Cost Comparison Between 2 Responses to Hepatitis A Virus Incidents in Restaurant Food Handlers—New York City, 2015 and 2017

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ABSTRACT

Context: While the New York City Department of Health and Mental Hygiene (DOHMH) can use agency-wide emergency activation to respond to a hepatitis A virus–infected food handler, there is a need to identify alternative responses that conserve scarce resources.

Objective: To compare the costs incurred by DOHMH of responding to a hepatitis A case in restaurant food handlers using an agency-wide emergency activation (2015) versus the cost of collaborating with a private network of urgent care clinics (2017).

Design: We partially evaluate the costs incurred by DOHMH of responding to a hepatitis A case in a restaurant food handler using agency-wide emergency activation (2015) with the cost of collaborating with a private network of urgent care clinics (2017) estimated for a scenario in which DOHMH incurred the retail cost of services rendered.

Results: Costs incurred by DOHMH for emergency activation were $65 831 ($238 per restaurant employee evaluated) of which DOHMH personnel services accounted for 85% ($55 854). Costs of collaboration would have totaled $50 914 ($253 per restaurant employee evaluated) of which personnel services accounted for 6% ($3146).

Conclusions: Accounting for incident size, collaborating with the clinic network was more expensive than agency-wide emergency activation, though required fewer DOHMH personnel services.

KEY WORDS: cost analysis, hepatitis A, New York City, restaurant food handler

Hepatitis A is an acute liver disease caused by infection with the hepatitis A virus (HAV). HAV is typically transmitted via the fecal-oral route, such as through consumption of contaminated food or liquid. Foodborne HAV outbreaks are infrequent in the United States and can be associated with HAV-infected food handlers.[1]

When a hepatitis A case is reported in a food handler, the New York City (NYC) Department of Health and Mental Hygiene (DOHMH) considers work duties, symptom history, and environmental assessments to make a decision to offer patrons or restaurant employees postexposure prophylaxis (PEP). PEP can prevent hepatitis A if administered within 2 weeks after HAV exposure.[1] DOHMH will perform serologic testing to confirm that only potentially exposed restaurant employees require PEP. Should testing identify any additional infectious restaurant employees that change the period during which the general public was exposed, DOHMH may reevaluate the need to include patrons in the response. In addition, testing can identify restaurant employees who meet criteria for PEP.

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In response to a large number of restaurant employees potentially exposed to HAV, DOHMH sometimes offers testing and PEP through emergency field operations. This historically has required an agency-wide emergency activation using the Incident Command System—a management system designed to mobilize resources to respond to an emergency.[2] However, the diversion of resources required to stand up field operations in response to a hepatitis A case in a food handler might not be efficient, especially because foodborne HAV outbreaks are rare. Identifying alternatives to emergency activation for this purpose could help health departments conserve scarce financial and personnel resources.

During 2015 and 2017, DOHMH employed 2 different approaches to offer testing and PEP in response to 2 separate incidents of HAV-infected food handlers at restaurants. In both incidents, DOHMH administered only hepatitis A vaccine as PEP to restaurant employees following evaluation by DOHMH to determine their need for testing and vaccination. DOHMH did not administer PEP to restaurant patrons because they were outside of the 2-week window for PEP and because of limited risk of transmission as confirmed by serologic testing. For the 2015 incident, DOHMH used an emergency activation for 10 days to stand up field operations through which testing and vaccine were offered in 3 separate locations over the course of 6 days. Of 276 restaurant employees evaluated by DOHMH, 266 were tested and 252 were vaccinated. For the 2017 incident, DOHMH referred evaluated restaurant employees to 1 site of a private network of urgent care clinics over the course of 6 days. Of 201 restaurant employees evaluated, 198 were tested and 198 were vaccinated. Here, we conduct a partial economic evaluation to compare the costs incurred by DOHMH during these 2 responses.

Methods

Direct monetary costs incurred by DOHMH were partially evaluated for the 2015 emergency activation and 2017 collaboration with the clinic network measured in 2017 US dollars from the DOHMH perspective. Costs for 2017 were estimated for a scenario in which DOHMH incurred the retail cost, or cost commensurate with prices charged to a potential patient, of testing and vaccination services rendered by the private clinic network.

Costs for both 2015 and 2017 were categorized into DOHMH personnel services (ie, non-overtime, cash overtime, and compensatory time), DOHMH supplies and equipment (ie, HAV IgM antibody tests and hepatitis A vaccine), transportation of vaccine by non-DOHMH courier, outsourcing to a private clinic network (ie, personnel services, HAV IgM antibody tests, and medical supplies), and miscellaneous.

DOHMH personnel time for 2015 was aggregated from DOHMH staff time sheets submitted to DOHMH using a labor allocation code specific to the activation. Because labor allocation is only tracked for emergency activations, personnel time in 2017 was self-reported via a Web-based survey that was developed specifically for this investigation and that was disseminated through SurveyMonkey on November 15, 2017, to DOHMH staff involved in the 2017 response. DOHMH provided the accompanying hourly wage for each employee. In both 2015 and 2017, the cost of personnel time was calculated by multiplying the hourly wage by hours worked. Overtime was calculated for both cash overtime and compensatory overtime (time off in lieu of overtime pay). Neither the cost of DOHMH personnel services in 2015 nor in 2017 included fringe benefits or overhead.

Testing and vaccine costs were calculated using unit costs from 2015 and 2017 multiplied by the number of restaurant employees tested or given hepatitis A vaccine as PEP. These do not include labor time involved in testing or vaccinating employees, or running the test at DOHMH in 2015, which is captured in DOHMH personnel time. Vaccine unit costs for 2015 and 2017 were provided by DOHMH. DOHMH provided hepatitis A vaccine to the private clinic network free of charge for administration to restaurant employees in 2017. Testing unit costs were provided by DOHMH for 2015 and quoted by the private clinic network for 2017. For 2015, this testing unit cost was applied to all 266 specimens, although 149 were run at an external laboratory vendor. No other ancillary medical supplies were included in the 2015 emergency activation, as these were already included in DOHMH's emergency stockpile.

In addition to the administration of testing and vaccine, the private clinic network quoted the retail cost of services rendered in the 2017 response for personnel services and medical supplies. Personnel services were calculated for administrative and medical operations of opening a dedicated clinic site in collaboration with DOHMH using hours worked multiplied by the hourly wage at the retail rate.

Miscellaneous costs in 2015 include items that were assigned an activation allocation code but that DOHMH could not identify to what they pertained.

Results

In 2015, the total cost incurred by DOHMH for emergency activation was $65 831 ($238 per restaurant employee evaluated). In 2017, the total cost

incurred by DOHMH in collaborating with the private clinic network would have been $50 914 ($253 per employee evaluated) (Table). DOHMH personnel services accounted for 85% ($55 854) of the costs of emergency activation in 2015 compared with 6% ($3146) of the 2017 scenario costs. These estimates reflect the differential DOHMH personnel time required for each response—1260.4 hours (of which 555 hours were cash and compensatory overtime) by staff from 21 DOHMH bureaus for emergency activation (2015) versus 74 hours (of which 6.33 hours were cash and compensatory overtime) by staff from 1 DOHMH bureau in collaborating with the private clinic network (2017).

Discussion

We compared the costs of responding to hepatitis A cases in restaurant food handlers using emergency activation versus collaborating with a private network of urgent care clinics. The total cost of emergency activation in 2015 may be more expensive than the total cost of collaborating with the clinic network in 2017. According to these estimations, emergency activation may have been approximately $15, or 6%, less expensive per restaurant employee evaluated than collaborating with the clinic network at the retail cost of service but required 17 times as much DOHMH personnel time. In interpreting these cost data, it is important to note that there was a relatively small number of restaurant employees evaluated compared with previous emergency activations through which DOHMH provided PEP to thousands of employees and patrons of a restaurant.[3]

The data presented here underscore the ongoing need to identify means of responding to HAV-infected food handlers in a manner that optimizes scarce financial and personnel resources. Emergency activation required more than 1200 hours of DOHMH personnel time. The burden of activation on DOHMH personnel time may impair DOHMH's ability to address other competing health needs in NYC by directly diverting staff resources.[4] Thus, the negative impact of emergency activation on other DOHMH priorities might negate identified cost savings of emergency activation in comparison with outsourcing

TABLE

Costs Incurred by the New York City Department of Health and Mental Hygiene in Response to 2 Hepatitis A Cases in Restaurant Food Handlers in 2015 and 2017

	2015 DOHMH Emergency Activation		2017 No DOHMH Emergency Activation	
Cost Category	Cost, $ (% of Total Cost)	Unit Cost, $	Cost, $ (% of Total Cost)	Unit Cost, $
DOHMH personnel services				
Non-overtime	30 569 (46.4)	42/h	2 878 (5.7)	42/h
Cash overtime	23 025 (35.0)	44/h	118 (0.2)	35/h
Compensatory time	2 260 (3.4)	45/h	150 (0.3)	50/h
Subtotal	55 854 (84.8)	…	3 146 (6.2)	…
DOHMH supplies and equipment				
HAV IgM antibody tests	3 059 (4.6)	11	…	…
Hepatitis A vaccine	6 778 (10.3)	25.73	5 481 (10.8)	27.68
Subtotal	9 836 (14.9)	…	5 481 (10.8)	…
Transportation of vaccine	…	…	50 (0.1)	…
Miscellaneous	140 (0.2)	…	…	…
Private clinic network				
Personnel services	…	…	38 080 (74.8)	57/h
HAV IgM antibody tests	…	…	3 366 (6.6)	17
Medical supplies	…	…	792 (1.6)	4
Subtotal	…	…	42 238 (83)	…
Total	65 831 (100)	…	50 914 (100)	…
Cost per restaurant employee evaluated[a]	238[a]	…	253[b]	…

Abbreviations: DOHMH, Department of Health and Mental Hygiene; HAV, hepatitis A virus.

[a] *276 employees were evaluated in 2015.*

[b] *201 employees were evaluated in 2017.*

testing and PEP administration services to an external entity.

This study is subject to some limitations. First, costs may be biased because of underestimation (eg, costs of testing conducted by an external laboratory), exclusion (eg, costs attributed to ancillary supplies already in DOHMH's emergency stockpile and personnel services not captured by the labor allocation code), or subjective estimation (eg, recall bias of staff and who completed the survey influencing estimates of 2017 personnel services). In addition, costs do not account for any revenue (eg, health insurance reimbursement) that could have potentially offset a portion of the costs associated with each response. Second, costs of the 2017 scenario reflect the clinic retail price of services rendered to private sector clients and do not necessarily reflect the terms of a negotiated contract between DOHMH and a vendor. Third, these cost estimates only account for direct monetary costs incurred to DOHMH and may undervalue the true economic burden of these responses by excluding lost business opportunities or employee productivity. For instance, DOHMH field operations may be more convenient for restaurant employees, reducing the cost of travel and productivity losses incurred when visiting a single clinic site with limited hours. Fourth, these estimates do not account for differences in the quality of these responses, because they only evaluate response costs without considering other measures of value, such as effectiveness. Finally, these results may not be generalizable to larger HAV outbreaks that require provision of PEP to restaurant patrons and may not be generalizable to health departments nationwide.

Implications for Policy & Practice

- Outsourcing testing and PEP administration services to an external entity may be slightly more expensive than agency-wide emergency activation of a health department in response to an HAV-infected food handler, though may require fewer health department personnel services.
- Health departments in larger cities could consider collaborating with a private clinic in response to an HAV-infected food handler taking into account that each response conserves different resources.

Future evaluations should focus on collecting outcome data to better articulate the trade-offs between costs, personnel, and effectiveness of alternative responses to emergency activation in response to an HAV-infected food handler. Establishing prospective approaches for data collection in advance of responding to an incident may yield the data required for a full economic evaluation of costs and outcomes.

References

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