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The role of regional surveillance networks in enhancing global outbreak reporting

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The role of regional surveillance networks in enhancing global outbreak reporting

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Background: The Program for Monitoring Emerging Diseases (ProMED) is a moderated electronic reporting system dedicated to the rapid, global dissemination of outbreak reports. Its moderators are globally diverse, carefully selected, highly trained specialists. To improve cross-border communication and rapidly identify regional health threats, ProMED created regional networks where locally-based moderators use their access to local and regional medical and public health networks and media sources to obtain information not readily available outside of their region. In this analysis, we assess the impact of the establishment of ProMED's Middle East/North Africa (MENA) and South Asia (SoAs) regional networks in April 2014 on ProMED's outbreak reports for these regions.

Methods & Materials: Outbreak reports in countries within the two regions were extracted from ProMED's database, and included country, disease name, species type, spatial coordinates, and report issue date. Data analysis included visualizing spatial information, identifying unique reports, and reporting trends per country and region. Data processing and analysis were conducted using R 3.4.0 statistical software. Rates of outbreak events per total number of ProMED reports per year were calculated to adjust for temporal trends in the total number of reports posted on ProMED. Rate comparison used a two-sided t-test; $P < 0.05$ was considered statistically significant.

Results: The mean monthly incidence of ProMED reports concerning outbreaks in the MENA region increased from 28 reports (May 2012 - April 2014) to 83 reports after the establishment of the networks (May 2014 - April 2016), and from 29 reports to 101 reports concerning outbreaks in the SoAs region over the same time period. The number of reports per total number of ProMED reports increased by 259% for MENA, and 289% for SoAs ($P < 0.01$). MENA reports most often addressed MERS (32.3%), foot-and-mouth disease (7.0%), avian influenza (6.7%), and measles (3.8%); whereas SoAs most often addressed dengue (14.9%), anthrax (7.3%), Japanese encephalitis (7.0%), CCHF (4.9%), and rabies (4.8%).

Conclusion: The establishment of MENA and SoAs regional networks with locally-based, expert moderators resulted in a significant increase in ProMED's outbreak reports from these regions and an increased flow of disease information across regional borders and to the global public health community.

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Characterization of 65 Babesia cases in Southeastern Pennsylvania, USA, from 2008 to 2016 with dramatic rise in 2015

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Background: The parasite *Babesia microti* is transmitted by ticks and causes a febrile illness. For decades it has been spreading outward from the northeastern USA. However, only 80 cases were reported 2005-2013 in Pennsylvania (mid-east coast USA, population 12,800,000). We report 69 cases from four hospitals of our healthcare system 2008-2016 with a striking rise in 2015.

Year	Hospital 1	Hospital 2	Hospital 3	Hospital 4[a]	Total Cases
2008	1				1
2009	2		2		4
2010		1			1
2011		2		5	7
2012		2	2	2	6
2013	3	1	5	2	11
2014	1	2		1	4
2015	2	8	12	6	28
2016		1	7	4	12

[a] No data before 2011

Methods & Materials: After Institutional Review Board approval, charts with positive *Babesia* blood smears were reviewed. Of 69 total records, one was not available and three were outpatients only.

Results: The 65 reviewed babesiosis patients averaged 10.7 symptomatic days, often with nondiagnostic outpatient evaluations, before hospitalization. All patients had fever but physical examination and WBC were usually unremarkable. Low platelets were common (90% < 150,000, 79% < 110,000, and 67% < 100,000) and 68% had elevated transaminases. but sometimes only minimally. Concurrent Lyme Disease was very common (54% of 61 pts tested) and four patients had elevated cytomegalovirus IgM levels. "Mild-moderately ill" patients (34) averaged 4.0 days in hospital after starting *Babesia* treatment versus "severely ill" (31) averaging 8.1 days on inpatient therapy often with complications (severe anemia, heart failure, altered mental status, symptomatic splenic infarcts). The latter group was older (average 69.9 vs. 65.1 years), with immunosuppression, splenectomy, and/or multiple medical problems. Degree of parasitemia, especially > 4%, correlated with worsened severity of illness.

Conclusion: Babesiosis has been increasing in southeastern Pennsylvania with a marked rise in 2015 reflecting ongoing geographic spread. Also, more rainfall the year before led to increased acorn production and more white-footed mice which host disease-transmitting ticks. Concurrent Lyme disease was very common in our patients. Time to diagnosis improved as more *Babesia* cases were encountered but recognition of the significance of very low platelets could be improved and concurrent illnesses (especially anaplasmosis) were not always excluded.

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