and Gender, Kingdom of Saudi Arabia, 2010

Year	Male		
	#	IR <sup>a</sup>	95% CI <sup>a</sup>
2004	532	4.26	3.90 - 4.62
2005	629	4.85	4.47 - 5.23
2006	592	4.40	4.05 - 4.76
2007	674	4.83	4.47 - 5.20
2008	714	4.93	4.57 - 5.30
2009	875	5.83	5.44 - 6.21
2010	885	5.68	5.31 - 6.06
Total	4,901		

# Colorectal Cancer, Kingdom of Saudi Arabia, 2004 - 2010

Its

y significant from 2004 –  
gh IR in 2009

ctal Cancer and Incidence  
Arabia, 2004 – 2010

IR°	95% CI*
4.06	3.79 - 4.32
4.51	4.23 - 4.78
4.40	4.13 - 4.66
4.70	4.43 - 4.97
4.83	4.56 - 5.10
5.54	5.26 - 5.82
5.62	5.34 - 5.90

nt increase was observed  
among non-Saudis, a  
d.

ctal Cancer and Incidence  
Kingdom of Saudi Arabia, 2004 –

Non-Saudi			p-value
#	IR°	95% CI*	
223	3.64	3.17 - 4.12	0.17
249	3.85	3.37 - 4.32	<0.05
272	3.97	3.50 - 4.44	0.09
292	4.03	3.57 - 4.49	<0.05
310	4.04	3.59 - 4.49	<0.05
324	3.99	3.56 - 4.43	<0.05
404	4.70	4.24 - 5.16	<0.05
2,074			

ed significantly from 2004  
o 5.68 in 2010]

y significant increase in IR  
2004 to 5.55 in 2010]

ctal Cancer and Incidence  
om of Saudi Arabia, 2004 –

Female			p-value
#	IR°	95% CI*	
383	3.80	3.42 - 4.18	0.09
422	4.07	3.68 - 4.46	<0.05
469	4.39	3.99 - 4.79	0.97
498	4.53	4.13 - 4.93	0.27
532	4.70	4.30 - 5.10	0.40
602	5.17	4.76 - 5.58	<0.05
665	5.55	5.13 - 5.97	0.65
3,571			

Figure 2. Incidence Rates of Reported Cases of Colorectal Cancer, by Year and Region°, Kingdom of Saudi Arabia, 2004 – 2010 (IR order based on 2010)

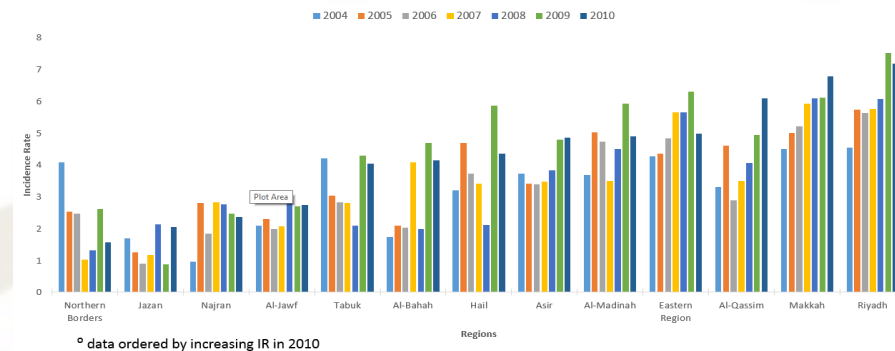
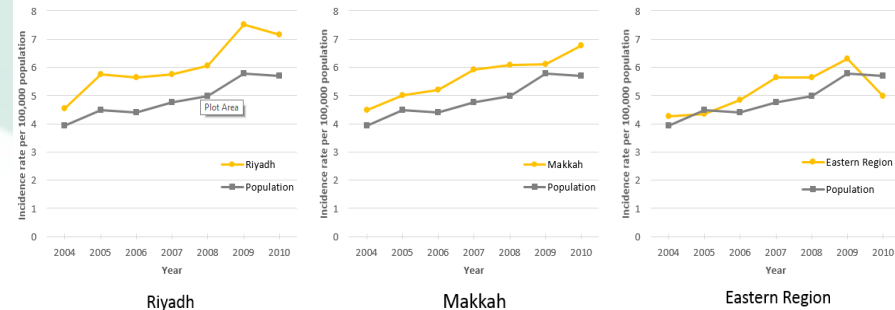


Figure 3. Incidence Rates of Reported Cases of Colorectal Cancer, by Year and Region, Kingdom of Saudi Arabia, 2004-2010



## Conclusion

- CRC incidence and mortality rates can be significantly diminished through early screening and detection, healthier diet, increased amounts of physical activity, and the elimination of harmful lifestyle habits

## Recommendations

- Investigate why there are higher IRs among men than women
- Study records of patients seen by private doctors
- Focus on individuals most at risk from CRC and determine risk factors

## Acknowledgments

- I would like to thank Natalie Schulhofer, Suman Kundu, Prabhjyot Saini, and the entire King Abdullah Fellowship team for their support
- Special thanks to the Ministry of Health and Saudi Cancer Registry



## Introduction

- Dengue fever (DF) is an infectious disease spread by the female mosquito *Aedes aegypti* which can cause severe illness and sometimes death
- Recent outbreak of DF in 2013 in Kingdom of Saudi Arabia (KSA) resulted in several deaths which necessitated enhanced public health surveillance

## Objectives

- Determine yearly incidence rate (IR) of DF for cities of Jeddah and Makkah from 2007 – 2013
- Calculate IR of DF in each city stratified by gender and nationality
- Analyze proportion of DF cases by age category and month of reporting

## Methods

- Used laboratory-confirmed cases reported in KSA from 2007 – 2013 which included demographic, clinical, laboratory, and epidemiologic information
- Calculated IRs using the number of cases over total population per 10,000 individuals
- Estimated population by gender using growth factor

## Results

- Overall, 18,772 confirmed cases of DF during 6-year study period; 67% from Jeddah (Table 1)
- IRs per 10,000 were <1 in Jeddah in 2007 and the same in Makkah in 2008. But in 2009, IRs in both cities were >10, and Makkah's IR was more than twice that of Jeddah's
- In Jeddah, the IRs of non-Saudis were generally greater than those of Saudis, and vice versa in Makkah (Figure 1)
- IRs were consistently higher in males than in females for both cities (Figure 2)
- Highest proportion of cases was reported in May in both cities (Figure 3)
- Age-specific proportions were similar in Jeddah and Makkah; over 60% of DF cases occurred among those aged 15 – 45 years old

Table 1. Reported Cases of Dengue Fever, by Year, Cities of Jeddah and Makkah, Saudi Arabia, 2007 – 2013

Year	Jeddah		
	#	IR <sup>a</sup>	95% CI <sup>b</sup>
2007	243	0.75	0.66 - 0.84
2008	807	2.44	2.28 - 2.60
2009	1,606	4.79	4.56 - 5.02
2010	2,244	6.55	6.28 - 6.82
2011	2,348	6.08	5.83 - 6.33
2012	991	2.49	2.33 - 2.65
2013	4,411	10.74	10.42 - 11.06
Total	12,650		

<sup>a</sup>IR = incidence rate per 10,000 population

<sup>b</sup>CI = confidence interval

Figure 1: Incidence Rate of Dengue Fever by Nationality, Cities of Makkah and Jeddah, Saudi Arabia, 2007 – 2013

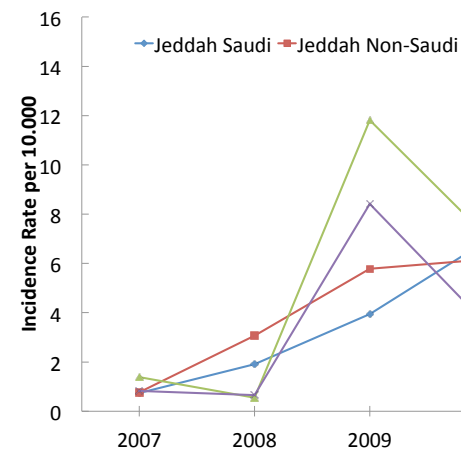
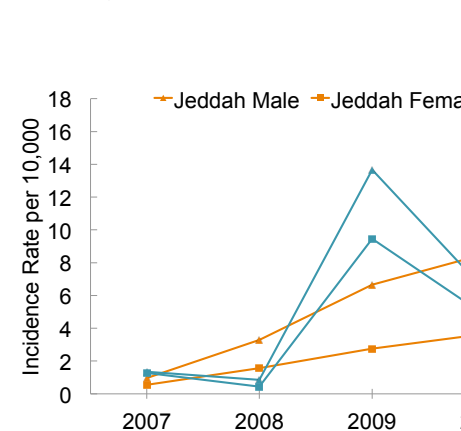


Figure 2: Incidence Rate of Dengue Fever by Gender, Cities of Jeddah and Makkah, Saudi Arabia, 2007 – 2013



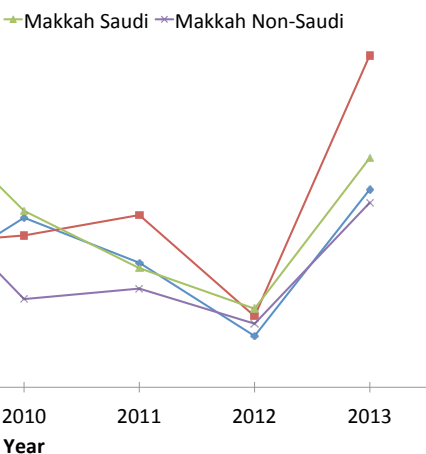


# Dengue Fever, Cities of Jeddah and Makkah, Kingdom of Saudi Arabia, 2007 - 2013

## Dengue Fever and Incidence in Jeddah and Makkah, Kingdom of Saudi Arabia

City	Makkah		
	#	IR <sup>a</sup>	95% CI <sup>a</sup>
Jeddah	182	1.16	1.00 - 1.33
Makkah	61	0.59	0.47 - 0.71
Jeddah	1,697	10.45	9.96 - 10.95
Makkah	949	5.72	5.36 - 6.08
Jeddah	867	4.48	4.18 - 4.78
Makkah	584	2.93	2.69 - 3.16
Jeddah	1,748	8.51	8.11 - 8.91
Total	6,122		

## Reported Dengue Fever, by City and Jeddah, Kingdom of Saudi Arabia



## Reported Dengue Fever, by Gender, Makkah, Kingdom of Saudi Arabia

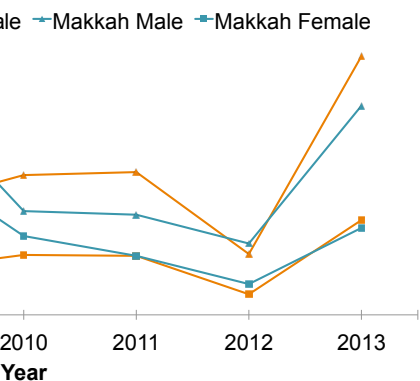
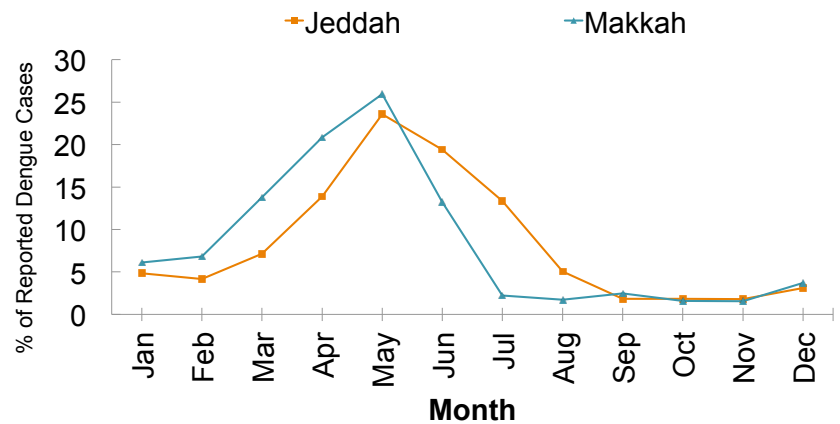


Figure 3. Percentage of Reported Dengue Cases in the Cities of Jeddah and Makkah, by Month, 2007 – 2013



Total Cases: Makkah= 6,122, Jeddah=12,650

## Conclusion

- 67% of all reported DF cases from 2007–2013 were from Jeddah
- IRs were higher in Jeddah than Makkah every year except 2009
- In Jeddah, IR of non-Saudis was greater than that of Saudis, and vice versa in Makkah
- IR of males was greater than that of females in both cities
- Greatest proportion of reported DF cases occurred among individuals aged 15-45 years
- Highest proportion of reported DF cases was observed in month of May. Proportion was lowest (<5%) from September to December in both cities

## Recommendations

- Develop comprehensive education campaign
- Improve mosquito control program
- Conduct follow-up studies to evaluate effectiveness of public health prevention and control efforts

## Acknowledgements

Thank you to the Ministry of Health in KSA for providing the data and to the KAFP team for their support.

### Introduction

- 3.2 billion people are at risk for malaria; 584,000 deaths in 2014
- Since 2000, 47% reduction in the global mortality rate, translating to 4.2 million lives saved
- KSA is a non-endemic country, though the southwest is at high risk

### Objectives

- Evaluate malaria trends in KSA from 2002 – 2011
- Analyze malaria incidence rates (IRs) stratified by administrative region, age, *Plasmodium* species, and transmission mode

### Methods

- IRs and 95% confidence Intervals (CIs) estimated using number of cases per year over total population per 100,000 persons in 13 KSA administrative regions from 2002 – 2011
- Proportion of malaria cases investigated by:
  - Age category
  - Species (*Falciparum*, *Vivax*, *Quartan*, and *Oval*)
  - Modes of transmission:
    - Local
    - Imported local (reported in one area of KSA but originally transmitted in another area of KSA)
    - Outside (imported from abroad)
    - Unclassified malaria parasite species
    - Illness by relapse or acquired by blood transfusion

Figure 1. Malaria-Endemic Countries in the Eastern Hemisphere, Centers for Disease Control and Prevention



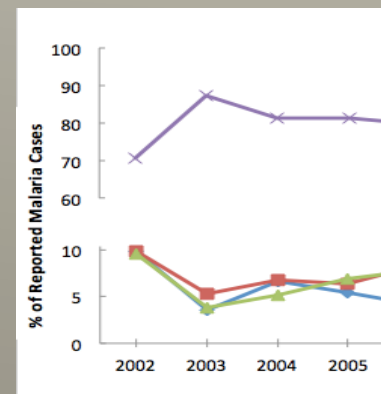
### Results

- 17,897 cases of malaria reported in KSA from 2002 – 2011
- In 2002, the IR for t [12.1 per 100,000 p [12.6)]; in 2007, the [11.8; 95%CI = 11.4 - 1
- Of 13 regions, great Jazan
- Tabuk, Jawf and East lower IRs than other
- Proportion of those v much higher for indi for those younger
- In 2012, proportion *falciparum* was muc *vivax*
- Malaria cases in KSA

Table 1. Reported Cases of Malaria in the Kingdom of Saudi Arabia, 2002 – 2011

Year	#
2002	2,583
2003	340
2004	1,229
2005	1,058
2006	1,278
2007	2,862
2008	1,491
2009	2,337
2010	1,934
2011	2,787
Total	17,897

Figure 4. Proportion of Reported Malaria Cases in the Kingdom of Saudi Arabia, 2002 – 2011



# of Malaria, Kingdom of Saudi Arabia, 2002 - 2011

## Results

Malaria reported to KSA MoH

Total population was highest  
population (95%CI = 11.6 -  
second-highest IR occurred  
[12.2]

test IRs were observed in

tern Region had consistently  
regions

with malaria was consistently  
individuals > 15 years old than

of malaria cases due to *P.*  
h lower than that due to *P.*

are mainly imported

ria and Incidence Rates, by Year,  
- 2011

IR°	95% CI
12.1	11.6 - 12.6
1.5	1.3 - 1.7
5.4	5.1 - 5.7
4.6	4.3 - 4.9
5.4	5.1 - 5.7
11.8	11.4 - 12.2
6	5.7 - 6.3
9.2	8.8 - 9.6
7.1	6.8 - 7.4
10	9.6 - 10.4

d Malaria Cases, by Age Category,  
- 2011

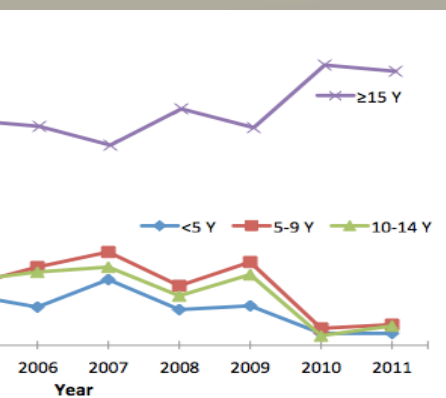


Figure 5. Proportions of Malaria Cases, Plasmodium Species, Kingdom of Saudi Arabia, 2002-2011

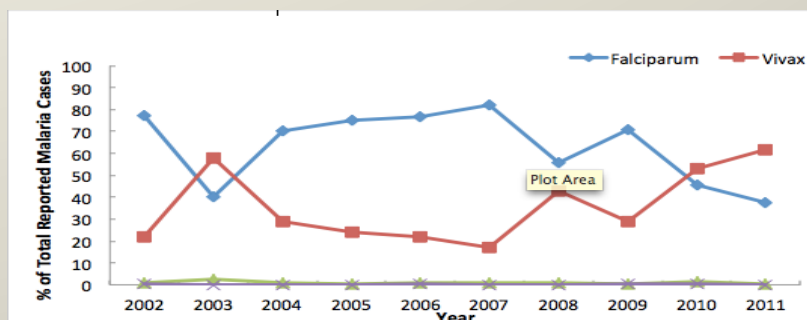
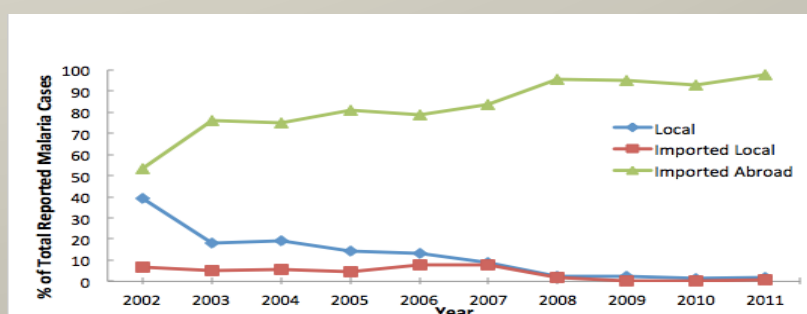


Figure 6. Proportion of Reported Malaria Cases, by Transmission Category, Kingdom of Saudi Arabia, 2002 - 2011



## Discussion

- Imported malaria has been major source of reported cases since 2002

## Recommendations

- Improve surveillance system to eliminate and prevent malaria
- Improve case definition, data collection, and data analysis
- Overcome political issues with Yemen to facilitate effective preventive measures
- Test those visiting the Kingdom for work, tourism, or religious purposes for any signs of malaria before entry

## Acknowledgments

- I would like to thank the Ministry of Health and Al-Noor Hospital in KSA for providing me the data and Natalie Schulhofer, Prabhjyot Saini, and Suman Kundu for their support.





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## EDITORIAL

# Commentary for Special Issue “Public health is new in Saudi Arabia. With this degree, I can go back and help to develop the field there.” — Naif Mohammed Alraihaan, King Abdullah Fellow, Rollins School of Public Health, 2015

## 1. Overview

In May 2010, His Excellency Dr. Abdullah Al Rabeeah (previous) Minister of Health of the Kingdom of Saudi Arabia (KSA) visited Emory University, Rollins School of Public Health (RSPH) to sign a memorandum of understanding (MOU). This MOU contained elements of collaboration that included the challenge to train MoH staff in the sciences of public health practice (e.g., epidemiology, biostatistics, program monitoring and evaluation, public health surveillance).

What emerged that year was the King Abdullah Fellowship Program (KAFFP); a joint effort of the Ministry of Health (MoH) of KSA, the Saudi Arabian Cultural Mission (SACM), and the RSPH. The KAFFP was established to further strengthen the healthcare in KSA by boosting the public health capacity there, raising the quality of the professional workforce, and promoting mutually beneficial scientific collaboration.

Since its inception, the KAFFP has grown in numbers and visibility, serving as a premier career development program in public health. To qualify for this 2-year scholarship, candidates are required to have worked four years at the MoH as physicians and be committed to returning to work in KSA after completion of their Master of Public Health (MPH)

degrees. By May 2015, 30 students will have graduated; 28 students are currently enrolled.

At RSPH, KA Fellows gain in-depth knowledge about core principles, theories, and best practices in public health. They have the benefit of RSPH's location adjacent to the Centers for Disease Control (CDC) headquarters, a proximity that provides our faculty and students with unparalleled opportunities for collaboration, joint research, teaching, continuing education and mentoring. At the same time, Fellows research issues of critical importance to the KSA healthcare landscape, completing at least 200 h of in-country fieldwork (called a practicum) and writing a research thesis.

The issues that students face during the acceptance, matriculation, and post-graduation phases of their MPH program point to the opportunities and challenges that exist for Saudis as both students studying in the United States and health professionals working to more firmly establish and expand the public health field currently taking shape in the KSA.

## 2. Admissions process

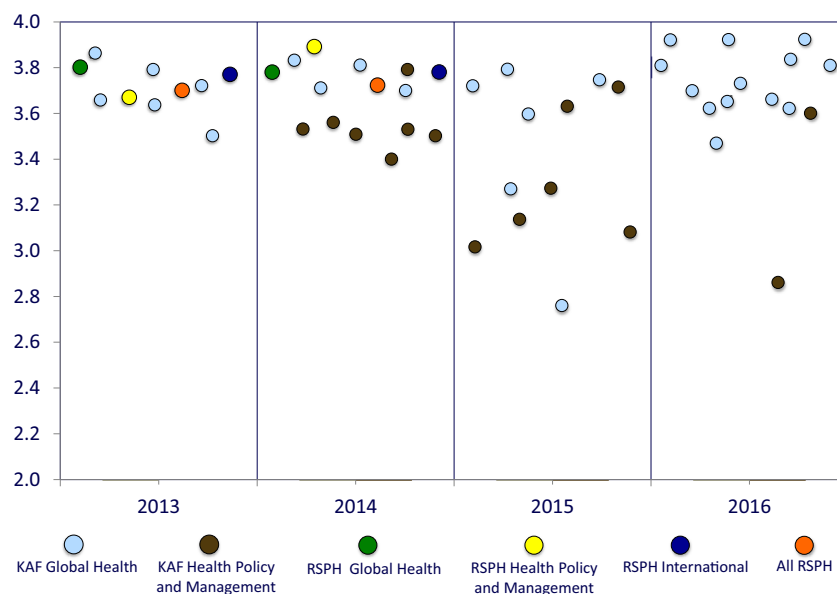
Initially, KAFFP candidates are interviewed and screened in KSA by KAFFP alumni who know what the students will face. After this, qualified

candidates apply directly to Emory, just as any other student would. During the application phase, candidates are judged on their transcripts, statements of purpose, Graduate Record Examination (GRE), and Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) scores. Standardized test scores are a major component of admissions criteria at RSPH. Because the test scores of KAFP candidates have generally been lower than those of other applicants, there has been resistance to offer them admission, which has been a major challenge to the KAFP.

The KSA applicants do not “look good on paper”. There are a several reasons why KAFP applicant performance on these exams is low compared to other applicants. The GRE contains information based on North American cultural norms and therefore can be considered culturally biased [8]. Due to different cultures, languages, and educational systems, foreign students tend to score substantially lower than Americans [7]. The use of topics such as sports, literature, and art in questions may make it more difficult for someone of a different cultural background to answer correctly within the allotted time period, no matter how intelligent or proficient in English they are. Furthermore, it was determined that GRE scores under-predicted grades received by older students and over-predicted the graduate ability of younger students [5]. This observation could be an

explanation for the situation of KA Fellows, who, as mid-career professionals, have been able to outperform expectations drawn from their GRE results (Fig. 1). Although their performance on the GRE may be lower than that of other applicants, their performance in the actual MPH program is commensurate with that of other students (see Tables 1–6).

While scores on both the TOEFL and IELTS exams are reliable indicators of English proficiency, it should be noted that correlations are negligible between TOEFL and GPA [4]. This is because above a certain level of English proficiency, other factors such as previous experience with subject matter, determination, academic aptitude, cultural awareness, and financial security have greater influence on academic success [6]. Medical training and work experience provide KA Fellows with both background knowledge and vocabularies well adapted for common class topics. In addition, KA Fellows, like any other students, have the ability to preview and review course material, record lectures, use dictionaries, and ask questions in and out of class. These facts allow KA Fellows to overcome any possible English weakness. Another factor unique to KA Fellows, which may explain their ability to succeed beyond what their standardized test scores predict, is the academic support they receive. KA Fellows receive supplemental instruction and editing assistance from full-time English as a Second Language (ESL) instructors as well as from tutors



**Fig. 1** Overall grade point averages of King Abdullah Fellows compared to Rollins School of Public Health (RSPH) graduates, by Department and Graduating Class, 2015–2016.

**Table 1** Overall grade point averages of King Abdullah Fellows, Hubert Department of Global Health, Rollins School of Public Health, 2013–2016.

Class of 2013	3.86	Class of 2014	3.83	Class of 2015	3.79
	3.79		3.81		3.75
	3.72		3.71		3.72
	3.70		3.70		3.60
	3.65				3.27
	3.50				2.76
Class of 2016	1	3.92	8	3.70	
	2	3.92	9	3.66	
	3	3.92	10	3.65	
	4	3.84	11	3.62	
	5	3.81	12	3.62	
	6	3.81	13	3.47	
	7	3.73			

**Table 2** Overall grade point averages of King Abdullah Fellows, Health Policy and Management, Rollins School of Public Health, 2014–2016.

Class of 2014	3.79	Class of 2015	3.72
	3.56		3.63
	3.53		3.27
	3.53		3.14
	3.51		3.12
	3.40		3.08
Class of 2016			3.60
			2.86

in biostatistics, epidemiology, data analysis and accounting. KA Fellows also receive cultural awareness training upon arrival.

On the Saudi side, once they have been accepted, MoH employees often have a difficult time securing leave from their jobs, which often delays their arrival. Additionally, Ramadan, a holy month for Muslims, has occurred over the summer

in recent years, resulting in delays in public and government sectors, and also affecting students' arrival [9]. Students routinely miss orientation on account of these issues. After they have received approval for leave from the MoH and been accepted to Emory, the Ministry of Civil Service must provide the final clearance for their departure. Yearly, students experience significant delays in this process, which impedes their ability to adjust to life in a new country in time to start their first semester without stress. Sometimes they arrive after classes begin.

### 3. Experiences at RSPH

Past and current Fellows have studied in the Global Health and Health Policy and Management (HPM) departments, concentrating specifically in Infectious Disease, Community Health, Public Nutrition, Health Policy, and Health Management. In these departments, KA Fellows have thrived. Fig. 1 shows that KA Fellows earned GPAs of

**Table 3** Thesis topics of King Abdullah Fellows, 2013 Cohort.

Hisham Bashawri	Sleepless in Makkah City, Saudi Arabia: prevalence and risk factors of insomnia and the variations in sleep quality among visitors of Primary Health Care Centers
Mohammad Al Khalawi	Evaluation of Tuberculosis public health surveillance, Al-Madinah Province, Kingdom of Saudi Arabia, 2012
Fawaz Al Rasheedi	Measles trends in the Kingdom of Saudi Arabia, 2002–2012
Fatima Al Slail	A descriptive study of cardiovascular risk profiles of adults with type 2 diabetes from Hospitals in Urban Saudi Arabia over a five year period (2008–2012), Riyadh, Saudi Arabia
Osama Mohammed	Dengue fever in Makkah, Kingdom of Saudi Arabia, 2008–2012
Saud Alzahrani	Analyses of foodborne disease outbreaks during Hajj, Makkah, Kingdom of Saudi Arabia, 2009–2011

**Table 4** Thesis topics of King Abdullah Fellows, 2014 Cohort.

Hamoud Al Garni	Trends of reported cases of Hepatitis b virus infection, Kingdom of Saudi Arabia, 2009–2013
Rana Al Helali	Evaluation of home respiratory therapy delivered to patients in the Ministry of Health's Home Medical Program (HMP) and Administered through the Madinah HMP Center, Kingdom of Saudi Arabia, 2013
Abdullah Alshahrani	Trends in the reported cases of Hepatitis c virus infection, Ministry of Health, Kingdom of Saudi Arabia, 2008–2012
Abdulaziz Aloufi	Trends of reported human cases of Brucellosis, Kingdom of Saudi Arabia, 2004–2012

**Table 5** Thesis topics of King Abdullah Fellows, 2015 Cohort.

Alanoud Alsaiari	Meningitis in KSA 1994–2014: secondary data analysis
Fahad Almutairi	Tuberculosis in KSA 2005–2013
Hassan Aldosari	Distribution and determinants of MERS COV in KSA 2012–2015
Mai Jamdar	Malaria in KSA 2002–2012
Marei Alrouaili	Colorectal cancer in KSA: incidence and determinants 2001–2010

**Table 6** Minimum required English as a second language test scores, by Department, Rollins School of Public Health, 2015.

Department	TOEFL (IELTS)
Global Health	80 (6.5)
Health Policy and Management	80 (6.5)
Behavior Sciences and Health Education	60 (6)
Epidemiology	100 (7)
Biostatistics and Bioinformatics	85 (6.5)
Environmental Health	80 (6.5)

≥3.5 out of 4. The average GPA of each graduating class of KA Fellows is comparable with the average overall GPAs of their respective department, the average overall GPA of international students, and the average overall GPA of the entire school (Fig. 2). In light of the strength of their track records and the immediate and growing public health needs in KSA, it is important that KA Fellows be able to study in all departments of the school, acquiring deep skills in other critical areas like epidemiology, biostatistics, environmental health, and behavioral science and health education.

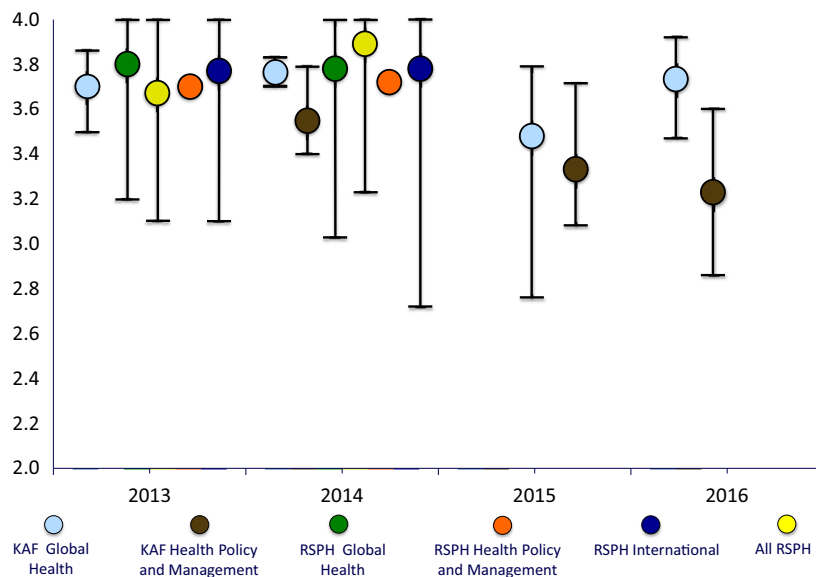
Students from KSA bring special assets to the school and contend with particular challenges. They have excelled academically (Fig. 1) and drawn from their experiences as health professionals in KSA. They have acted as cultural ambassadors. In 2013, a female physician KA Fellow was invited and delivered the school-wide commencement speech at graduation ([www.youtube.com/watch?v=oelstvBfPwnE](http://www.youtube.com/watch?v=oelstvBfPwnE)). Her speech now has >16,000 downloads. They have been active outside of the classroom too, publishing editorials in the student newspaper and founding the Saudi Students Association, the first such organization on Emory's campus.

The challenges KA Fellows face while studying here are several. English is their second language, and most have not had a rigorous formal English language education, so participating in group projects and writing papers can be a struggle at first. They also lack exposure to higher-level math, which they do not study in medical school and may not have taken since 10th grade. In addition to these academic issues, there are personal challenges. KA Fellows generally have larger family sizes than other students, and along with that, increased family pressures (taking care of small children, dealing with illnesses) that take them away from their studies. Additionally, the cultural and religious atmospheres of KSA and the United States are vastly different, and adjusting to life in the United States (while also helping family members adjust) can be difficult. Lastly, these physicians must live under the financial strain of earning only half of their salaries in an expensive city.

4. Experience returning to KSA

After graduating, KA Fellows return to KSA with a global orientation to public health, highly motivated to address KSA's own priority health issues. According to a survey of KAFP alumni, the majority





**Fig. 2** Overall mean and range grade point averages of King Abdullah Fellows (KAF) compared to Rollins School of Public Health (RSPH) graduates, by Department and Graduating Class, 2015–2016.

of graduates considered earning their MPH at Emory to have been a positive and transformational educational experience. Half of the survey respondents indicated that their positions had changed and responsibilities grown since graduating.

Today, KAFP alumni are working on the front lines of public health: leading the MERS-CoV surveillance effort in Madinah, directing the National Diabetes Prevention and Control Program, heading up the Health Policy department in Eastern Province, supervising training in Makkah for the Center for Mass Gathering Medicine, coordinating quality control in the Infectious Disease department, and studying for PhDs and board certification in Community Medicine.

One of the main hurdles upon their return is the lack of a clear career path. Public health as a field is still new in KSA. The late King Abdullah invested tremendously in the health sector and specifically the public health sector. Current developments in KSA's public health sector such as the new Center for Command and Control (established with support from the CDC) and the Center for Mass Gathering Medicine (with support from WHO) exemplify the kinds of initiatives that the KAFP is ideally positioned to strengthen. However, the level of knowledge about public health and viable career paths within the field are still limited.

The recent growth and transformation of the field in some ways mirrors that of the public health field's emergence in the United States. In the first

part of the 20th century, successes that accompanied the implementation of preventive measures inspired stronger governmental and societal involvement in public health. In 1935, through the Social Security Act, the government allocated funding to support public health services and workforce training (Future of Health). In 1946, the federal government established The Centers for Disease Control and Prevention (CDC), which is now at the forefront of U.S. public health efforts to prevent and control infections and chronic diseases, injuries, workplaces hazards, disabilities, and environmental health threats [2]. The CDC then formed the Epidemic Intelligence Service (EIS) in 1951, an applied epidemiology training and service program through which officers conduct epidemiologic investigations and public health surveillance within and outside of the United States [3]. Since then, government organizations and universities across the United States have instituted preventive medicine residencies and fellowships, where health professionals gain hands-on experience in public health agencies at the federal, state, and local levels [1].

As RSPH prepares to enroll the fifth cohort of Fellows in 2015, we are confident that we are educating some of the world's most dedicated and talented public health leaders, who are returning to KSA well equipped to provide leadership and innovation for addressing the major causes of illness and death in the Kingdom.

## 5. Recommendations

- Increased involvement of the KA alumni group in selection and screening of candidates.
- Establish career paths for public health professionals, including graduates of MPH programs.
- Board certification for public health (or preventative medicine) programs.
- Streamlined process between MoH and Civil Service so that students can travel here earlier to prepare for classes.

## References

- [1] Centers for Disease Control and Prevention. Preventive Medicine Residency and Fellowship (PMR/F); 2012 [retrieved March 31, 2015].
- [2] Centers for Disease Control and Prevention. Our History – Our Story; 2013 [retrieved March 31, 2015].
- [3] Centers for Disease Control and Prevention. History of EIS; 2015 [retrieved March 31, 2015].
- [4] Cho Y, Bridgeman B. Relationship of TOEFL iBT(R) scores to academic performance: some evidence from American Universities. *Lang Test* 2012;29(3):421–42. <http://dx.doi.org/10.1177/0265532211430368>.
- [5] House JD. Age bias in prediction of graduate grade point average from graduate record examination scores. *Educ Psychol Meas* 1989;49(3):663–6. <http://dx.doi.org/10.1177/001316448904900319>.
- [6] Johnson P. English language proficiency and academic performance of undergraduate international students. *TESOL Q* 1988;22(1):164–8. <http://dx.doi.org/10.2307/3587070>.
- [7] Kaiser J. The differential predictive validity of the GRE aptitude test for foreign students. In: Paper presented at the Annual Meeting of the Eastern Educational Research Association. Baltimore, MD; 1983.
- [8] Mupinga EE, Mupinga DM. Perceptions of international students toward graduate record examination (GRE). *Coll Student J* 2005;39:402.
- [9] Radwan A. Doing business during ramadan; 2007 [retrieved March 31, 2015].

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