



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



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Acknowledgements



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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

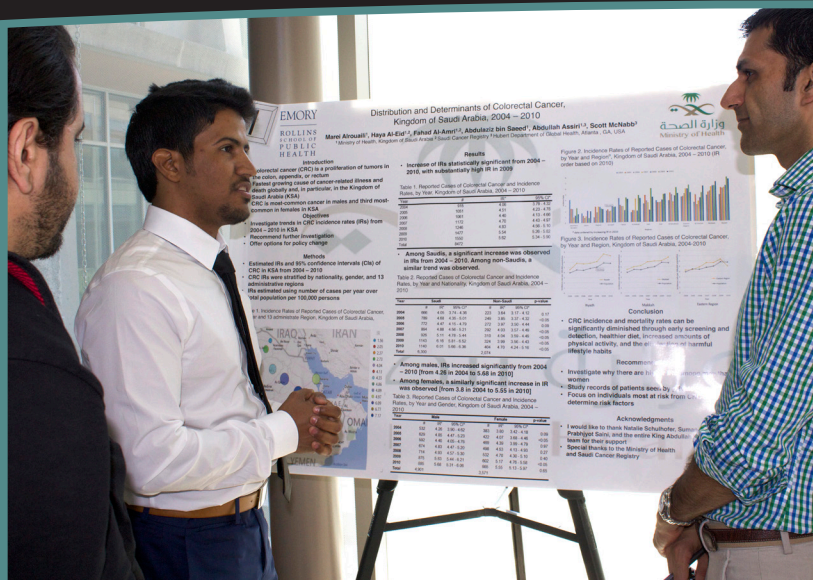
Sep 2015: Drs. Hisham Bashawri and Sulafa Alqutub join KAFP as In-Country Program Directors.

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: 2nd 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: 2nd 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
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Hisham Bashawri
M.B.B.S., MPH

In-country Director
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Sulafa Alqutub
M.B.B.S., MPH

In-country Director
Health Policy and
Management



Lea Matar
BSc., MPHc

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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

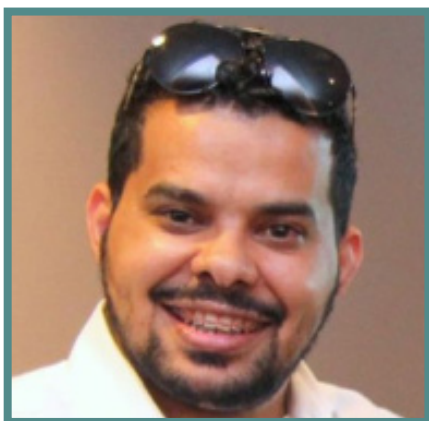


Hossam Alakhrass
M.B.B.S., MPH

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

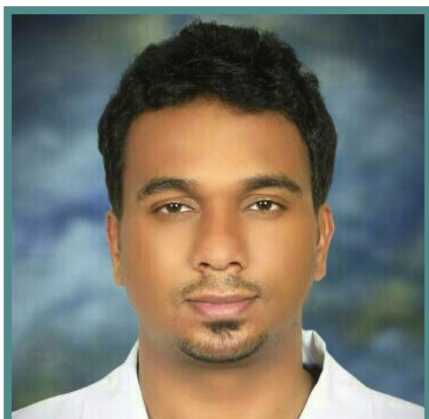


Mohammed Aldhafiri
BSN, MPH

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

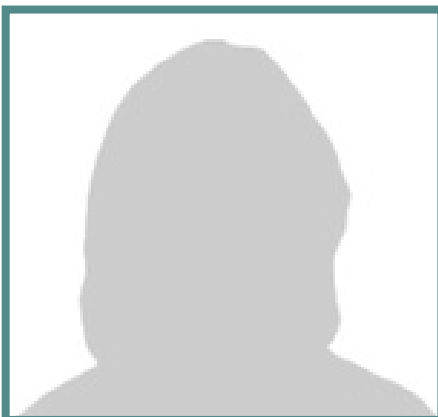


Zaki Algasemi
M.B.B.S., MPH

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
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Hubert Department of Global Health



Mohrah Al-Alawi
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Education:

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Work Experience and Training:

Epidemiology Resident, Communicable Disease
and Vector Control Directorate



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

Education:

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Work Experience and Training:

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Yahya Alasseri
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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



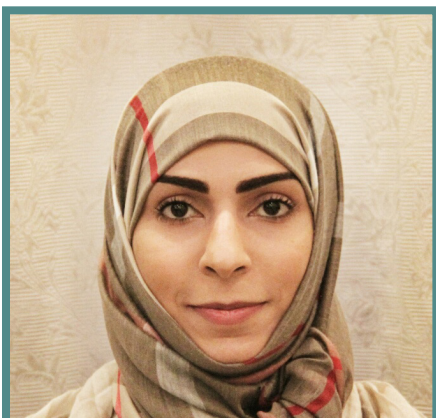
Naif Alraihaan
M.B.B.S., MPH

Education:

Bachelor of Medicine and Surgery

Work Experience and Training:

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

Education:

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Work Experience and Training:

Resident



Yasser Bakhsh
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Education:

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Work Experience and Training:

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Shada Baoum
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Education:

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Work Experience and Training:

Family Physician Specialist



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

Education:

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Work Experience and Training:

Resident

King Abdullah Fellows Cohort of 2014

Hubert Department of Global Health



Eiman Gaid
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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
Year			<i><.01</i>
2012	5	3 (60)	
2013	136	76 (56)	
2014	552	231 (42)	
Age			<i><.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)	
Gender			<i><.01</i>
Male	442	217 (49)	
Female	251	93 (37)	
Nationality			<i><.0001</i>
Saudi	449	243 (54)	
Non-Saudi	244	67 (28)	
Total	693	310 (45)	

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

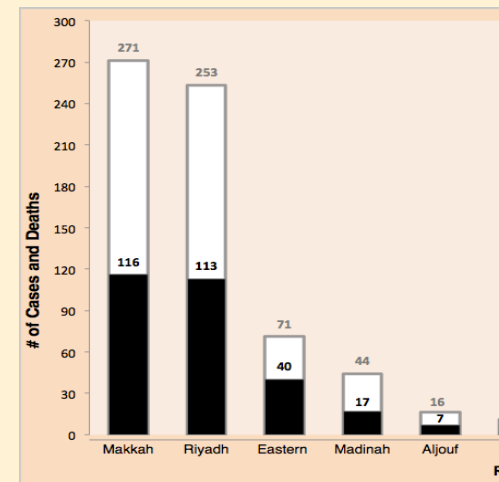


Table 2. Reported MERS-CoV Cases and Deaths by Age, Gender, and Nationality, Kingdom of Saudi Arabia, 2012 – 2014

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

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%)

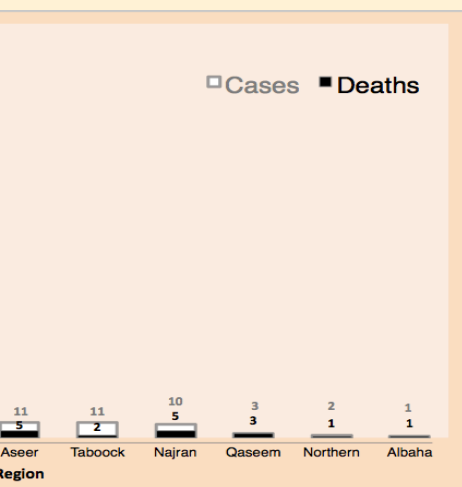
) resulted in death

who died was 59.3 years old;

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

ses and deaths significantly
the study period, while the
reased

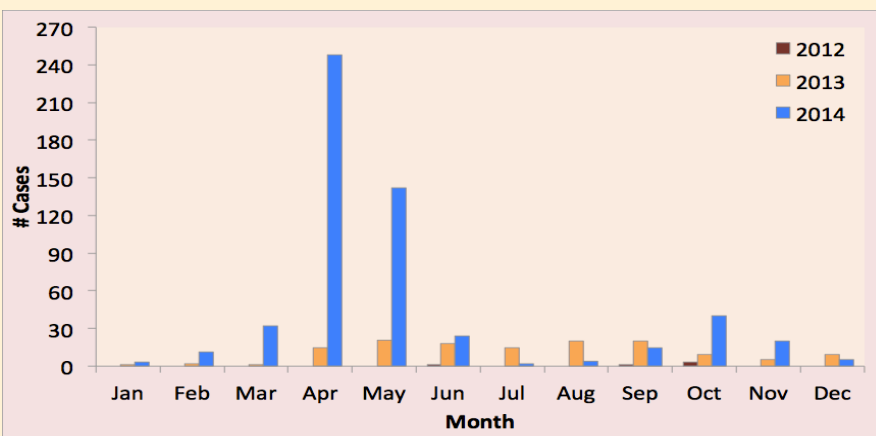
ths of MERS-CoV, by Region,
2014



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

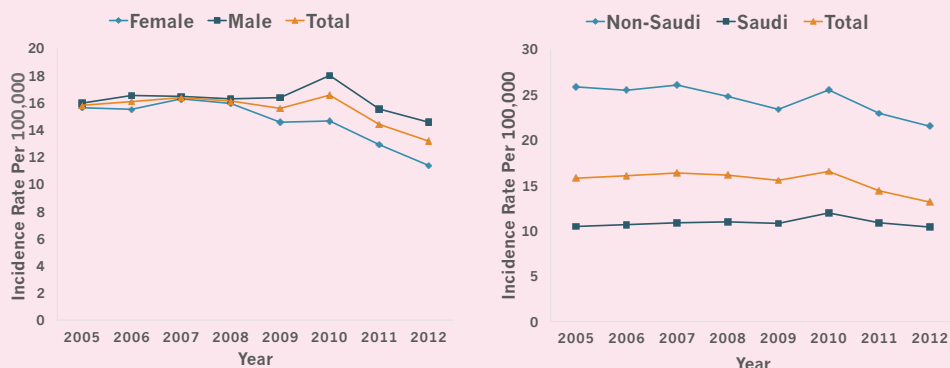


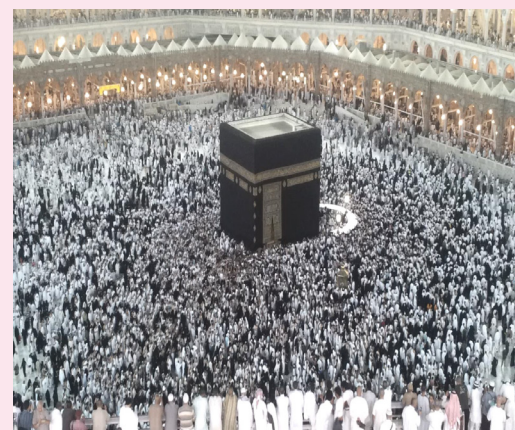
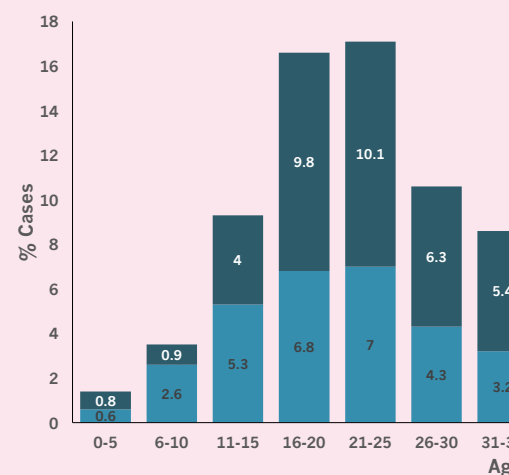
Figure 2. Number and Proportion of Reported Cases of Tuberculosis, by Nationality, Kingdom of Saudi Arabia, 2005 – 2012



Results

- Total of 32,345 TB cases reported
- IRs significantly decreased (16.31) in 2005 to 13.6 (95% CI = 12.8-14.4) in 2012
- IRs for males and females were 16.31 and 14.95 respectively, but greater for males from 2005 to 2012
- IRs of non-Saudis were 16.5 and Saudis 10.5 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

pproximately 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

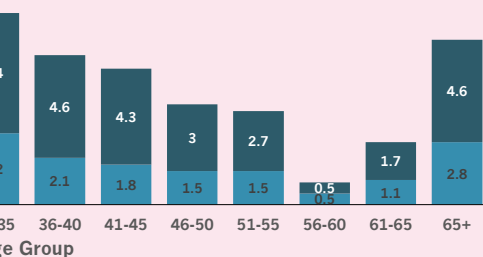
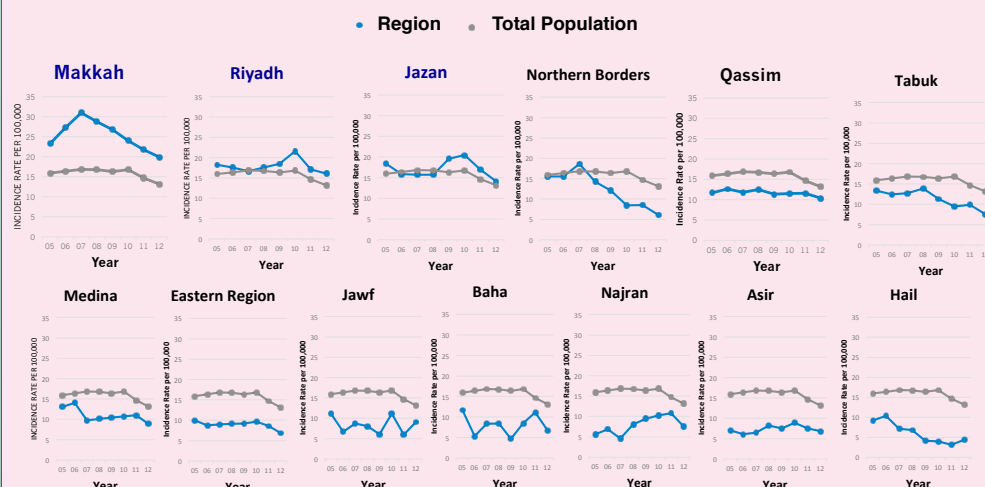


Figure 4. Incidence Rates of Reported Cases of Tuberculosis, by Region, Kingdom of Saudi Arabia, 2005 – 2012



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

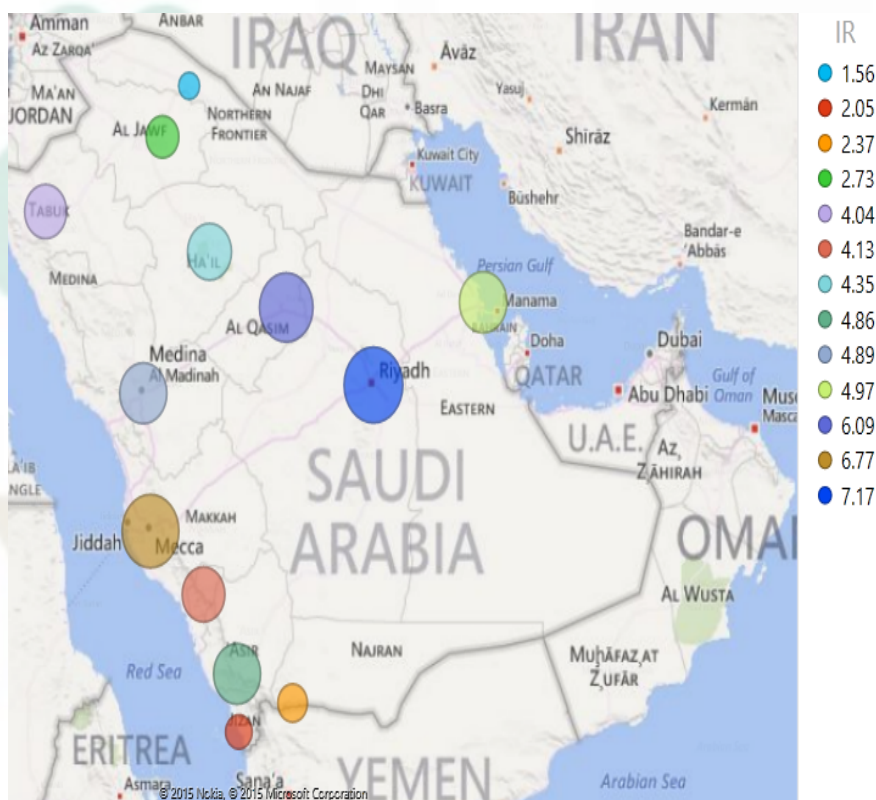
Objectives

- 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 ^a	95% CI ^a
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 ^a	95% CI ^a
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)

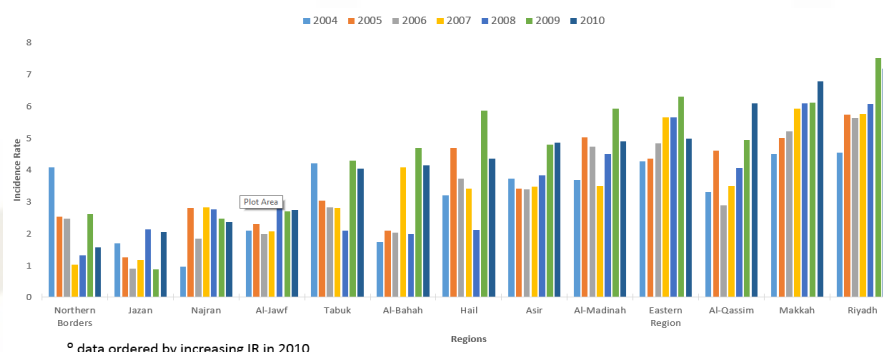
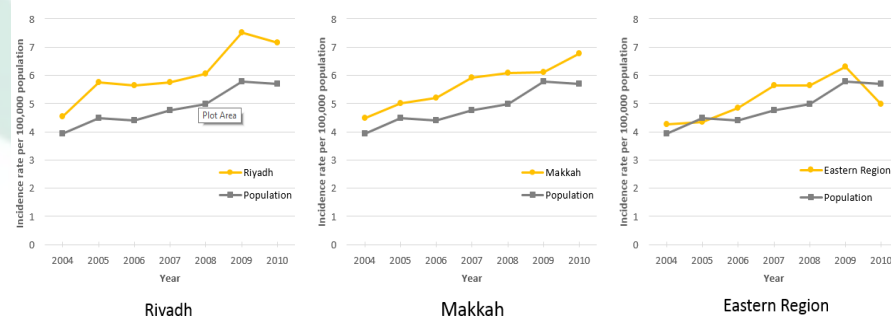


Figure 3. Incidence Rates of Reported Cases of Colorectal Cancer, by Year and Region, Kingdom of Saudi Arabia, 2004-2010



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 ^a	95% CI ^b
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		

^aIR = incidence rate per 10,000 population

^bCI = confidence interval

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

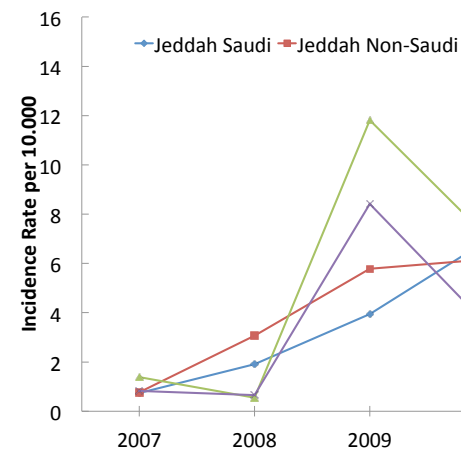
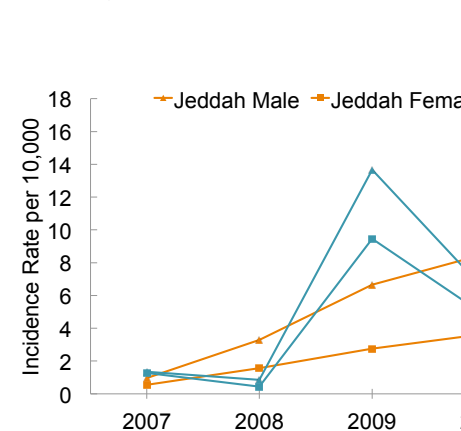


Figure 2: Incidence Rate of Dengue Fever by Gender, Cities of Jeddah and Makkah, Saudi Arabia, 2007 – 2013

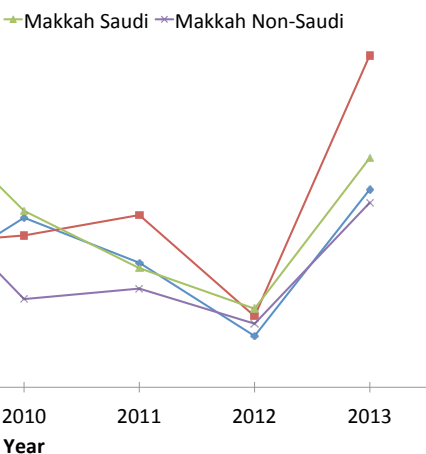


Dengue Fever, Cities of Jeddah and Makkah, Kingdom of Saudi Arabia, 2007 - 2013

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

City	Makkah		
	#	IR ^a	95% CI ^a
2007	182	1.16	1.00 - 1.33
2008	95	0.59	0.47 - 0.71
2009	1,697	10.45	9.96 - 10.95
2010	949	5.72	5.36 - 6.08
2011	867	4.48	4.18 - 4.78
2012	584	2.93	2.69 - 3.16
2013	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

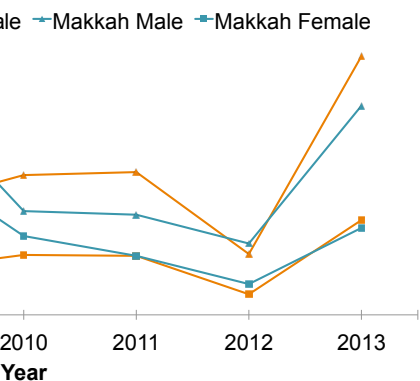
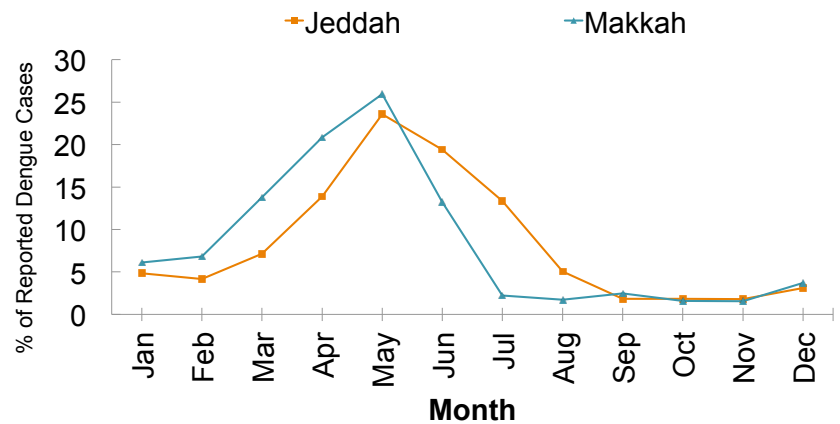


Figure 3. Percentage of Reported Dengue Cases in the Cities of Jeddah and Makkah, by Month, 2007 – 2013



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



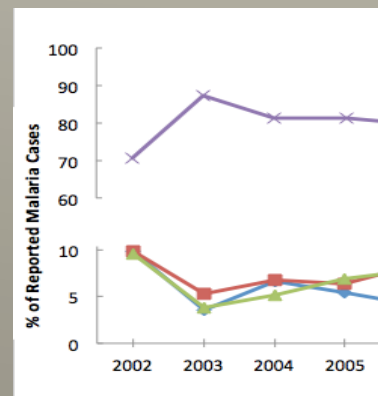
Results

- 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

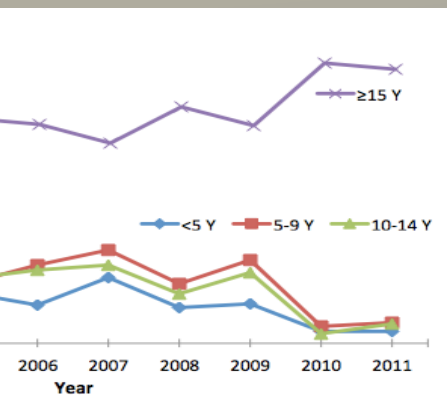


Figure 5. Proportions of Malaria Cases, Plasmodium Species, Kingdom of Saudi Arabia, 2002-2011

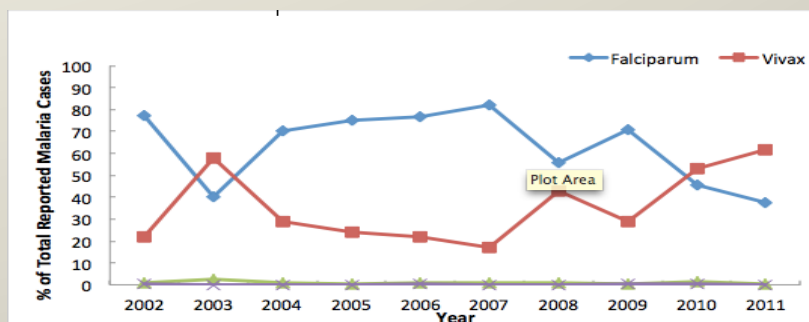
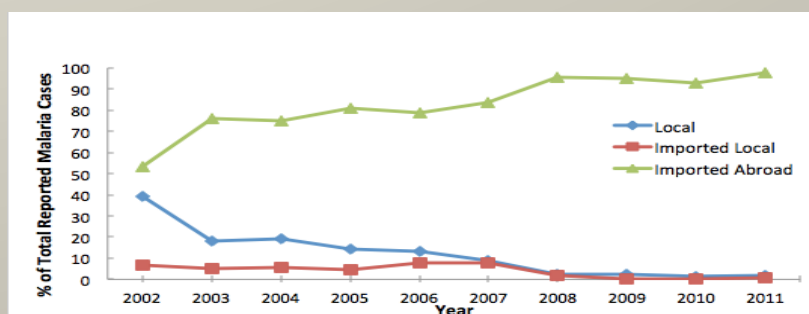


Figure 6. Proportion of Reported Malaria Cases, by Transmission Category, Kingdom of Saudi Arabia, 2002 - 2011



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

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