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Dear Colleagues –

We would like to draw your attention to a number of recent trends in the field of emerging respiratory viruses (ERV), including:

- 1. Upswing in MERS-CoV reports from the Middle East, primarily Saudi Arabia, since December 2014.**
 - a. In the context of the dramatic surge in MERS-CoV that occurred during the spring 2014, with amplification in the nosocomial setting, close monitoring through the coming weeks is warranted.
 - b. See the attached graphics of MERS-CoV case reports by time and geographic mapping as illustration.

- 2. A third wave of avian influenza A(H7N9) activity that began in mid-October 2014 in China has shown substantial increase through December and January.**
 - a. Given that avian influenza viruses have distinct winter-spring seasonality, and given the substantial second wave of H7N9 activity that occurred in the spring 2014, close monitoring for a further surge through the winter/spring 2015 period is warranted.
 - b. See the attached graphics of H7N9 case reports by time and geographic mapping as illustration.
 - c. As previously shared, two human cases of A(H7N9) infection were reported in British Columbia in a couple recently returned from travel within China in January 2015, reinforcing the need for ongoing vigilance.

- 3. A variety of other avian influenza viruses have been associated with human infections and poultry outbreaks globally in recent weeks, namely:**
 - a. Human cases of H5N1 and H9N2 in Egypt and H5N6 in China.
 - b. Poultry outbreaks due to highly pathogenic avian influenza of the Eurasian H5 lineage including H5N1, H5N8 and/or H5N2 in Europe and Asia and newly also now in North America.

- 4. Although the risk to Canadians remains low, clinicians should remain vigilant.**
 - a. Clinicians should obtain relevant travel, animal or other contact exposure history from patients presenting with severe acute respiratory illness and consult their local Medical Health Officer for advice related to diagnostic testing, infection control and follow up where a novel emerging pathogen may be suspected.

Further information related to these trends is provided in detail below.

1. MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV), MIDDLE EAST

Since our last ERV bulletin to you on November 5, 2014, 124 additional MERS-CoV cases have been reported, including at least 44 deaths. Nearly all of these recent cases have been reported in Saudi Arabia (118/124, 96%), mostly from the Riyadh region, with additional cases reported in Oman (3), UAE (1), Qatar (1), and the Philippines ex. KSA (1). Of these 124 recent cases, ages range from 22 to 99 years (median: 56 years); 76% are male; and 79% have had one or more comorbid conditions.

In January 2015, Oman reported its first case since October 2013 in a farm owner with frequent contact with animals, including camels. Two secondary cases in close contact with this index case were subsequently reported by Oman. On February 13, 2015, the Philippines reported a case in a health care worker who was likely exposed at a hospital in Riyadh, Saudi Arabia. Of note, there were no cases identified in association with the Hajj in October 2014, despite enhanced surveillance activities upon exit from the country and in the countries of the returning pilgrims. However, the recent importation of a MERS-CoV case to the Philippines emphasizes ongoing risk for returning travellers, particularly among those exposed to a recognized transmission setting (e.g. health care facility) or to animals or animal products for which the index of suspicion may be higher.

Dromedary camels are now recognized as the likely animal reservoir for MERS-CoV. However, even among those with close contact with infected camels, a recent serological study indicated no evidence of human infection, and the factors associated with possible transmission to humans remain unclear. Furthermore, among recent human cases, only about one in ten reported contact with an animal or animal product, while up to one-third may have had nosocomial exposure. This epidemiologic pattern is consistent with earlier periods of the outbreak that have been characterized by exposure to a primary animal source (likely camels or camel products) followed by amplification in health care settings. Overall, however, the risk for sustained human-to-human transmission in the community remains low.

As of February 23, 2015, the WHO has been informed of 1,026 laboratory-confirmed cases of human infection with MERS-CoV, including at least 376 deaths (case fatality 37%), since its emergence in March/April 2012. Among cases with known age or sex, an adult male predominance persists: ages range from 9 months to 99 years (median: 48 years) and 64% are male. Affected countries include: Egypt, Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, UAE and Yemen in the Middle East; Algeria and Tunisia in North Africa; Austria, France, Germany, Greece, Italy, the Netherlands, Turkey and the United Kingdom in Europe; Malaysia and Philippines in Southeast Asia; and the United States of America. All cases reported outside of the Middle East have had direct exposure or an epidemiological link to persons with recent travel to affected regions in the Middle East.

See the attached graphics of MERS-CoV case reports by time and geographic mapping as illustration.

2. AVIAN INFLUENZA A(H7N9), CHINA

Since November 5, 2014, 151 human infections with avian influenza A(H7N9) have been reported, including at least 32 deaths. Of the 103/151 recent cases with known age and gender, ages range from <1 to 83 years (median: 55 years) and 66% are male.

Of the recently reported cases, all were likely exposed in affected regions of China, including two cases reported in British Columbia, Canada, in a couple who had recently returned from travelling in China and three unrelated cases reported in Hong Kong with recent travel to mainland China. Affected provinces in China include: Guangdong (63), Fujian (36), Zhejiang (17), Jiangsu (13), Xinjiang UAR (7), Shanghai (4), Anhui (2), Jiangxi (2), Guizhou (1), and Shandong (1).

To date, there have been 608 laboratory-confirmed human cases of avian influenza A(H7N9) infection, including at least 204 deaths (case fatality 34%). Case reports continue to show a seasonal pattern, peaking in January to March with sporadic cases reported during summer months. The first wave (February to September 2013) included 136 cases; the second wave (October 2013 to September 2014) included 320 cases; and the third wave (since October 2014) has included 152 cases to date. The majority of cases continue to be among older, adult men and almost all with a known exposure history have reported exposure to live poultry or live poultry markets. To date, however, at least 17 family clusters have been identified, each comprised of 2-3 cases. Notwithstanding these limited instances of possible close contact transmission, the risk of sustained human-to-human transmission in the community remains low.

See the attached graphics of H7N9 case reports by time and geographic mapping as illustration.

3. OTHER AVIAN INFLUENZA

- a. Avian Influenza A(H5N1). Since September 2014 and as of January 26, 2015, 51 human infections with highly pathogenic avian influenza (HPAI) A(H5N1), including 20 deaths, have been reported in Egypt, including at least three clusters each involving two to three cases. More recent estimates suggest that the number of human infections with A(H5N1) in Egypt since September 2014 now exceeds 100 cases, the majority with onset between December 2014 and February 2015. Of the 51 cases identified up to January 26, ages range from 1 to 65 years (median: 20 years), and 39% are male indicating a very different age and gender profile from that of H7N9 in China. Almost all cases reported exposure to sick or dead poultry, most notably backyard flocks. Preliminary investigations did not detect changes in the viruses isolated from recent cases compared to previous isolates. Avian influenza A(H5N1) viruses are known to circulate in poultry in Egypt, and this country has historically been one of the most affected by the A(H5N1) outbreak. Since 2003, about one-third of the human cases globally have been reported in Egypt. Cumulatively, 777 human cases of A(H5N1) have been reported to the WHO from 16 countries, including 428 deaths (case fatality 55%) since 2003.
- b. Avian Influenza A(H5N6). On February 9, 2015, the National Health and Family Planning Commission (NHFPC) of China reported a fatal human infection with avian influenza A(H5N6) in a 44-year-old male in Yunnan Province. The patient had a history of exposure to dead birds and developed symptoms in late January. This is the third reported human infection with an A(H5N6) virus. Two human cases of A(H5N6), including one fatality, were previously reported in China in 2014.
- c. Avian Influenza A(H9N2). On February 10, 2015, Egypt reported its first human case of avian influenza A(H9N2) in a 3-year-old male. The patient had a history of contact with backyard poultry and developed symptoms in mid-January. Two human cases of A(H9N2), one in a child and one in

an elderly adult and both mild, were previously reported in China in 2014 and prior to that, in total, H9N2 has been associated with a dozen or more recognized human cases, primarily in China (but also Bangladesh), mostly (but not exclusively) in children and with mild illness. Influenza A(H9N2) is a low pathogenic avian influenza (LPAI) virus usually associated with mild or absent disease in birds that is endemic in poultry China. It has been considered by some experts as a scaffold for the generation of new reassortant viruses in poultry, donating gene segments to A(H7N9), A(H5N1), and other avian influenza virus subtypes. For this reason, careful monitoring of this subtype and its geographic spread is warranted.

- d. **Avian Influenza Outbreaks in Poultry: Europe, North America and Asia.** Since November, several poultry outbreaks due to highly pathogenic avian influenza (HPAI) viruses, including A(H5N1), A(H5N2), and A(H5N8), have been reported to the World Organization for Animal Health (OIE) from Europe, and Asia and newly also from North America. These reports include the first detections of HPAI Eurasian lineage H5 viruses in North America reported in British Columbia in December and January 2014, likely introduced through the mixing of migratory birds where flyways intersect and culminating in reassortant strains including Eurasian and North American lineage viral gene segments. To date, no human cases of avian influenza have been reported associated with these recent outbreaks but ongoing monitoring is warranted.

4. ACTION AND ADVICE

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. Travel history (direct or indirect) is critical to elicit from SARI patients.

Health care workers should implement respiratory precautions immediately, and cases should be managed in respiratory isolation with contact and droplet precautions. Airborne precautions are warranted in the event of aerosol-generating procedures or conditions. 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. Facilities should be mindful of the protection of other patients and visitors, in addition to healthcare workers, to minimize nosocomial transmission and risk.

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. For diagnostic testing for suspected MERS-CoV or avian influenza, 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.

5. OTHER USEFUL RESOURCES

MERS-CoV:

Latest ECDC Rapid Risk Assessment (February 23, 2015):

http://www.ecdc.europa.eu/en/publications/Publications/MERS_update_14-Feb2014.pdf

Latest WHO Summary of Current Situation, Literature Update and Risk Assessment (February 5, 2015):

http://www.who.int/csr/disease/coronavirus_infections/mers-5-february-2015.pdf?ua=1

WHO statement on the Eighth Meeting of the IHR Emergency Committee regarding MERS-CoV (February 5, 2015):

<http://www.who.int/mediacentre/news/statements/2015/8th-mers-emergency-committee/en/>

H7N9:

Latest ECDC Epidemiological Update (February 12, 2015):

http://www.ecdc.europa.eu/en/press/news/layouts/forms/News_DispForm.aspx?List=8db7286c-fe2d-476c-9133-18ff4cb1b568&ID=1167

Latest ECDC Rapid Risk Assessment (February 2, 2015):

<http://ecdc.europa.eu/en/publications/Publications/RRA-Influenza-A-H7N9-update-four.pdf>

Latest WHO Risk Assessment (October 2, 2014):

http://www.who.int/influenza/human_animal_interface/influenza_h7n9/riskassessment_h7n9_20Oct14.pdf?ua=1

Other Influenza Virus

WHO Issues Statement on Volatility of Influenza Viruses:

<http://www.who.int/influenza/publications/warningsignals201502/en/>

Previous ERV Bulletins of the BCCDC:

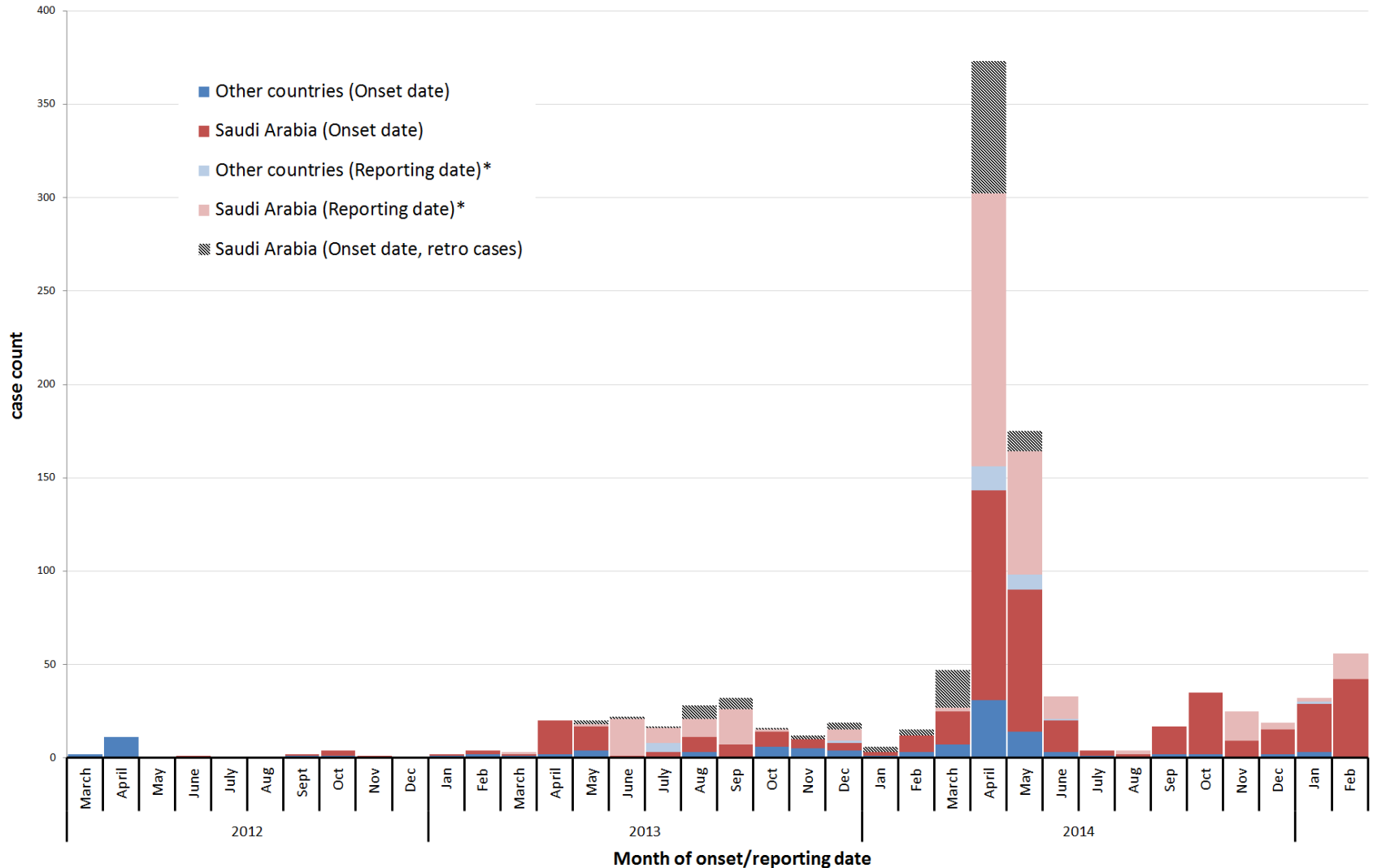
<http://www.bccdc.ca/dis-cond/DiseaseStatsReports/EmergingRespiratoryVirusUpdates.htm>

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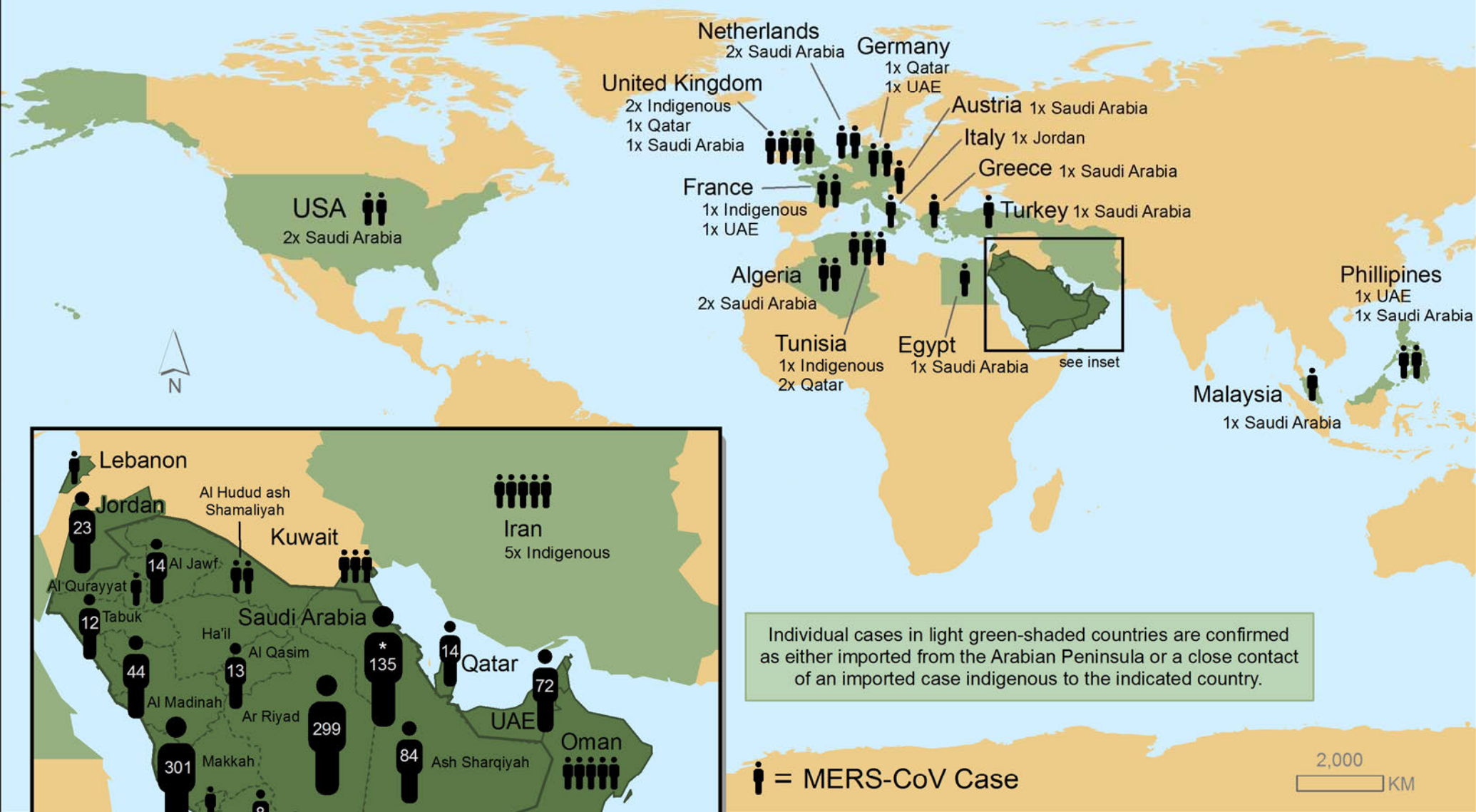
BC Centre for Disease Control

MERS-CoV cases by location and time



* Cases are shown by 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 February 25, 2015



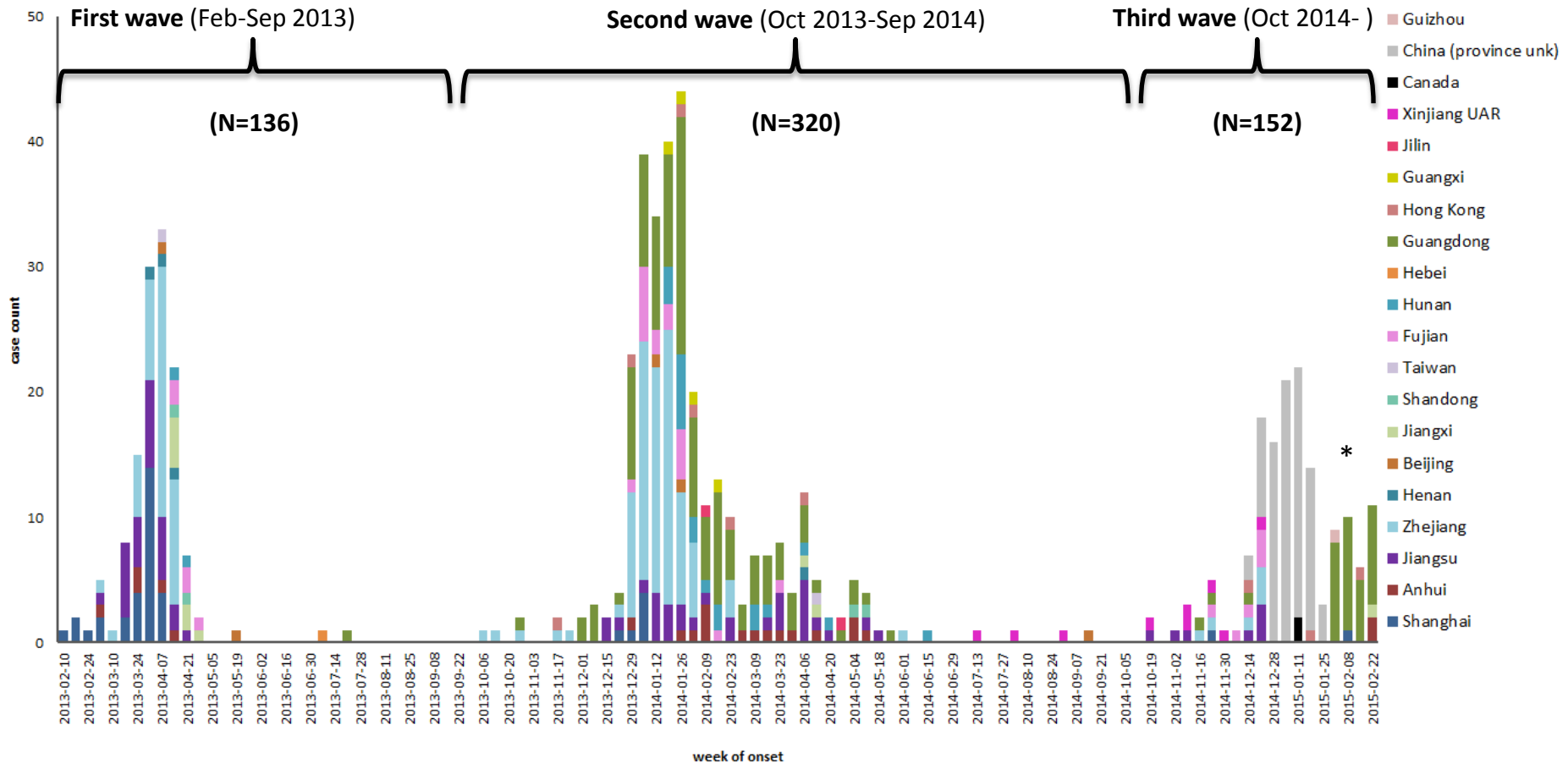
Individual cases in light green-shaded countries are confirmed as either imported from the Arabian Peninsula or a close contact of an imported case indigenous to the indicated country.

👤 = MERS-CoV Case

2,000 KM

*Cases with unknown province 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. Cases with origin and history of travel restricted to Arabian Peninsula are shown once on map, according to reporting country. In a retrospective report from Saudi Arabia on 2014-09-18, two cases were retracted (one false positive, one duplicate) but are still displayed here due to insufficient details.

H7N9 cases by place of residence and week of illness onset*



*Cases shown in February 2015 (30 in Guangdong, 2 in Anhui, 1 in Jiangxi, and 1 in Shanghai) plotted by reporting date pending availability of onset date.

Does not include: 1 Henan, 4 Jiangsu, and 1 Guizhou cases with unknown onset date; one asymptomatic case in Beijing.

H7N9 avian influenza first, second and third wave cases by location of residence

