COST OF HOSPITALIZATION FOR FOODBORNE DIARRHEA: A CASE STUDY FROM VIETNAM

Associate Prof. Hoang Van Minh, MD, PHD
Ha Anh Duc, PHD
Nguyen Viet Hung, PHD
Tran Tuan Anh, MA

HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

DIARRHEA: GLOBAL ESTIMATES

- The most frequent causes of foodborne illness were diarrhoeal disease agents, particularly norovirus and Campylobacter spp
- Foodborne diarrhoeal disease agents caused **230,000 (95% UI 160,000–320,000) deaths**, particularly non-typhoidal Salmonella enterica (NTS, which causes diarrhoeal and invasive disease)
- Worldwide, **18 (95% UI 12–25) million DALYs** were attributed to foodborne diarrhoeal disease agents, particularly NTS and enteropathogenic Escherichia coli (EPEC)

HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

DIARRHEA: VIỆT NAM

Year	Numbers of cases	Morbility rate per 100,000 population	Numbers of deaths	Mortality rate per 100,000 population
2002	1,055,969	1,327.62	16	0.02
2003	972,463	1,208.50	10	0.01
2004	922,832	1,133.18	18	0.02
2005	1,011,718	1,220.98	11	0.01
2006	981,633	1,169.57	16	0.02
2007	974,586	1,157.48	24	0.03
2008	952,187	1,109.17	8	0.01
2009	930,496	1,083.90	4	0.01
2010	852,747	983.02	3	0.01
2011	753,714	860.30	5	0.01
2012	721,959	813.20	9	0.01
2013	662,589	736.21	9	0.01
2014	566,275	624.14	9	0.01
	11,359,168		**142**	

Source: Health Statistic Yearbook: various years

COST OF ILLNESS ANALYSIS ?

- Cost-of-Illness (COI) studies aim to identify and measure all the costs of a disease
- COIs estimate the economic burden of a specific disease to a society ≈ the savings that could be done if the disease were to be eradicated
- The most developed cost estimation strategies and data sources relate to estimating:
  - direct health-sector costs and
  - indirect costs associated with a sick persons' lost earnings (productivity losses)

HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

OBJECTIVE

To estimate hospitalization costs of foodborne diarrhoea cases in selected health facilities in Vietnam.

MATERIALS AND METHODS

Analytical framework	Details
Design	A facility-based cost-of-illness study
Study perspective	Societal perspective using retrospective approach
Epidemiological approach	Prevalence-based study
Sources of data for direct costs	Selected health facilities in Vietnam
Indirect cost estimation methods	Human capital approach
Intangible costs	No
The reference year	For the calculation of absolute numbers was June-August, 2013

HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

MATERIALS AND METHODS

Study setting	
Level	**Health facility visited**
National	National Hospital of Tropical Disease (Ha Noi)
Provincial	- Hung Yen Provincial General Hospital - Nghe An Provincial General Hospital
District	- Khoai Chau District Hospital (Hung Yen) - Do Luong District Hospital (Nghe An)
Commune	- Commune Health Stations in Khoai Chau: Binh Kieu, Da Trach, Dai Hung - Commune Health Station in Do Luong: Minh Son, Lac Son, Da Son

MATERIALS AND METHODS

Selection of cases	- who admitted to the studied health facilities during June - August, 2013 - Three or more loose stools in 24 hr or three or more times vomiting in 24 hr, or diarrhea with at least one additional symptom or vomiting with at least two additional symptoms
Data collection	- Direct medical costs: hospital bills (direct medical charges); adjusted based on interviewing with financial staff on direct medical charges covered the actual costs. - Direct non-medical costs: interviewing with the patients and their relatives. - Productivity losses of patients & their relatives: human capital approach used
Data management and analysis	- Excel spreadsheet - The currency used was Vietnamese Dong, presented here in 2013 prices - Exchange rate: 20,619.6 VND = 1 US$ (2011)

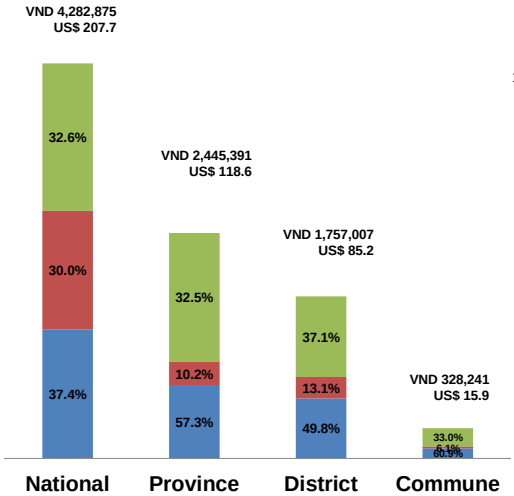
HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

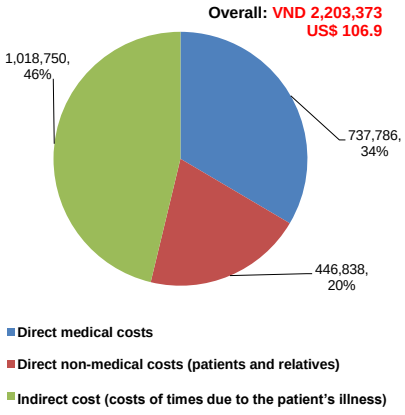
CHARACTERISTICS OF THE STUDY RESPONDENTS

Parameters	National hospital	Provincial hospital	District hospital	Commune health center	Overall
Number of patients	18	34	22	13	87 (100)
Gender					
Men, n (%)	12	22	8	8	50 (47.4)
Women, n (%)	6	12	14	5	37 (42.5)
Age					
<= 15 yr, n (%)	2	1	1	1	5 (5.7)
16-59 yr, n (%)	13	29	16	12	73 (83.9)
>= 60 yr, n (%)	3	2	3	1	9 (10.3)
Average length of stay (day)	4.4	3.2	2.5	1	2.8

HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

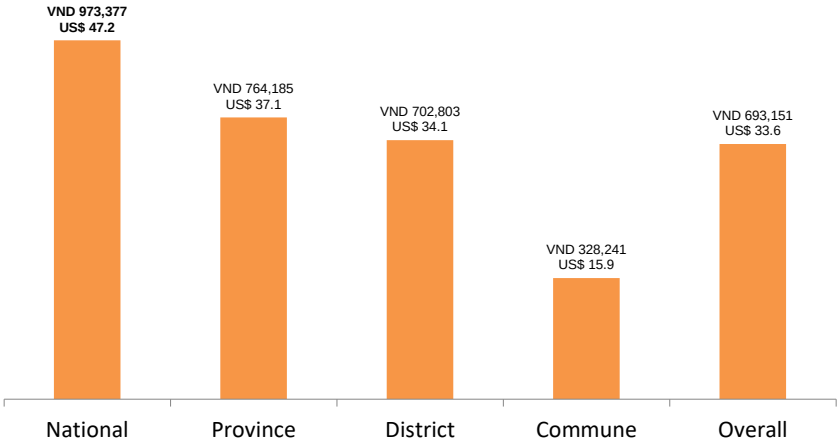
COST PER HOSPITALIZATION EPISODE FOR FOODBORNE DIARRHOEA CASE BY HEALTH FACILITIES





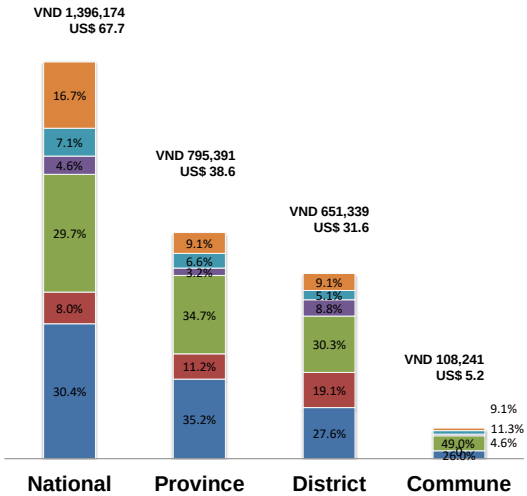
HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

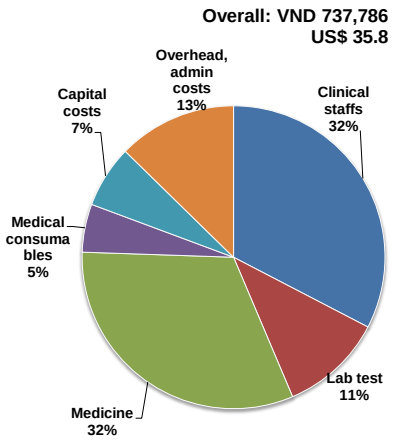
COST PER HOSPITALIZATION DAY
FOR FOODBORNE DIARRHOEA CASES BY HEALTH FACILITIES



HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

DIRECT COST PER HOSPITALIZATION EPISODE
FOR FOODBORNE DIARRHOEA CASES BY HEALTH FACILITIES

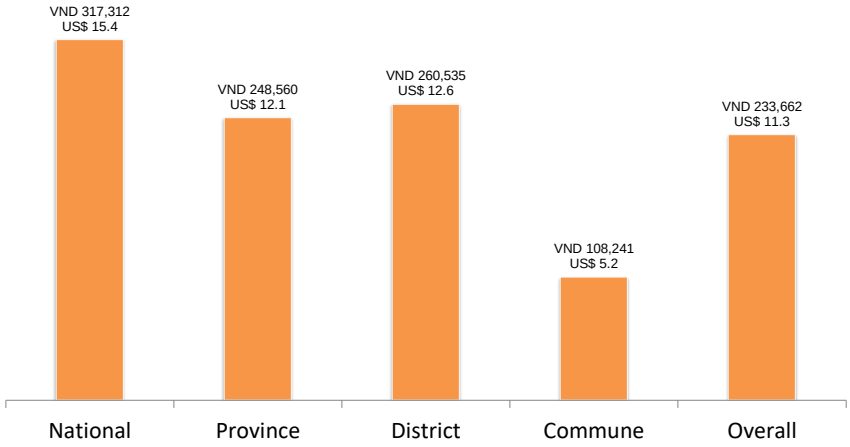




HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

DIRECT COSTS PER HOSPITALIZATION DAY

FOR FOODBORNE DIARRHOEA CASES BY HEALTH FACILITIES



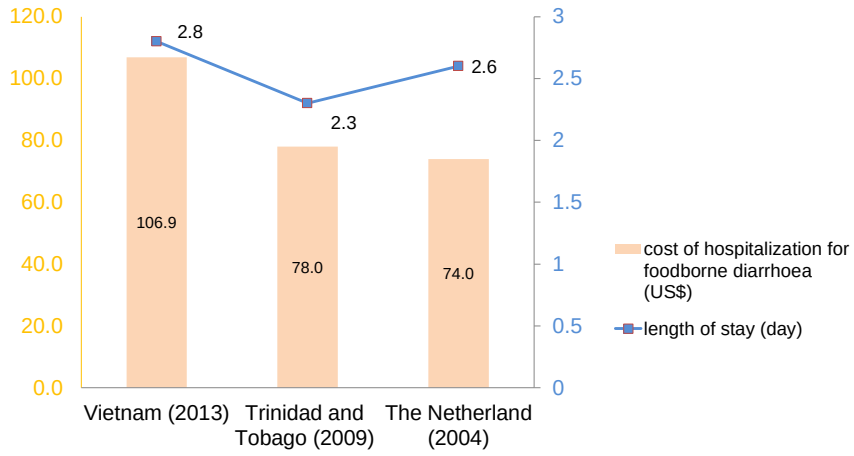
HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

TOTAL ANNUAL COSTS ASSOCIATED WITH HOSPITALIZATION
FOR FOODBORNE DIARRHEA IN VIETNAM

Parameters	Scenario 1*	Scenario 2**
Population of Vietnam in 2013 (13)	**90,388,000**	**90,388,000**
Rate of diarrhea admitted to health facilities (per 100.000)	**210.57**	**210.57**
Total cases of diarrhea admitted to health facilities	**190,330**	**190,330**
Total cases of diarrhea admitted to health facilities due to foodborne diseases	**60,906**	**67,567**
Of which, number of cases treated at each level of health care facilities		
Number of cases treated at national hospital (4%)	**2,436**	**2,703**
Number of cases treated at provincial hospital (45%)	**27,408**	**30,405**
Number of cases treated at district hospital (36%)	**21,926**	**24,324**
Number of cases treated at commune health centers (15%)	**9,136**	**10,135**
Costs per hospitalization episode (US$)		
At national hospital	**208**	**208**
At provincial hospital	**119**	**119**
At district hospital	**85**	**85**
At commune health centers	**16**	**16**
Total costs of hospitalization (US$)		
At national hospital	**506,023**	**561,370**
At provincial hospital	**3,250,407**	**3,605,921**
At district hospital	**1,868,327**	**2,072,675**
At commune health centers	**145,432**	**161,339**
Total costs of hospitalization at all levels of health facilities (US$)	**5,770,190**	**6,401,305**
GDP Vietnam 2013 (Billion US$) (18)	**172.73**	**172.73**
Total annual costs associated with hospitalization for foodborne diarrhea in Vietnam as % of GDP	**0.003**	**0.004**

***: Scenario 1: Based on figure on the proportion of gastroenteritis specifically attributable to foodborne transmission from Australia = 32%**
****: Scenario 2: Based on figure on the proportion of gastroenteritis specifically attributable to foodborne transmission from USA = 35.5%**

INTERNATIONAL COMPARISON



CONCLUSION

- Cost of hospitalization for foodborne in Vietnam is substantial.
- More attentions should be paid on prevention and control of foodborne diarrhea cases in Vietnam.
- Ensuring the safety of food depends on the efforts of everyone involved in the food chain continuum, from production, processing, transport to consumption.
- Further study on economic aspects of foodborne diarrhea cases are needed to provide further insights into the problems associated with foodborne diarrhea cases in Vietnam.

HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION

THANK YOU !


HANOI UNIVERSITY OF PUBLIC HEALTH
INTEGRITY – DEVELOPMENT – GLOBALIZATION