Yellow Fever (YF) in Brazil: Preventing Urban Outbreaks

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Background
• Endemic to populations in South America and Africa
• Estimated 30,000 deaths globally each year, 90% in Africa
  • urban YF outbreak → more deaths in South America
• Sylvatic Cycle
  • Transmission between non-human primates and Haemagogus leucocelaenus mosquitoes
  • Occurs in dense jungle regions
• Urban Cycle
  • Transmission between humans and Aedes aegypti mosquitoes
  • Occurs in urban areas, around standing water

Objective of Project
1. Identify causes of 2017 sylvatic outbreak
2. Explore possibility of urban outbreak and identify methods to prevent urban spread of YF

Previous Outbreaks
• Most recent urban YF epidemic in 1928-29 in Rio de Janeiro
  • 738 cases and 478 deaths confirmed and recorded
• Vector control efforts against A. aegypti
  • No urban cases recorded in Brazil since 1942
  • 1949 vector control campaign among 10 South American countries, including Brazil
• Since the 1940s, A. aegypti populations have re-emerged in Brazilian urban centers
  • This re-emergence, along with rapid urban expansion, has increased risk of an urban outbreak by bringing humans in closer contact with jungles containing active sylvatic cycles

Present – 2017 Outbreak
• Outbreak began on 12/1/2016, when unvaccinated human was infected after spending time in jungle with active sylvatic YF cycle
  • All current cases have originated from sylvatic cycle, but risk of urban cycle re-emergence exists
  • Dam collapse in Minas Gerais is hypothesized to have caused monkey migration, bringing yellow fever to new regions
  • 777 cases and 261 deaths confirmed
  • Spread to urban areas through A. aegypti would increase both numbers
  • Field work testing A. aegypti populations for YF has not found infected mosquitoes
  • Updated vaccination coverage
    • Not all states require YF vaccinations, but based on non-human primate death rates, vaccination coverage area has been expanded

Future Challenges
• Ministry of Health declared epidemic over on 9/6/17, but high vaccination coverage must be maintained in order to prevent disease re-emergence
• Eradication of A. aegypti is not permanent, and its resurgence in recent years makes a future urban epidemic of YF possible

Conclusion
• Vaccination education and administration campaigns must be both implemented and maintained consistently in order to prevent urban outbreaks and human YF infections

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