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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 and Incidence Rates, by Year, Cities of Jeddah and Makkah, Kingdom of Saudi Arabia, 2007 – 2013

Year	Jeddah			Makkah		
	#	IR	95% CI*	#	IR	95% CI*
2007	243	0.75	0.66 - 0.85	182	1.16	1.00 - 1.33
2008	807	2.44	2.28 - 2.61	95	0.59	0.47 - 0.71
2009	1,606	4.79	4.56 - 5.03	1,697	10.45	9.96 - 10.95
2010	2,244	6.55	6.28 - 6.82	949	5.72	5.36 - 6.08
2011	2,348	6.08	5.83 - 6.33	867	4.48	4.18 - 4.78
2012	991	2.49	2.33 - 2.64	584	2.93	2.69 - 3.16
2013	4,411	10.74	10.42 - 11.05	1,748	8.51	8.11 - 8.91
Total	12,650			6,122		

IR = incidence rate per 10,000 population

*CI = confidence interval

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

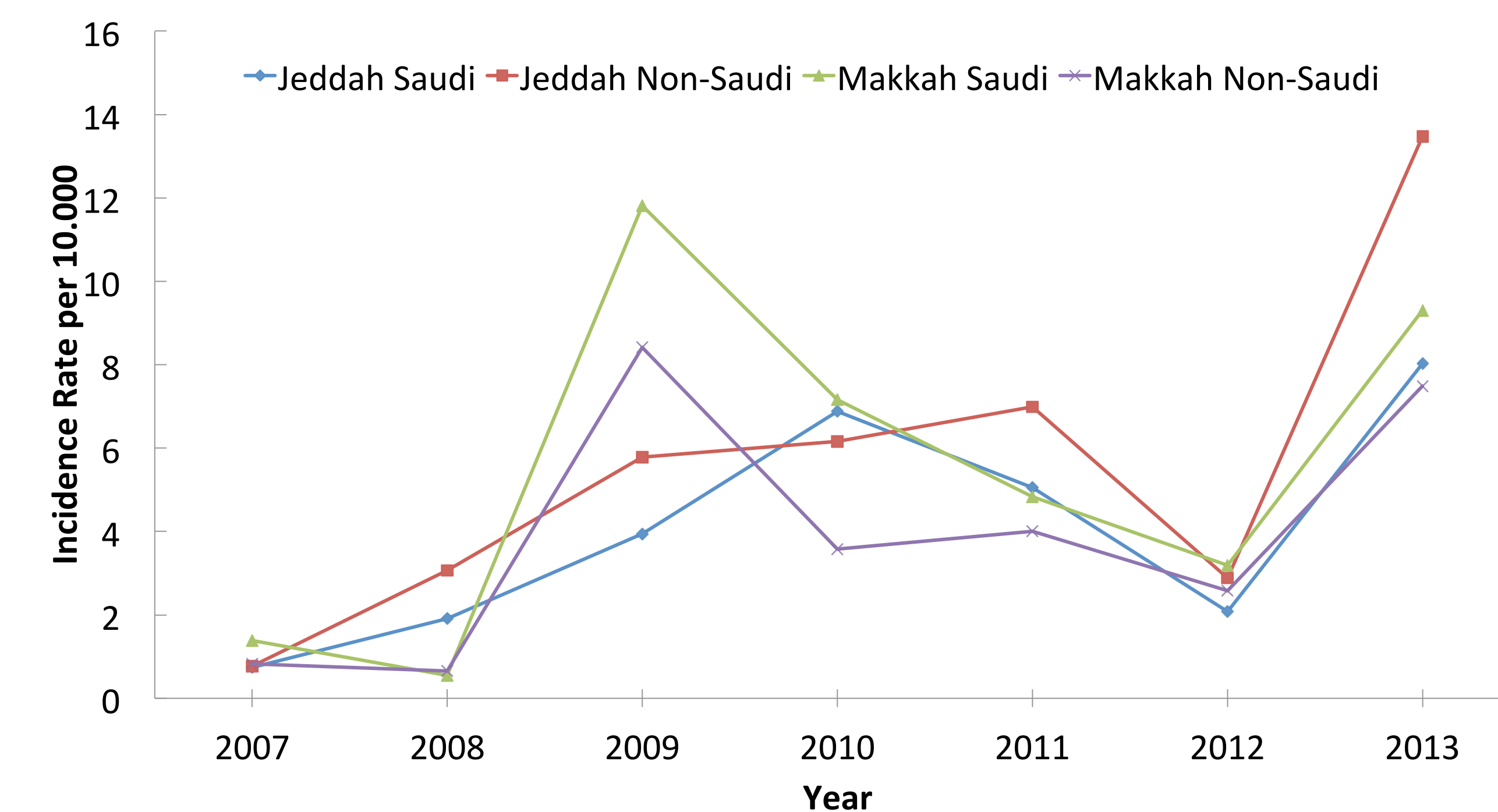


Figure 2. Incidence Rate of Reported Dengue Fever, by Gender, Cities of Jeddah and Makkah, Kingdom of Saudi Arabia, 2007 – 2013

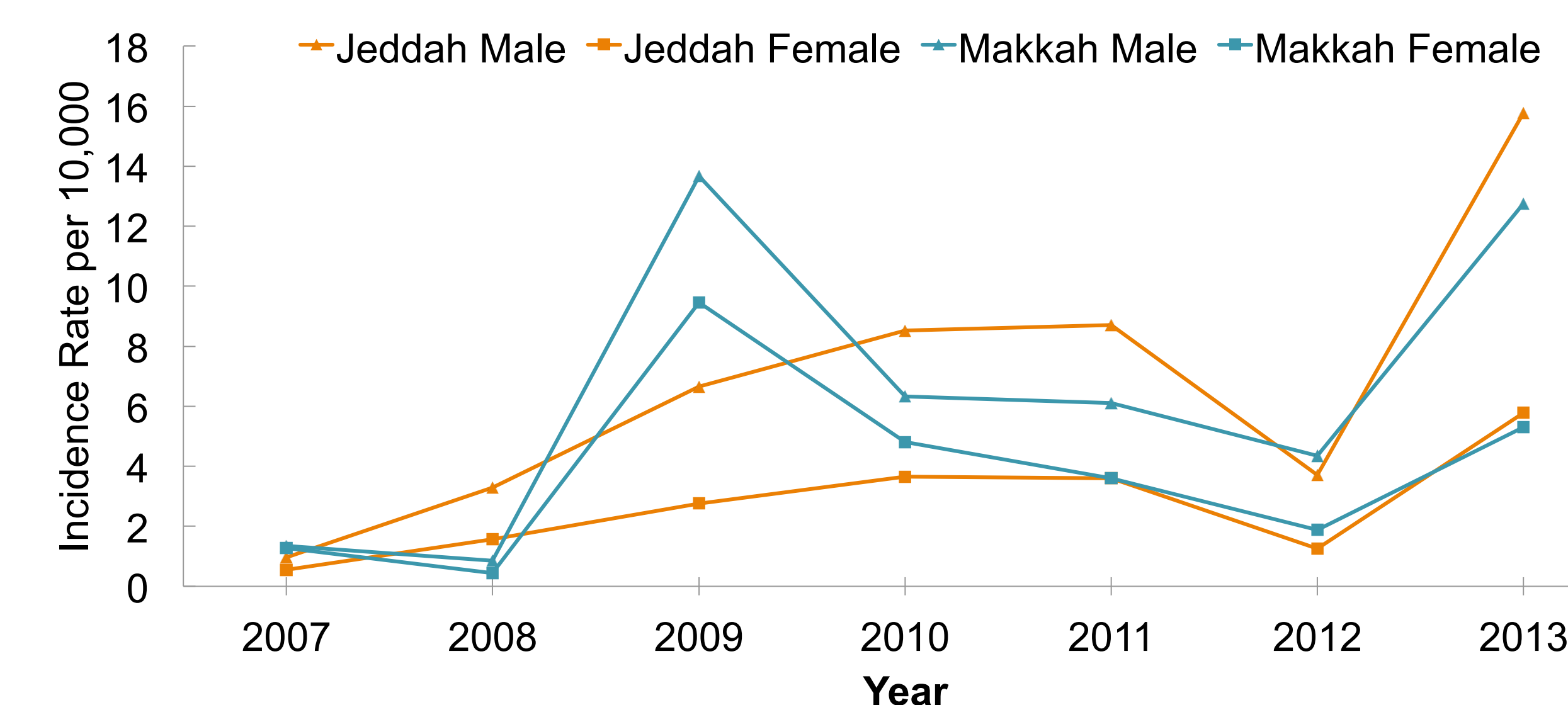
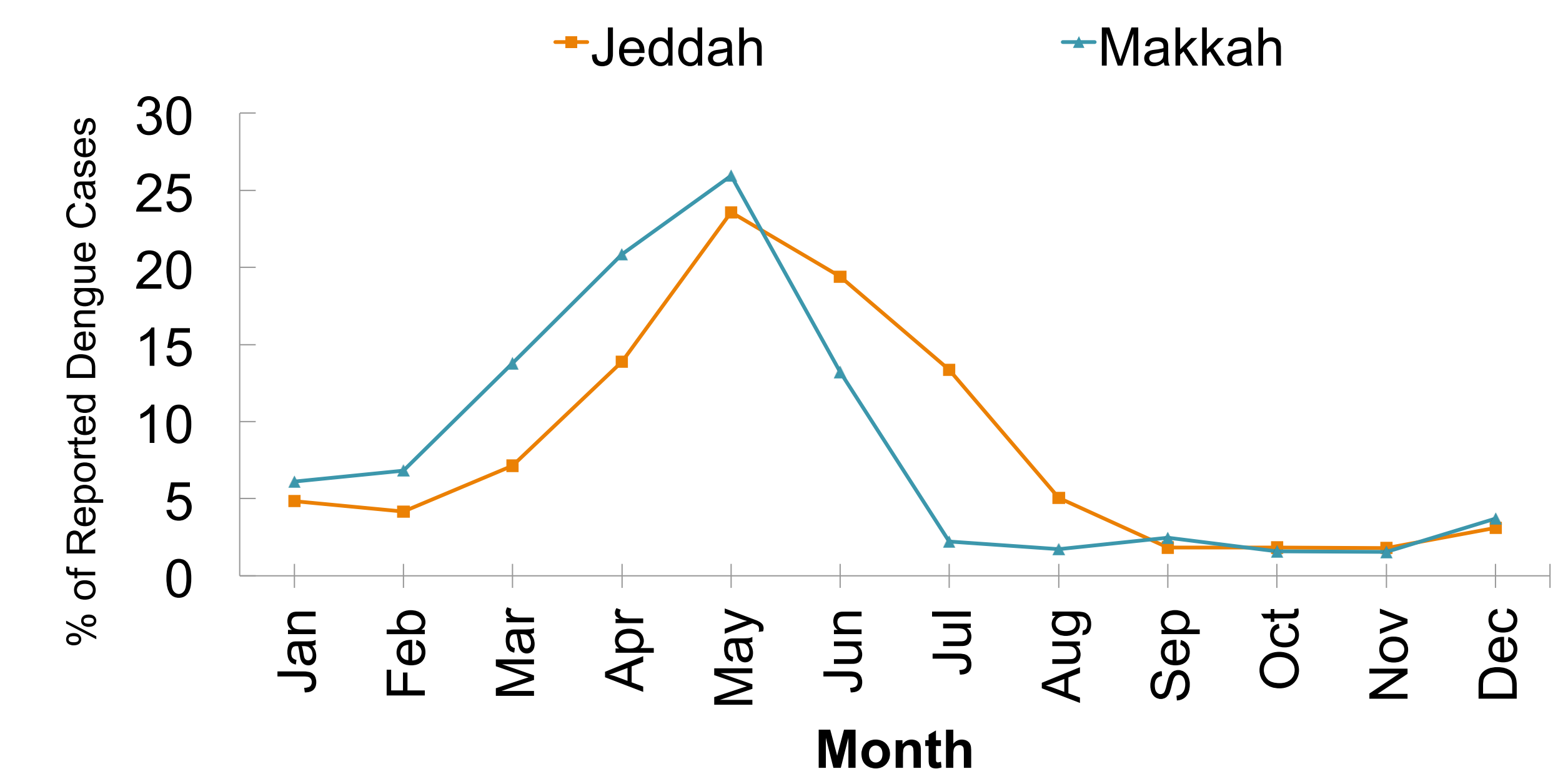


Figure 3. Percentage of Reported Dengue Cases in the Cities of Jeddah and Makkah, by Month, 2007 – 2013



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

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