To:	BC MHOs, PHNLs, ICPs, ERDOCs, IDSPEC, MEDMICRO, AMBULANCE, BCCDC Internal Groups, National Partners
Subject:	**April 7, 2014** – Emerging Respiratory Pathogens Update
Purpose:	Heightened clinician awareness
Action required:	Yes
Recommendations:	Enhanced vigilance, notification and infection control by clinicians in response to cases of severe acute respiratory illness (SARI) with links to affected areas in the two weeks prior to symptom onset.

***** Please share with your workplace colleagues as appropriate. *****

Dear Colleagues –

Human cases of avian influenza A(H7N9) continue to be detected in China and new cases of MERS-CoV have also been reported from affected areas in the Middle East. Below, is an update on these two emerging respiratory viruses.

1. H7N9 UPDATE [Total: 413 cases; Deaths: 121+], China

The second wave of human H7N9 cases in China continues although the rate of reporting has decreased in recent weeks. Since our last update to you one month ago (on 5 March 2014), 30 new human cases have been reported. On average, about 5 new cases per week (based on onset date) were reported during this period compared to 35-40 cases per week during the second wave peak in January 2014. See attached H7N9 slide 1, Epidemic Curve.

Cumulatively to date (as of 7 April 2014), 413 human H7N9 infections have been reported, including at least 121 deaths (case fatality ~30%). This total includes 134 cases and 43 deaths reported as part of the first wave (February-May 2013) and 277 cases and 78 deaths reported as part of the second wave (ongoing since October 2013). Of note, since its first detection in March 2013, H7N9 has contributed nearly two-thirds the tally of human cases in just one year in China (n=413) that H5N1 had contributed across more than a decade globally (n=650) with a per case fatality about one-half that of H5N1 but nevertheless substantial (30% vs. 59%, respectively). The ascertainment bias skewing toward more severe case detection and reporting is acknowledged for both viruses.

Cases have been reported from 15 provinces/municipalities in mainland China and from Malaysia (1), Hong Kong (8) and Taiwan (2) in association with travel. Guangdong and Zhejiang provinces have been most affected during the second wave, with ongoing case reports from Guangdong. Of the cases reported since our last update, about one-half have been reported from Guangdong. See attached H7N9 slide 2, Geographic Map.

Older, adult men continue to be the most affected demographic group, with an overall median age of 58 years (range: 0-91 years) and a male-to-female sex ratio of 2.2. The age and sex distribution does not substantially differ between first and second wave cases (median age: 60 vs. 58 years; sex ratio: 2.4 vs. 2.1). See attached H7N9 slide 3, Cases by Age and Sex.

The majority of cases have reported a history of exposure to poultry or live poultry markets, but in the absence of obvious poultry outbreaks, suggesting that the most likely transmission scenario is one of a mostly “silent” zoonotic epidemic in poultry with sporadic transmission to humans in close contact with the animal reservoir. There remains no evidence of sustained human-to-human transmission.

Further human cases are expected, however, given ongoing subclinical circulation of the virus in poultry (as a low pathogenic avian influenza (LPAI) virus in birds), an incubation period extending up to 10-14 days in exposed and affected people, and further anticipated reporting delays. Ongoing monitoring has especially been emphasized in relation to the recent Qingming festival celebrated in China and some of its neighbouring countries on April 5, lasting approximately 3 days. The festival is a yearly family event for honouring ancestors and may be associated with increased purchase, slaughter and consumption of

poultry. Finally, it is worth remembering that the first wave peak of H7N9 infections in 2013 was in March-April whereas the second wave peak in 2014 has been in January with ongoing detection through March, notably in the southern province of Guangdong. It cannot be predicted whether there will be a further April or northward resurgence (following migratory birds) but at this time the risk due to H7N9 is considered low, especially taking into account the overall limited number of human cases relative to the dense human population in affected regions. Given the severity and pandemic potential of H7N9, ongoing close monitoring and enhanced vigilance are nevertheless underscored.

Of interest (to some of us anyway), recent publications have highlighted greater genetic diversity in the internal proteins of the H7N9 virus (derived from H9N2) compared to the surface haemagglutinin (H) and neuraminidase (N) proteins. Greater immune pressure and a higher rate of mutation in the H and N are more typically expected. Instead, the greater heterogeneity in internal components of H7N9 is believed to have resulted from dissemination of the H7N9 virus into local poultry populations and their sequential dynamic reassortment with regionally endemic H9N2. H9N2 has also donated internal gene segments to other emerging avian viruses (e.g. H5N1 and H10N8) and has been considered a possible "scaffold" or "incubator" virus for wild bird reassortant strains that may facilitate their adaptation to domestic hosts. This hypothesis may warrant further consideration in designing strategies to mitigate risk in poultry and people. See: http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)60386-X/fulltext?rss=yes

To stay current with ongoing developments, please consult the WHO avian influenza A(H7N9) page: www.who.int/influenza/human_animal_interface/influenza_h7n9/en/index.html.

For the latest ECDC Rapid Risk Assessment on human infections with avian influenza A viruses in China (24 February 2014), see: http://www.ecdc.europa.eu/en/publications/Publications/avian-flu-china-rapid-risk-assessment-26022014.pdf

2. MERS-CoV UPDATE [Total: 222 cases; Deaths: 87], Middle East

Our last update to you about MERS-CoV was about two months ago (on 7 February, 2014). To date (as of 7 April 2014), a total of 222 cases of MERS-CoV, including 87 deaths, have been reported. These counts include the retrospectively identified nosocomial cluster reported from Jordan in March-April 2012, which may account, in part, for discrepancies in case tallies across various sources. See MERS-CoV slide 1, Epidemic Curve.

Saudi Arabia remains the most affected country, accounting for 75-80% of MERS-CoV reports, with cases also reported from Jordan, UAE, Oman, Qatar, and Kuwait. Imported cases in persons with recent travel to the Middle East, with some limited secondary transmission, have also been reported from France, Germany, Italy, and the United Kingdom in Europe and Tunisia in North Africa. See MERS-CoV slide 2, Geographic Map.

Twenty-nine new cases of MERS-CoV have accrued since 1 February 2014: 22 cases from Saudi Arabia, 6 from the United Arab Emirates (UAE) (of which, 2 had probable exposures in Oman and 2 in Saudi Arabia), and one from Kuwait. Among the cases reported from Saudi Arabia, almost all (19 of 22) were from the Riyadh region.

Of the latest reported cases, at least 7 were secondary cases with a suspected epidemiological link to a confirmed case, of whom 4 had mild symptoms or were asymptomatic. These included a household cluster involving 3 secondary cases in Riyadh, Saudi Arabia, and at least 3 cases who acquired their infections in health care settings. There have also been unconfirmed reports of a nosocomial cluster involving 6 cases, of whom 4 were health care workers, in Jeddah, Saudi Arabia (not included in our current case tallies pending confirmation). Overall, cases have been predominantly older adult men; however, the age/sex distribution varies by type of exposure. According to a recent WHO summary, compared to index or sporadic cases, secondary cases are younger (median age: 45 vs. 58 years) and female (42% vs. 20%).

The role of dromedary camels in the MERS-CoV transmission cycle is becoming increasingly evident. In their recent summary, the WHO acknowledges camels as the primary source of MERS-CoV infection in humans, citing several recent studies. They report that the most likely transmission scenario is one of repeated introductions of MERS-CoV into human populations from camels, possibly via indirect transmission routes, with subsequent limited human-to-human transmission and in the absence of sustained community transmission among humans. Accordingly, the WHO has also recently revised their guidance document for case-control studies to include more detailed questions about contact with animals, especially camels.

For the full WHO summary update (27 March 2014), see:
http://www.who.int/csr/disease/coronavirus_infections/archive_updates/en/.

For ongoing WHO MERS-CoV updates, see:
www.who.int/csr/disease/coronavirus_infections/en/index.html.

3. ACTION AND ADVICE [abbreviated]

In the event of severe acute respiratory illness (SARI) in a patient with links to affected areas in the two weeks prior to symptom onset (i.e. residence, travel history or contact with someone with such history), clinicians should notify their local health authority/Medical Health Officer.

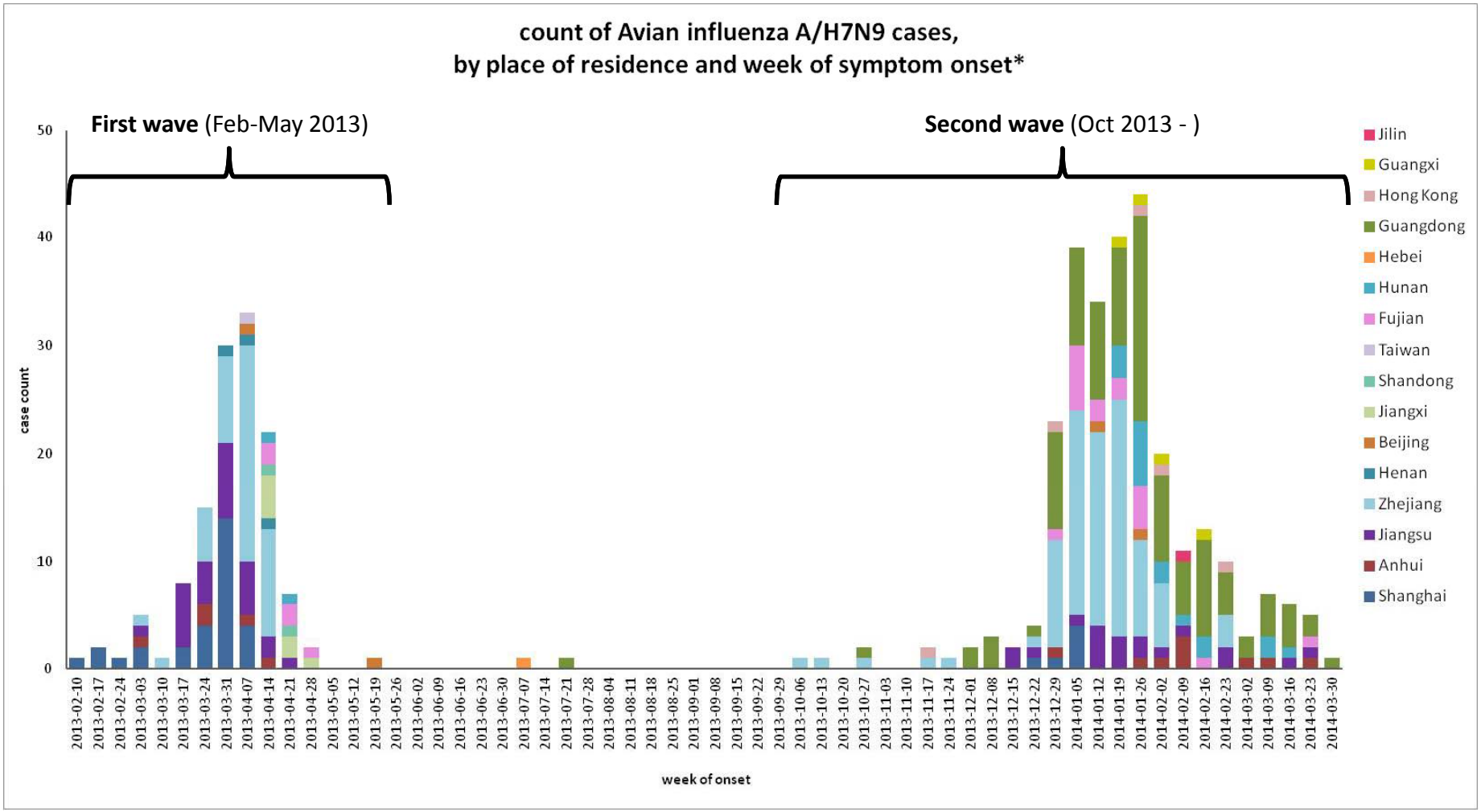
Health care workers should implement respiratory precautions immediately, and cases should be managed in respiratory isolation with contact and droplet precautions. Aerosol-generating procedures may facilitate spread warranting airborne precautions. Given a spectrum of illness inclusive of milder or atypical presentations, clinicians are encouraged to use their judgement and/or consult infection control for guidance around enhanced measures where the index of suspicion (e.g. based on contact, comorbidity or clustering history) and exposure risk may be higher.

For diagnostic testing for suspected novel influenza viruses or MERS-CoV, please discuss with your local health authority/Medical Health Officer and consult a virologist or microbiologist at the BC Public Health Microbiology & Reference Laboratory (PHMRL) to arrange advance notification and direct shipping. Lower respiratory specimens (e.g., sputum, endotracheal aspirate, or bronchoalveolar lavage) are recommended, where possible and clinically indicated. Follow strict infection prevention and control guidelines when collecting respiratory specimens.

To review prior bulletins issued by the BCCDC Influenza & Emerging Respiratory Pathogens team, see:
http://www.bccdc.ca/dis-cond/DiseaseStatsReports/EmergingRespiratoryVirusUpdates.htm.

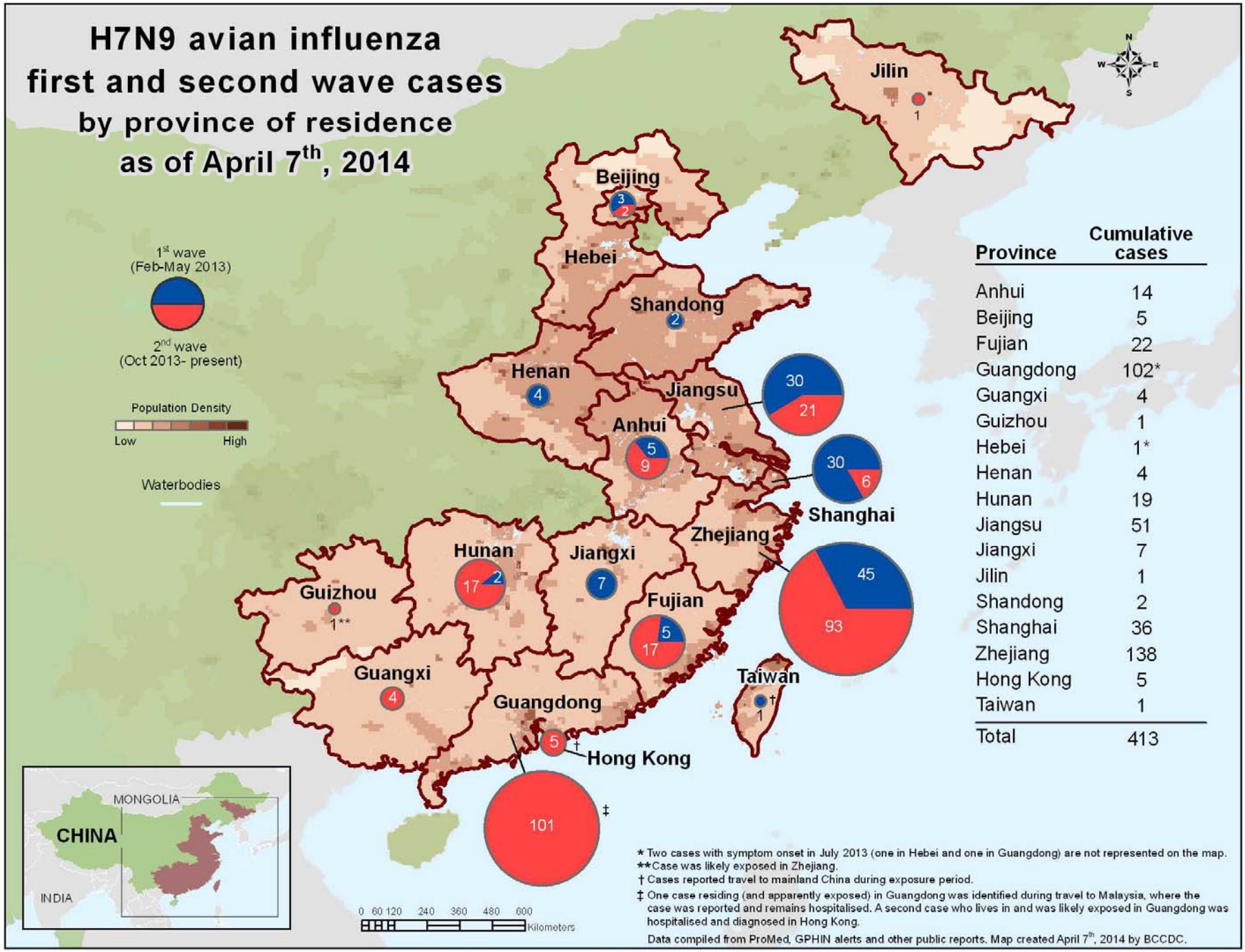
Influenza & Emerging Respiratory Pathogens
BC Centre for Disease Control

H7N9 Epidemic Curve



*Does not include: 1 Henan, 6 Jiangsu, and 1 Guizhou cases with unknown onset date; one asymptomatic case in Beijing.

H7N9 avian influenza first and second wave cases by province of residence as of April 7th, 2014

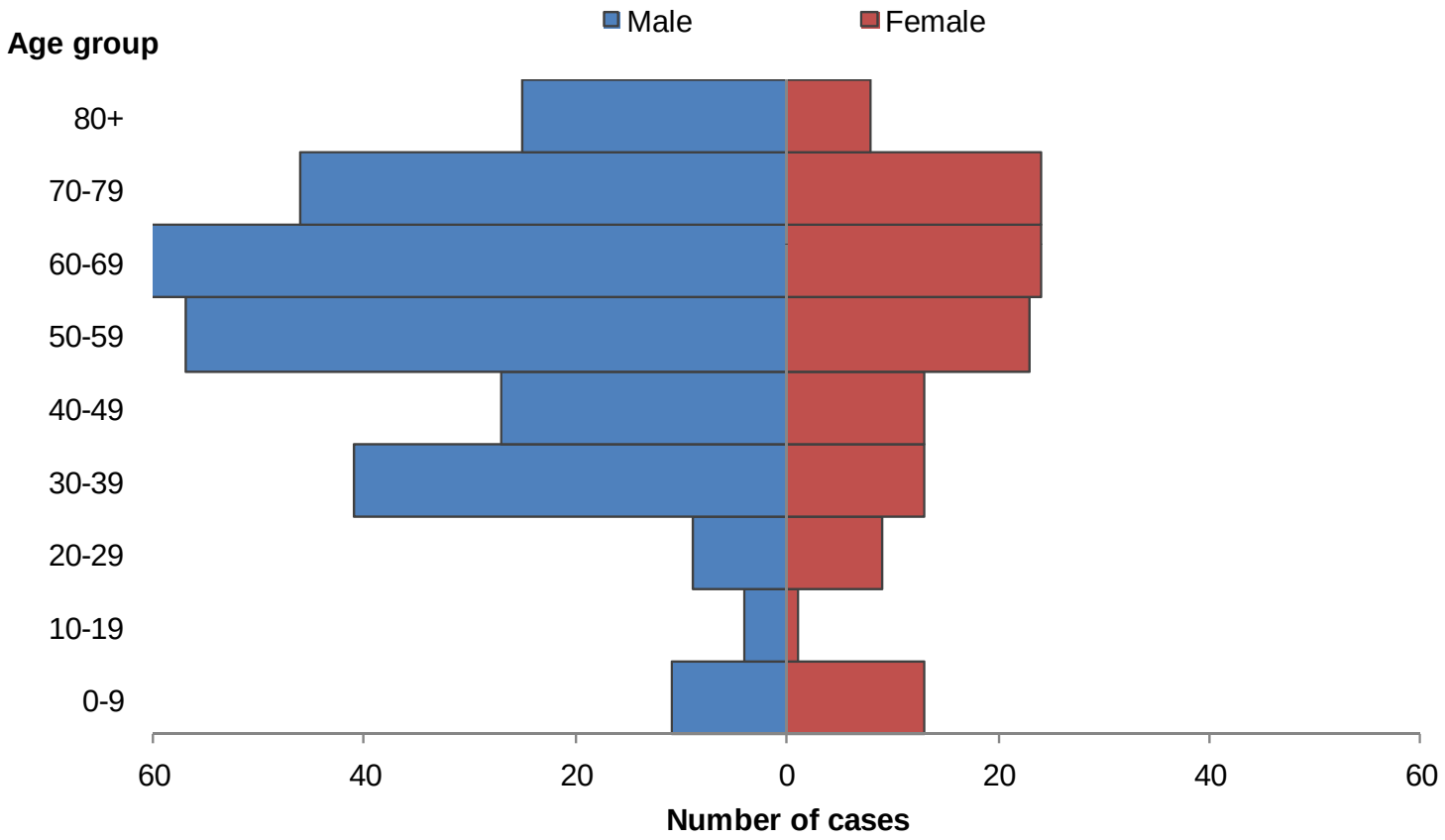


Province	Cumulative cases
Anhui	14
Beijing	5
Fujian	22
Guangdong	102*
Guangxi	4
Guizhou	1
Hebei	1*
Henan	4
Hunan	19
Jiangsu	51
Jiangxi	7
Jilin	1
Shandong	2
Shanghai	36
Zhejiang	138
Hong Kong	5
Taiwan	1
Total	413

* Two cases with symptom onset in July 2013 (one in Hebei and one in Guangdong) are not represented on the map.
**Case was likely exposed in Zhejiang.
† Cases reported travel to mainland China during exposure period.
‡ One case residing (and apparently exposed) in Guangdong was identified during travel to Malaysia, where the case was reported and remains hospitalised. A second case who lives in and was likely exposed in Guangdong was hospitalised and diagnosed in Hong Kong.

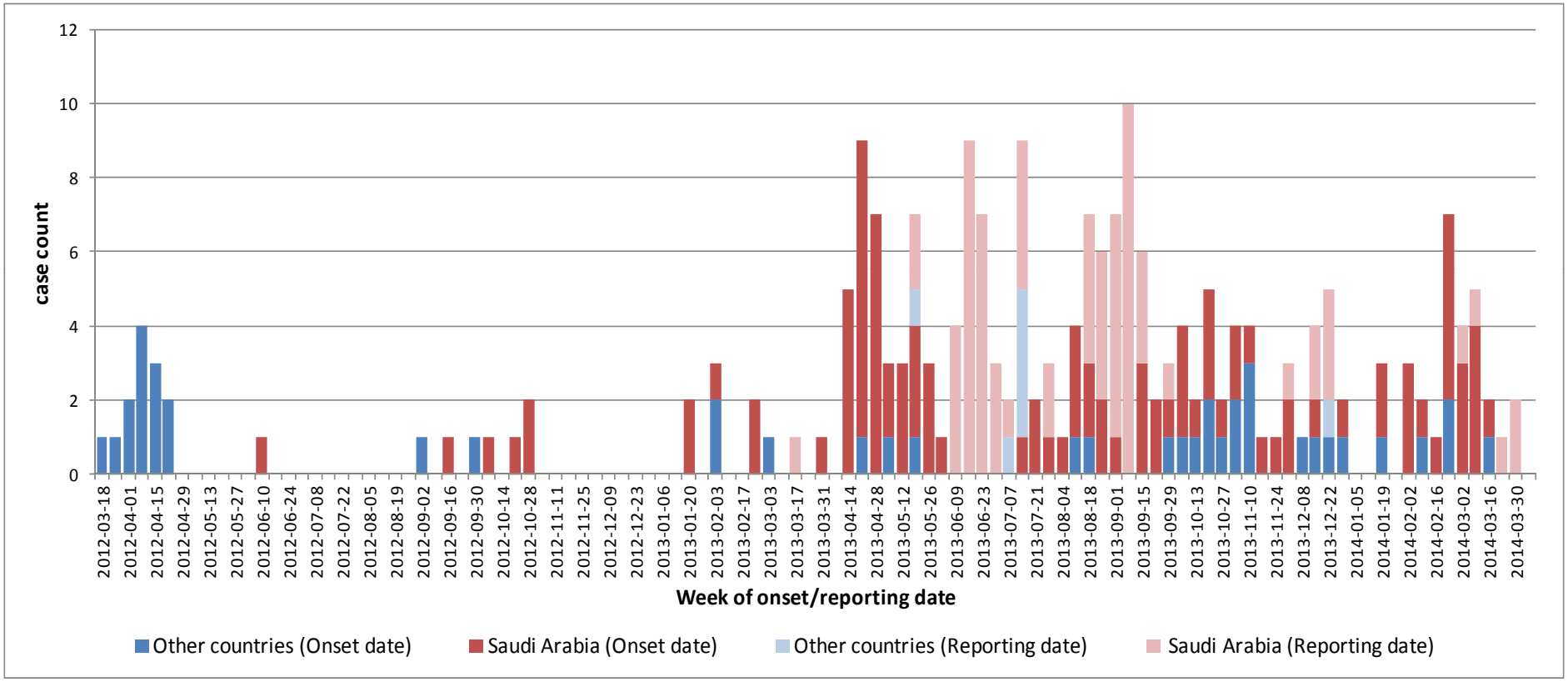
Data compiled from ProMed, GPHIN alerts and other public reports. Map created April 7th, 2014 by BCCDC.

H7N9 Cases by Age and Sex (N=413)*

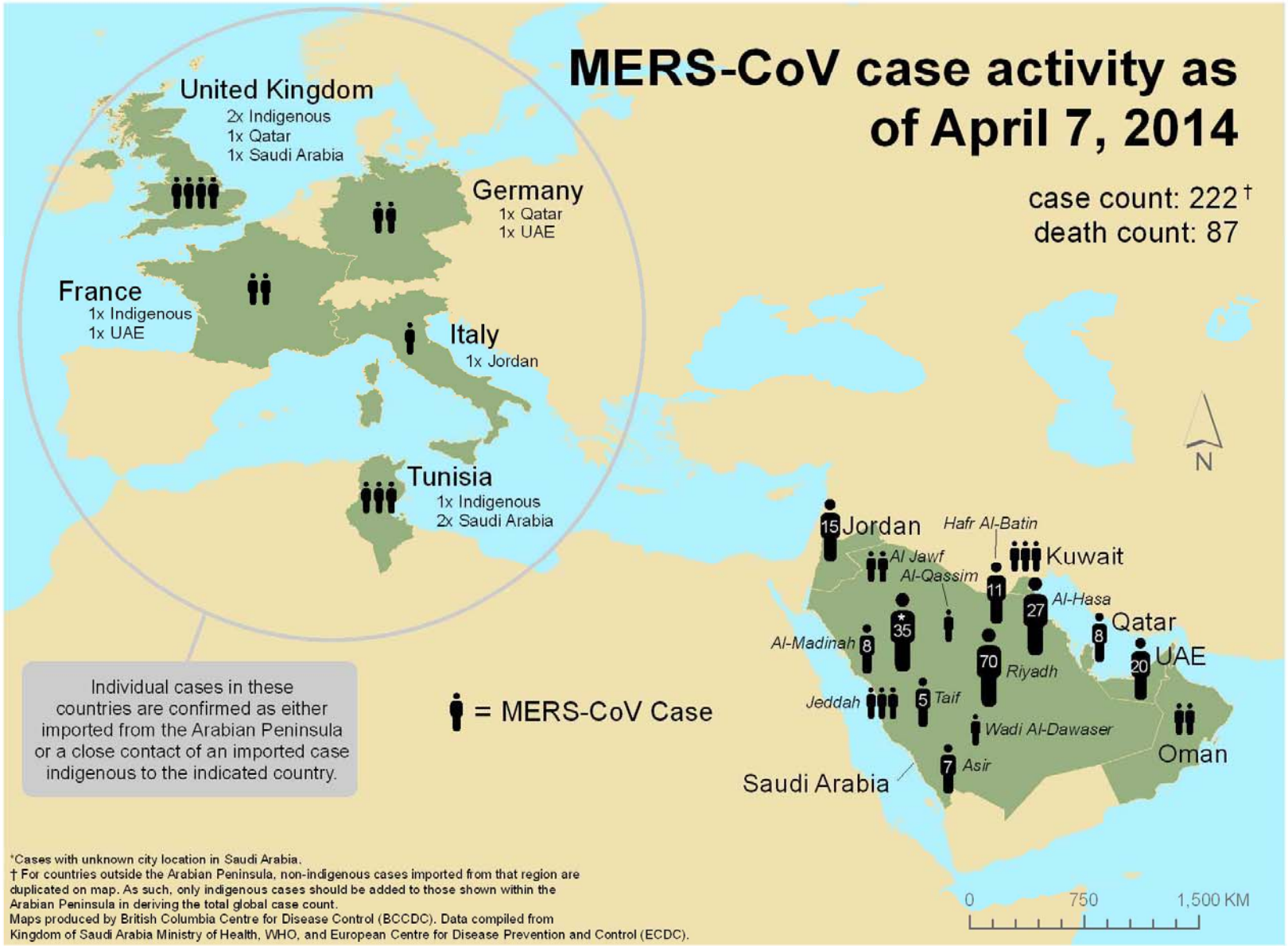


* 3 cases with missing age/sex not shown

MERS-CoV Epidemic Curve*



*MERS-CoV cases plotted by most likely country of exposure or by reporting country if place of exposure unknown and by symptom onset date or by reporting date if onset date unavailable or case is asymptomatic


MERS-CoV case activity as of April 7, 2014
case count: 222 †
death count: 87
United Kingdom
2x Indigenous
1x Qatar
1x Saudi Arabia
Germany
1x Qatar
1x UAE
France
1x Indigenous
1x UAE
Italy
1x Jordan
Tunisia
1x Indigenous
2x Saudi Arabia
Individual cases in these countries are confirmed as either imported from the Arabian Peninsula or a close contact of an imported case indigenous to the indicated country.
= MERS-CoV Case
N
15 Jordan
Hafr Al-Batin
Kuwait
Al Jawf
Al-Qassim
11
27
Al-Hasa
Qatar
8
35*
Al-Madinah 8
70
Riyadh
20
UAE
Jeddah
5
Taif
Wadi Al-Dawaser
Oman
7
Asir
Saudi Arabia
0
750
1,500 KM
*Cases with unknown city location in Saudi Arabia.
† For countries outside the Arabian Peninsula, non-indigenous cases imported from that region are duplicated on map. As such, only indigenous cases should be added to those shown within the Arabian Peninsula in deriving the total global case count.
Maps produced by British Columbia Centre for Disease Control (BCCDC). Data compiled from Kingdom of Saudi Arabia Ministry of Health, WHO, and European Centre for Disease Prevention and Control (ECDC).