Cost-of-illness for diarrhoea and pneumonia among children under five in urban slums, non-slums, and rural areas of Bangladesh

Md Zahid Hasan

Associate Scientist

Health Economics and Financing

icddr,b

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JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH

INTERNATIONAL VACCINE ACCESS CENTER

Md Zahid Hasan[1,2,3*], Bryan Patenaude[4], Deborah Odihi[4], Hemel Das[1], Zerin Jannat[1], Wazed Ali[1], Gatien de Broucker[4], Sayem Ahmed[5], Shehrin Shaila Mahmood[1], Jasim Uddin[1]

Affiliations

1) Health Systems and Population Studies Division, icddr,b, Dhaka 1212, Bangladesh

2) Nuffield Centre for International Health and Development, Leeds Institute of Health Sciences University of Leeds, Leeds LS2 9JT, United Kingdom

3) Academic Unit of Health Economics, Leeds Institute of Health Sciences, University of Leeds, Leeds LS2 9JT, United Kingdom

4) International Vaccine Access Center, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21218, United States

5) Health Economics Research Group (HERG), Department of Health Sciences, Brunel University London, Uxbridge, London, UK

Background

- Childhood immunizations remain one of the most cost-effective public health programs to reduce child morbidity and mortality and help in achieving Sustainable Development Goal 3
- Despite significant progress in childhood immunisation in Bangladesh, valid vaccination coverage is lower in urban than rural areas (79.0% vs 84.6%)
- Vaccine preventable diseases (VPDs) such as Diarrhoea and Pneumonia continue to impose a substantial public health burden, particularly among under five children
- With the rapid urbanisation, it is expected that the population of its capital city Dhaka, will increase from 40% to 50% by 2035 with a significant proportion in slum areas
- Limited research exists on the economic impact of these disease in slum, non-slum, and rural areas of Bangladesh

Objectives

To estimate the cost-of-illness for vaccine preventable diseases (Diarrhoea and Pneumonia) in urban slum, non-slum and rural settings in Bangladesh

Methodology

Methods

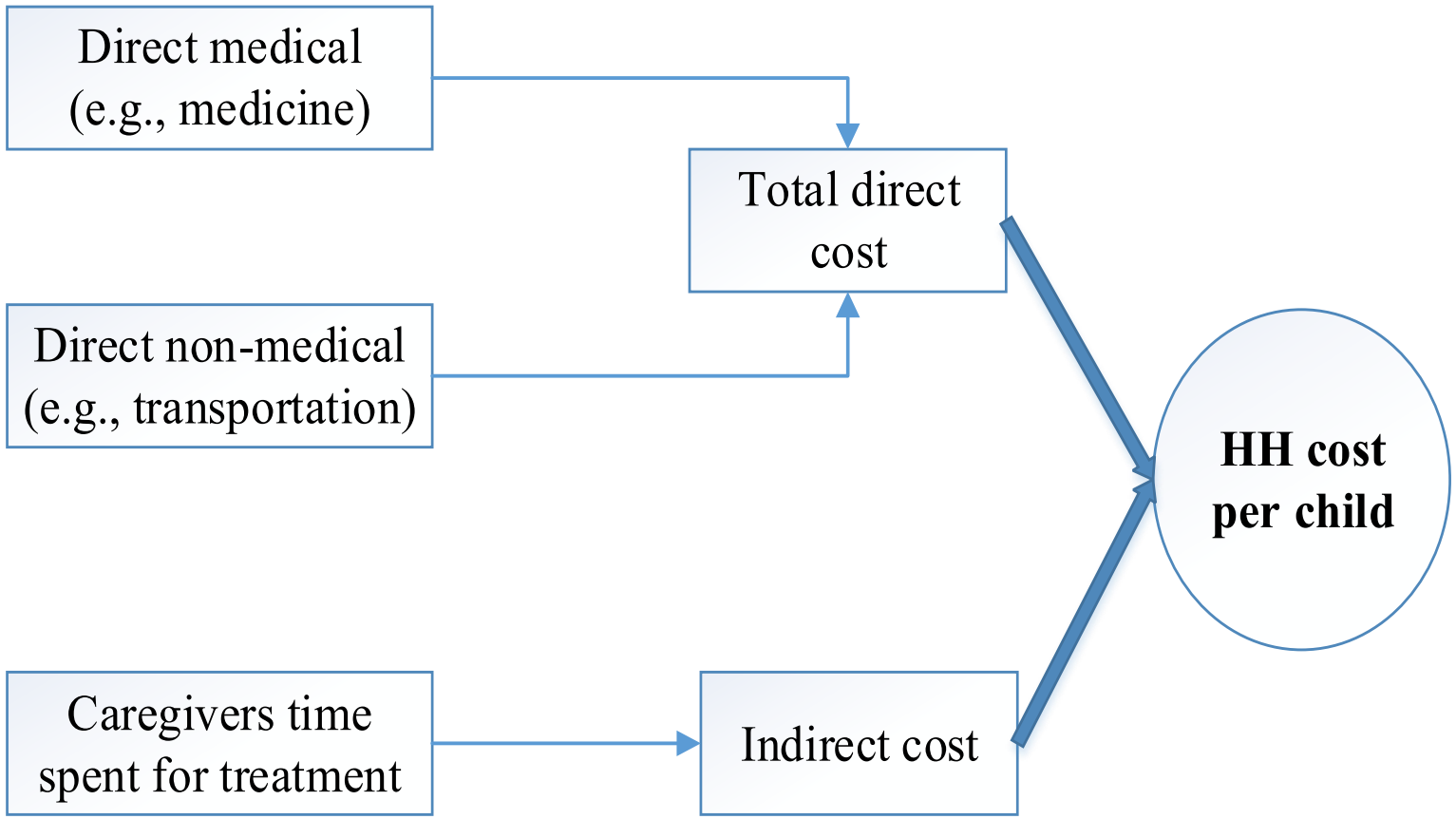
Survey types, respondents and sample size:

- ✓The study was conducted in purposively selected city corporations (CC) (slum and non-slum areas) and rural upazilas in Bangladesh
- ✓Data were collected through face-to-face interview

Survey types	Study population	Sample size
Health facility survey	Facility manager/administrators	8
Patient exit survey	Caregivers of 0-59 months aged children at facility	1,233 (553 for diarrhoea and 680 for pneumonia)

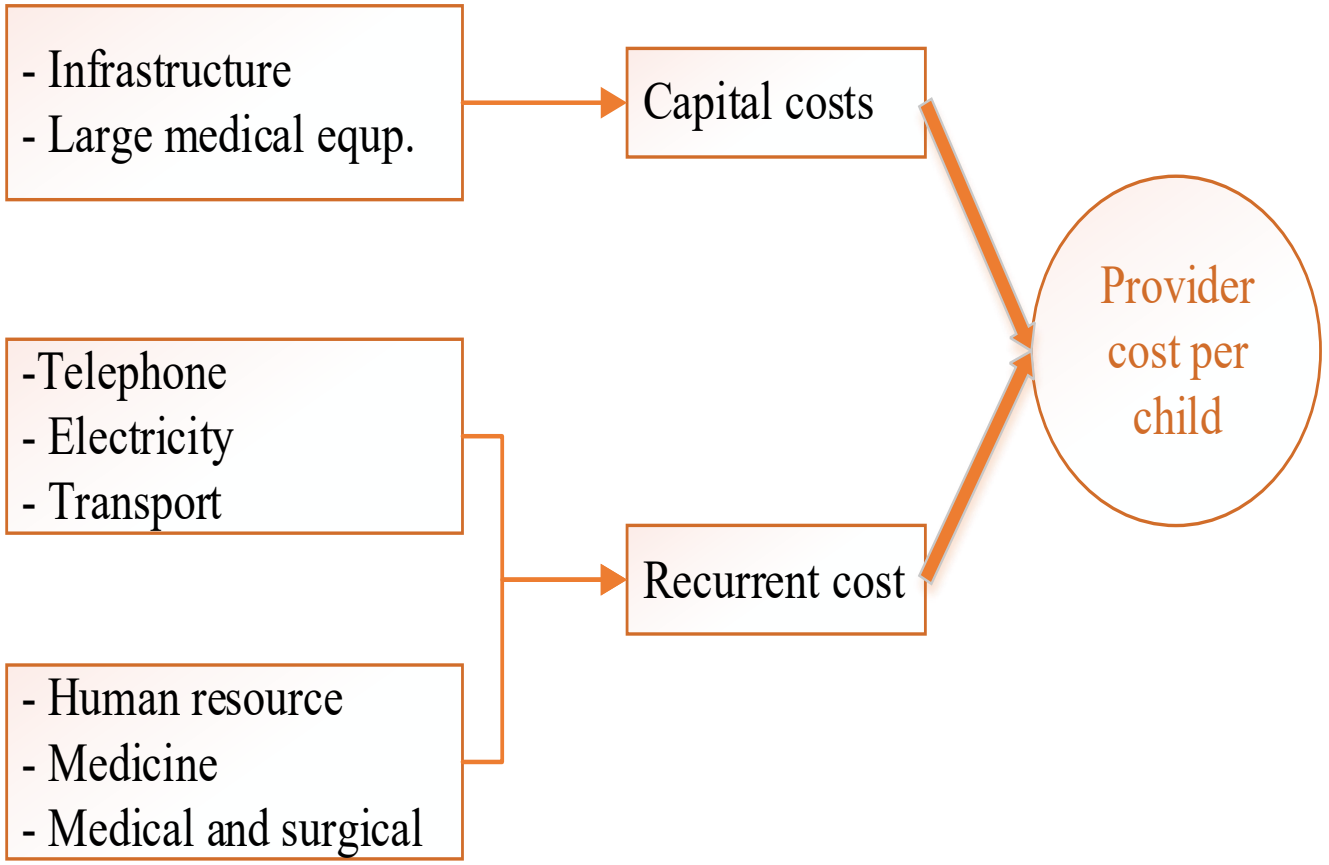
Household costs of illness

- ✓ Considers out of pocket (OOP) costs incurred to the households for treating patients
- ✓ Human capital approach counts any hour not worked for caregiving is as an hour lost
- ✓ Minimum wage was used as a proxy of labour productivity in the absence of formal occupation of caregiver

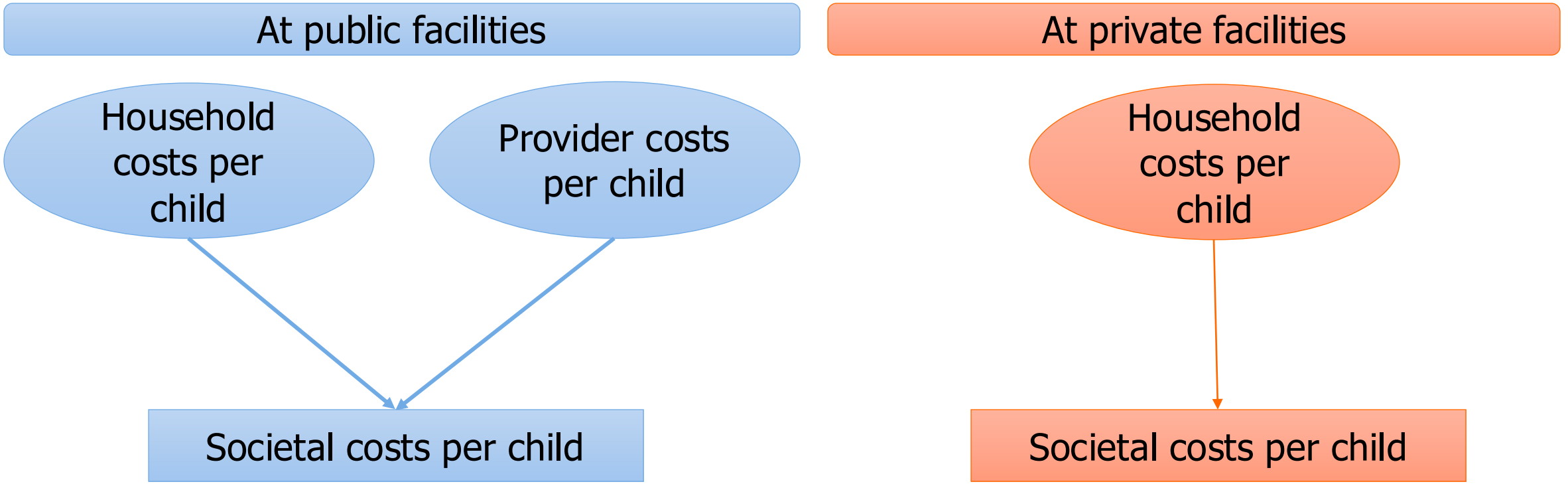


Provider costs of illness at public facilities

- ✓ All resources used for treatment were identified, quantified, and valued
- ✓ Input quantity of items was multiplied by the unit prices of corresponding items to get the total cost of each input
- ✓ Capital items were annualized: 50 years for infrastructure and 5 years for medical equipment with a **discount rate of 3%**
- ✓ **Costs of shared items** were estimated based on the utilization of the items by the patients of the selected disease in a facility



Societal cost per patient



Private facilities charge total costs of services to patients

All costs information were collected in BDT and converted to US$ as 1 US$=BDT 88.99 in 2022

Incidence of catastrophic expenditure for treatment

Direct treatment costs

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10% or 25% of household's total income

Household face catastrophic expenditure for healthcare

Findings

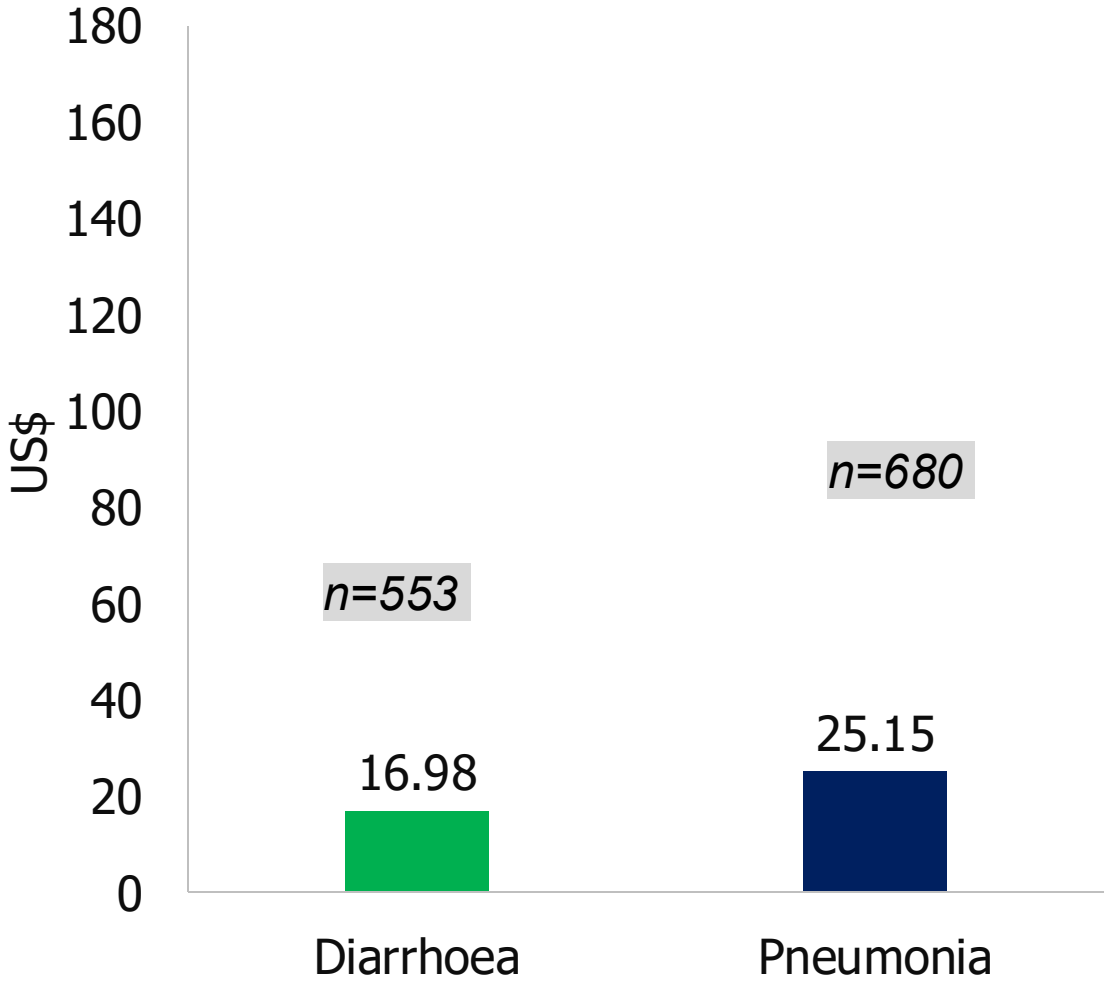
Characteristics of Diarrhoea & Pneumonia patients

Characteristics	Diarrhoea (n=553)	Pneumonia (n=680)
Age-group		
0 to 5 months	19.2	23.2
6 to 11 months	31.3	26.3
12 to 24 months	33.1	27.5
25 to 59 months	16.5	22.9
Sex		
Male	57.3	56.5
Female	42.7	43.5
Education of caretaker		
No institutional education	3.4	3.7
Up-to primary (1-5)	20.3	23.2
Up-to secondary (6-10)	52.8	53.8
Higher sec. & above	23.5	19.3
Residence		
Slum	19.2	21.2
Non-slum	20.4	22.1
Rural	60.4	56.8

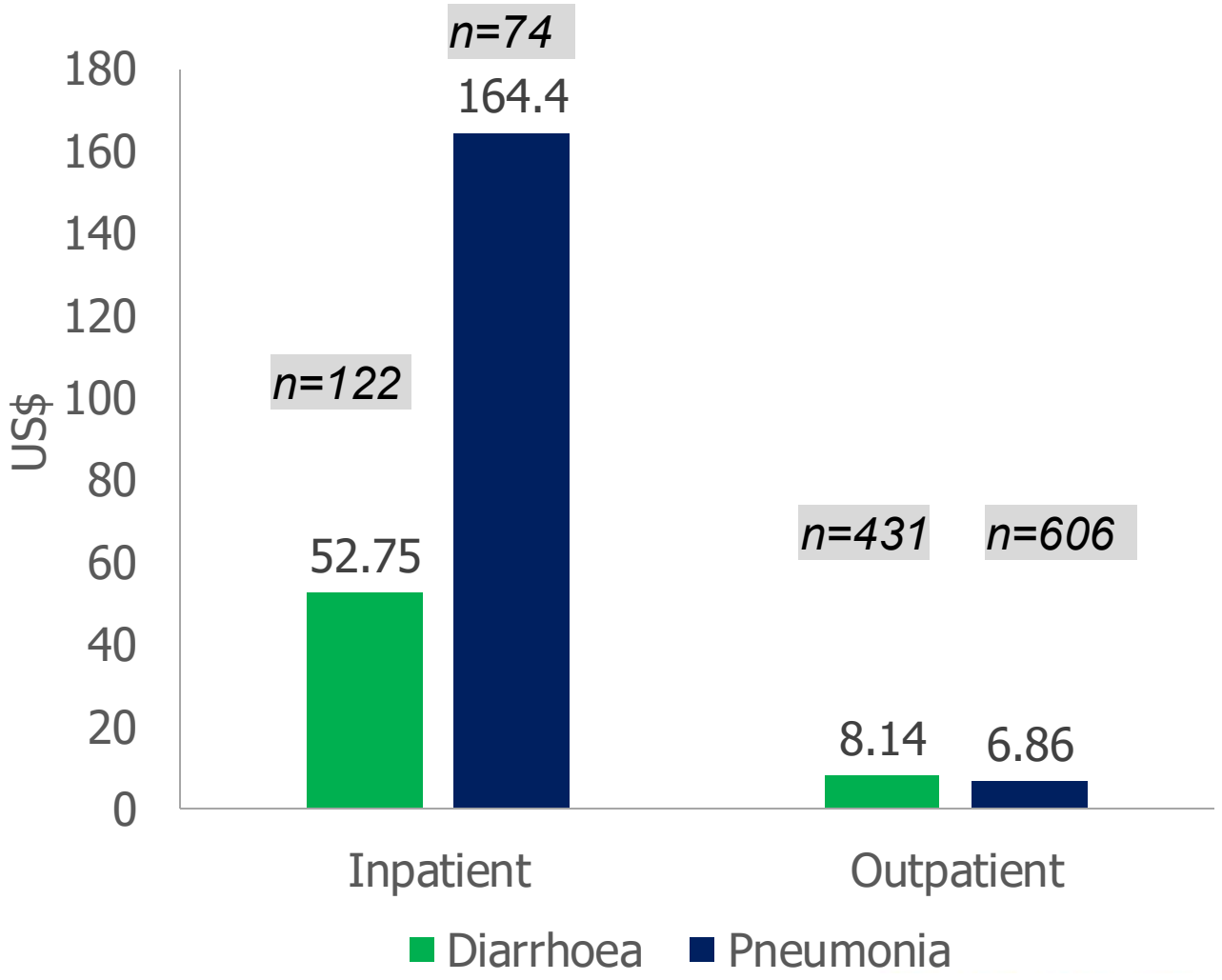
Characteristics	Diarrhoea (n=553)	Pneumonia (n=680)
Type of visit		
Inpatient service	22.1	10.9
Outpatient service	77.9	89.1
Length of stay (IPD)		
Up to 1 day	78.7	71.6
2-4 days	18.0	12.2
5 days or more	3.3	16.2
Type of facilities		
Public	78.8	78.2
Private for-profit	17.9	17.8
Private not-for-profit	3.3	4.0

Household costs per patient

Overall*

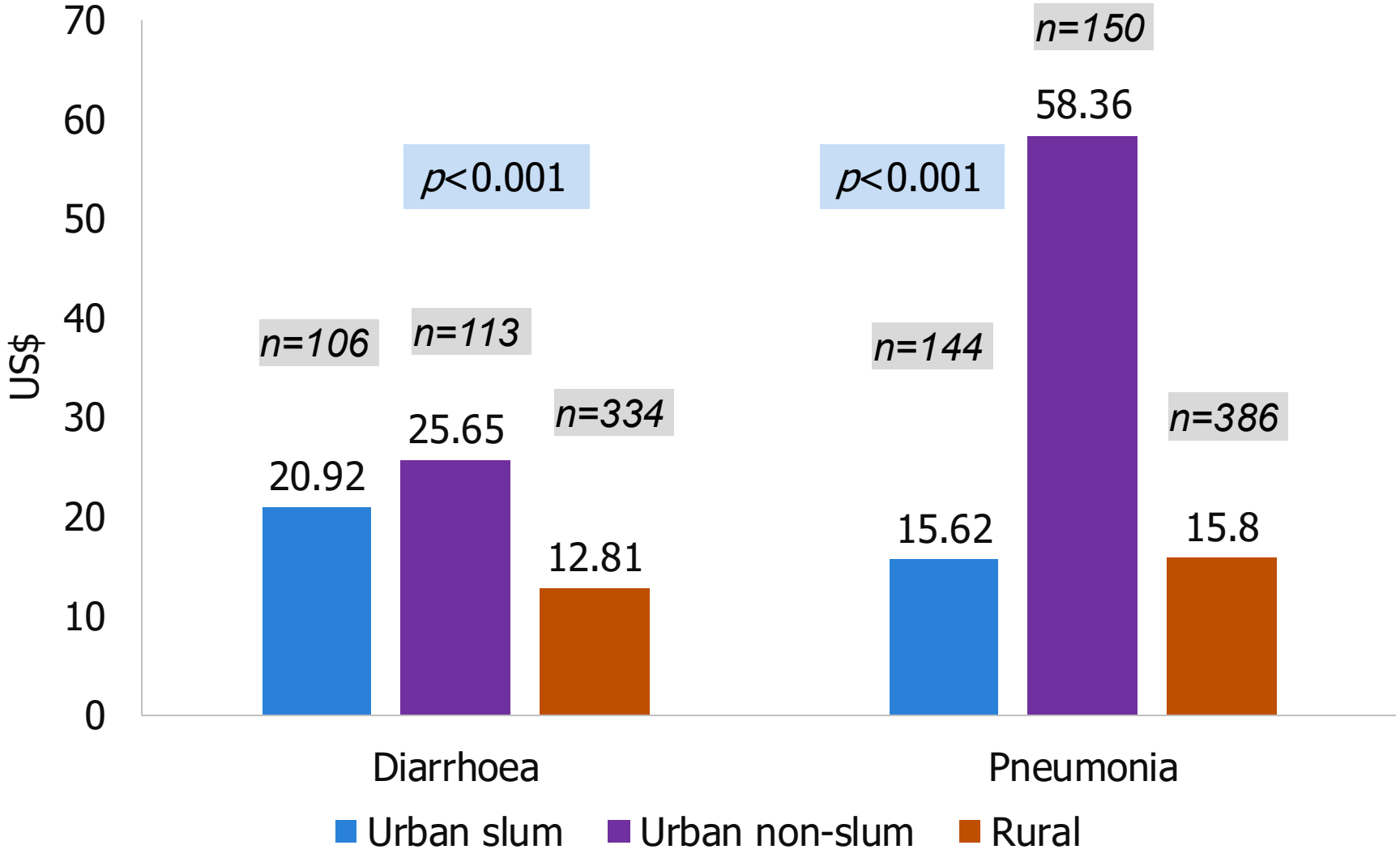


By patients' visit types



**Includes both inpatient and outpatient*

Household costs per patient by study areas



*One-way analysis of variance

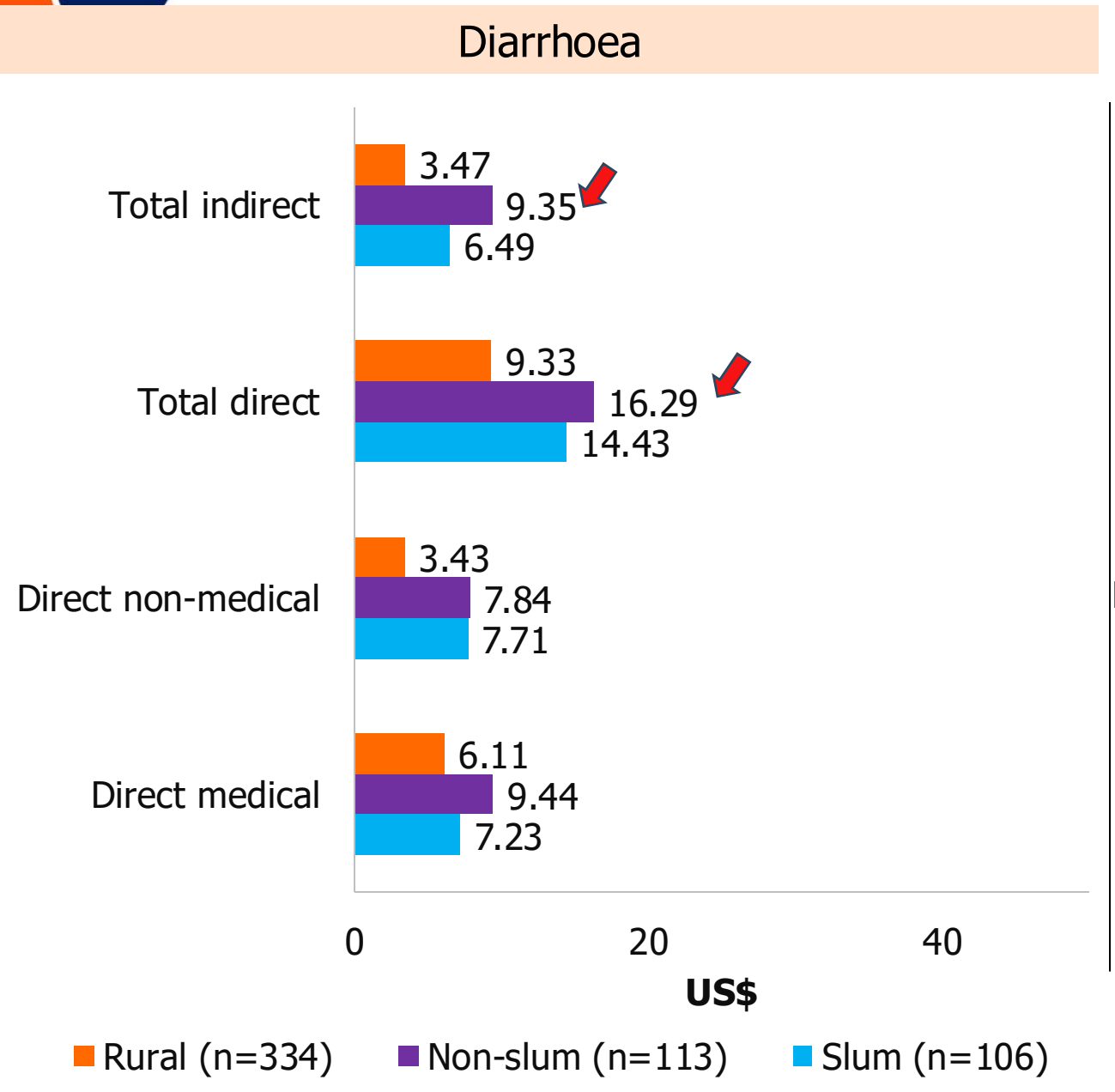
Includes both inpatients and outpatients

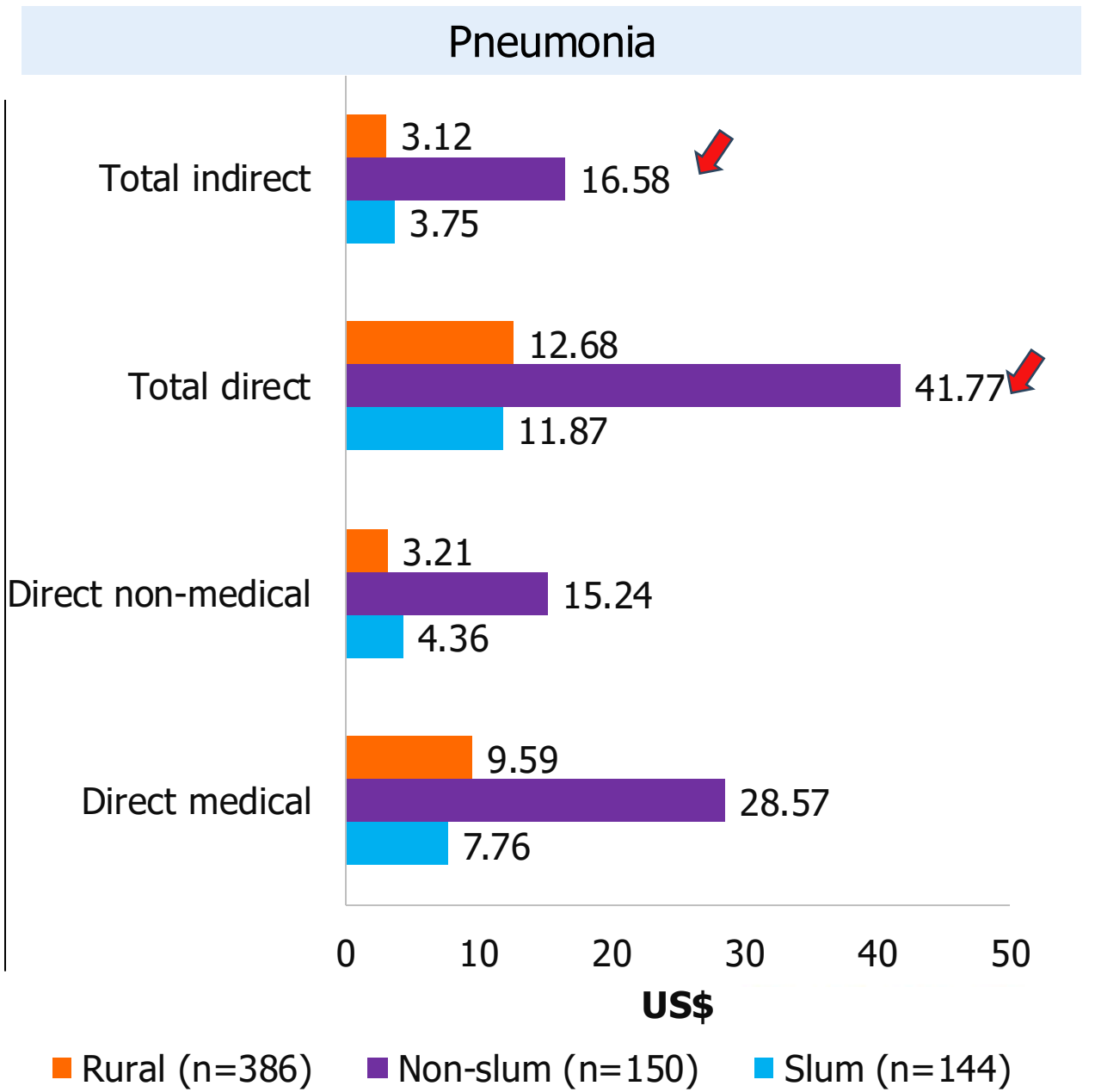
Household costs per patient by cost categories

Cost categories		Diarrhoea (n=553)		Pneumonia (n=680)	
		n	Average costs per patient in US$	n	Average costs per patient in US$
Direct medical	Consultation	553	1.00	680	1.3
	Drugs	481	4.92	580	9
	Diagnostic	52	**9.04**	110	**13.76**
	Bed/ cabin	69	**6.92**	49	**30.45**
Direct non-medical	Transportation	513	2.97	635	2.99
	Food	133	6.90	85	18.42
	Others (e.g., tips)	57	3.19	57	5.26
Total direct		553	11.73	680	18.93
Total indirect (productivity loss)		553	5.25	680	6.22
Total costs per patient		553	16.98	680	25.15

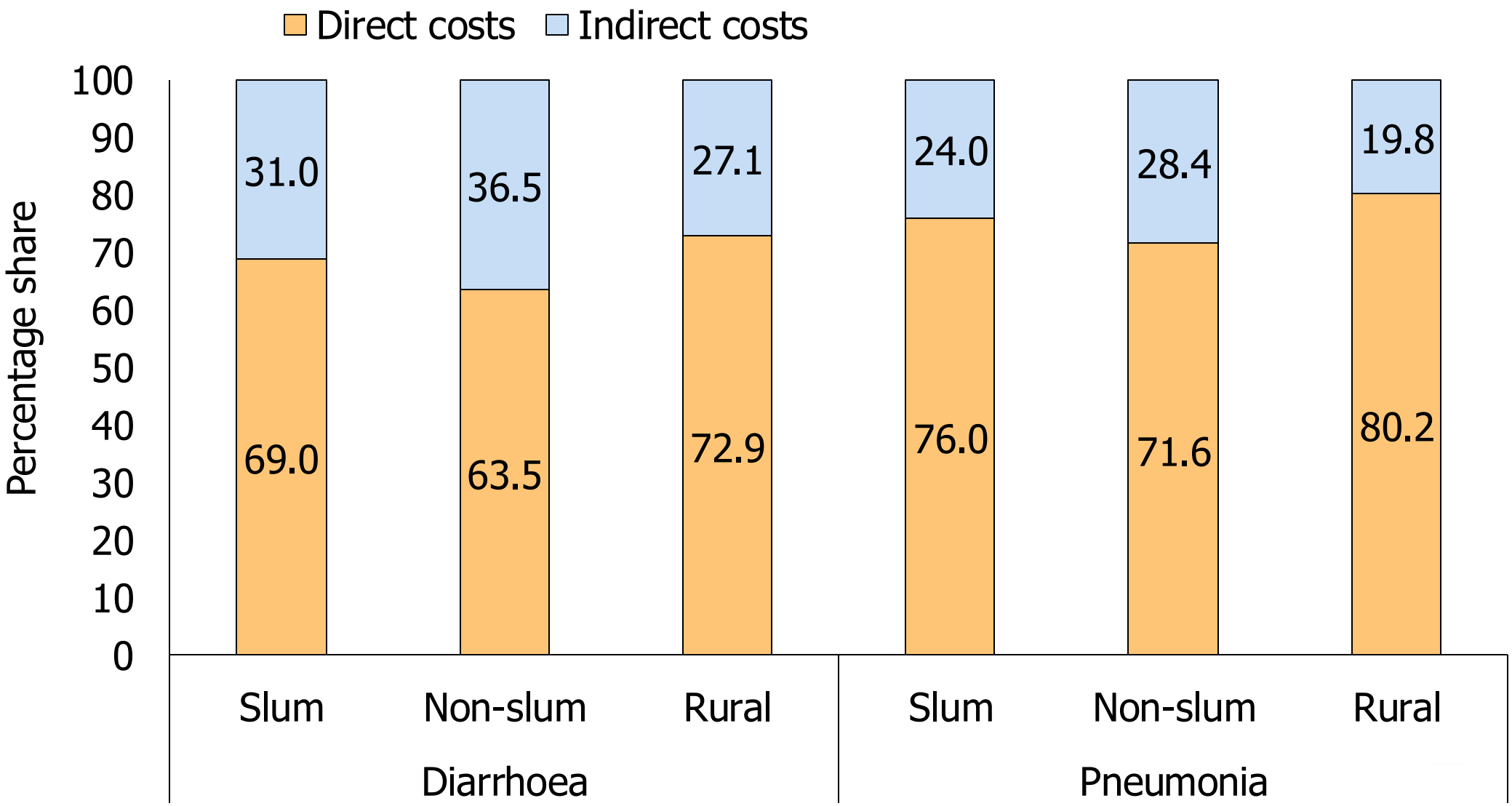
Includes inpatient and outpatients

Households' costs by costs components and study areas





% share of households' costs per patient by components



Households' costs per patient by patients' characteristics

Characteristics	Diarrhoea (n=553)			Pneumonia (n=680)		
	n	Mean	p-value	n	Mean	p-value
Age category		**US$**			**US$**	
0 to 5 months	106	9.63	<0.001[a]	158	48.2	<0.001[a]
6 to 11 months	173	21.80		179	20.8	
12 to 24 months	183	19.24		187	22.1	
25 to 59 months	91	11.85		156	10.4	
Gender						
Male	317	18.67	<0.05[b]	384	25.6	<0.143[b]
Female	236	14.72		296	24.6	
Length of stay (IPD)						
Up to 1 day	526	15.05	<0.001[a]	656	18.4	<0.001[a]
2-4 days	22	51.83		12	155.2	
5 days or more	5	67.23		12	265.2	

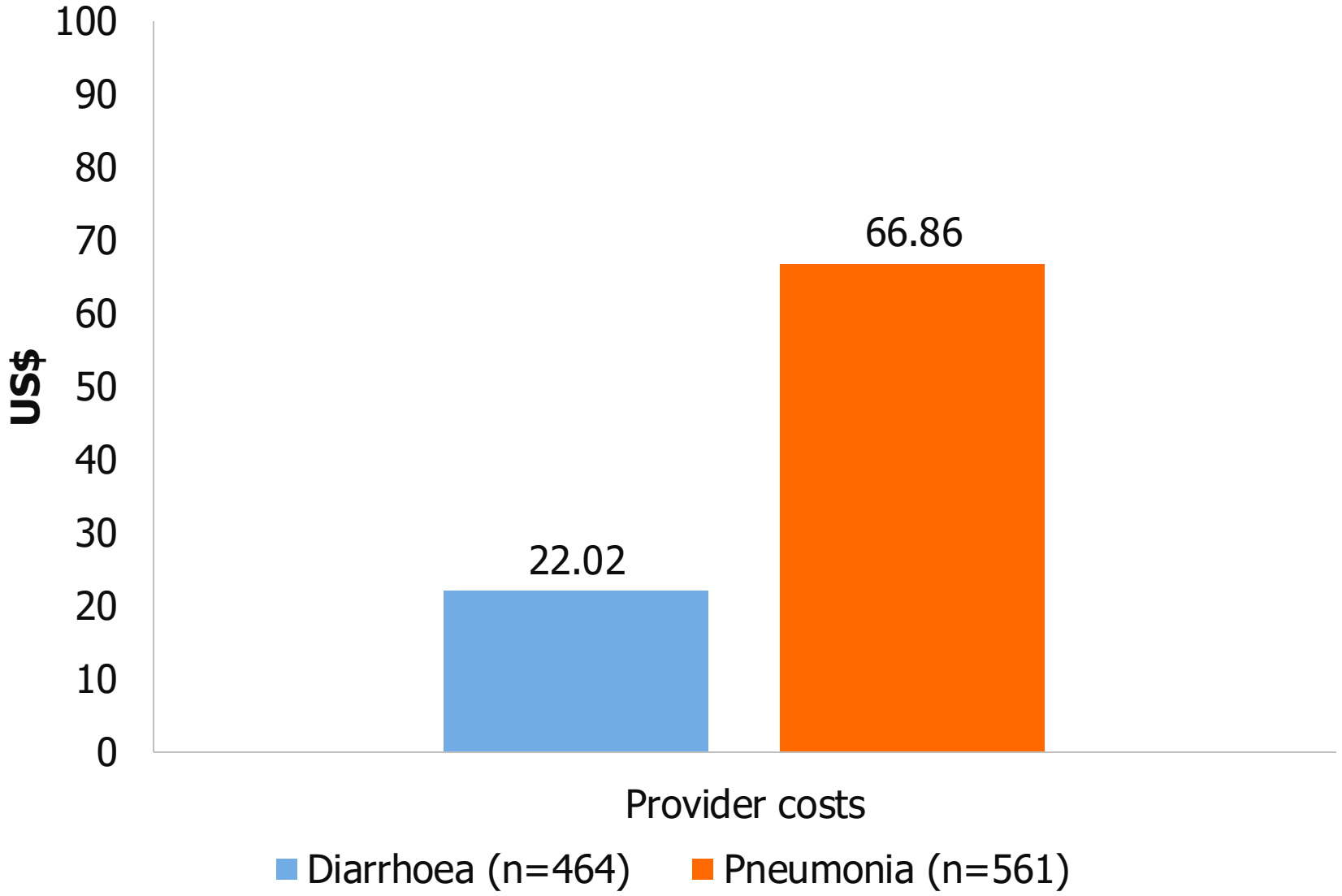
[a)]One-way ANOVA; [b)]One-sample t-test

Households' costs per patient by patients' characteristics (cont.)

Characteristics	Diarrhoea (n=553)			Pneumonia (n=680)		
	n	Mean	p-value	n	Mean	p-value
Type of facilities		**US$**			**US$**	
Public	464	12.78	<0.001[a]	561	13.1	<0.001[a]
Private for-profit	72	44.90		92	101.6	
Private not-for-profit	17	13.52		27	14.9	
Asset quintiles						
Poorest	120	17.30	<0.001[c]	132	18.7	<0.001[c]
2nd	110	16.19		134	27.7	
3rd	138	14.02		181	18.0	
4th	98	17.80		118	31.2	
Richest	87	21.33		115	34.7	

[a)] One-way ANOVA; [c)] Kruskal–Wallis rank test

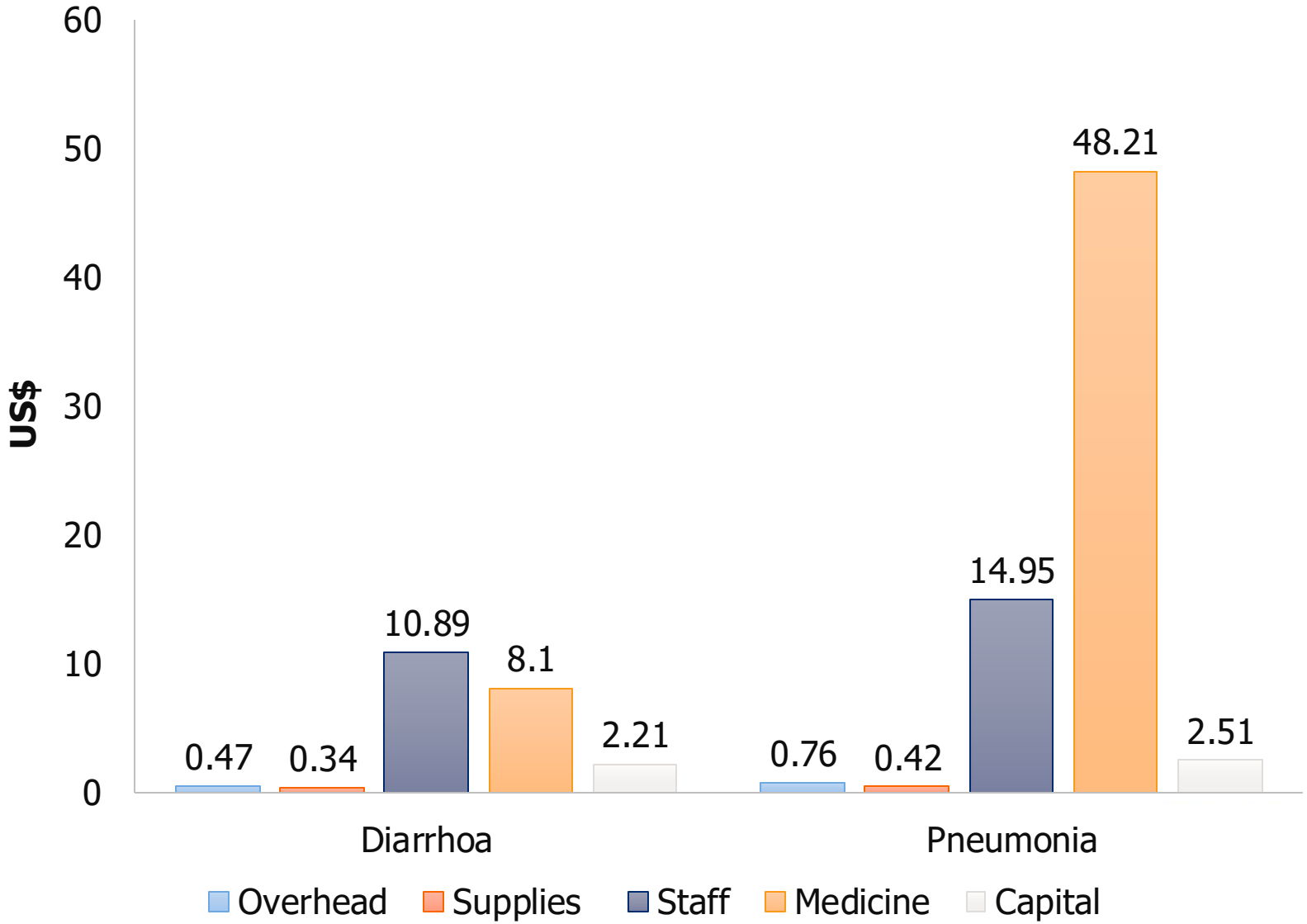
Overall provider costs per patient at public facilities



Includes both inpatient and outpatient

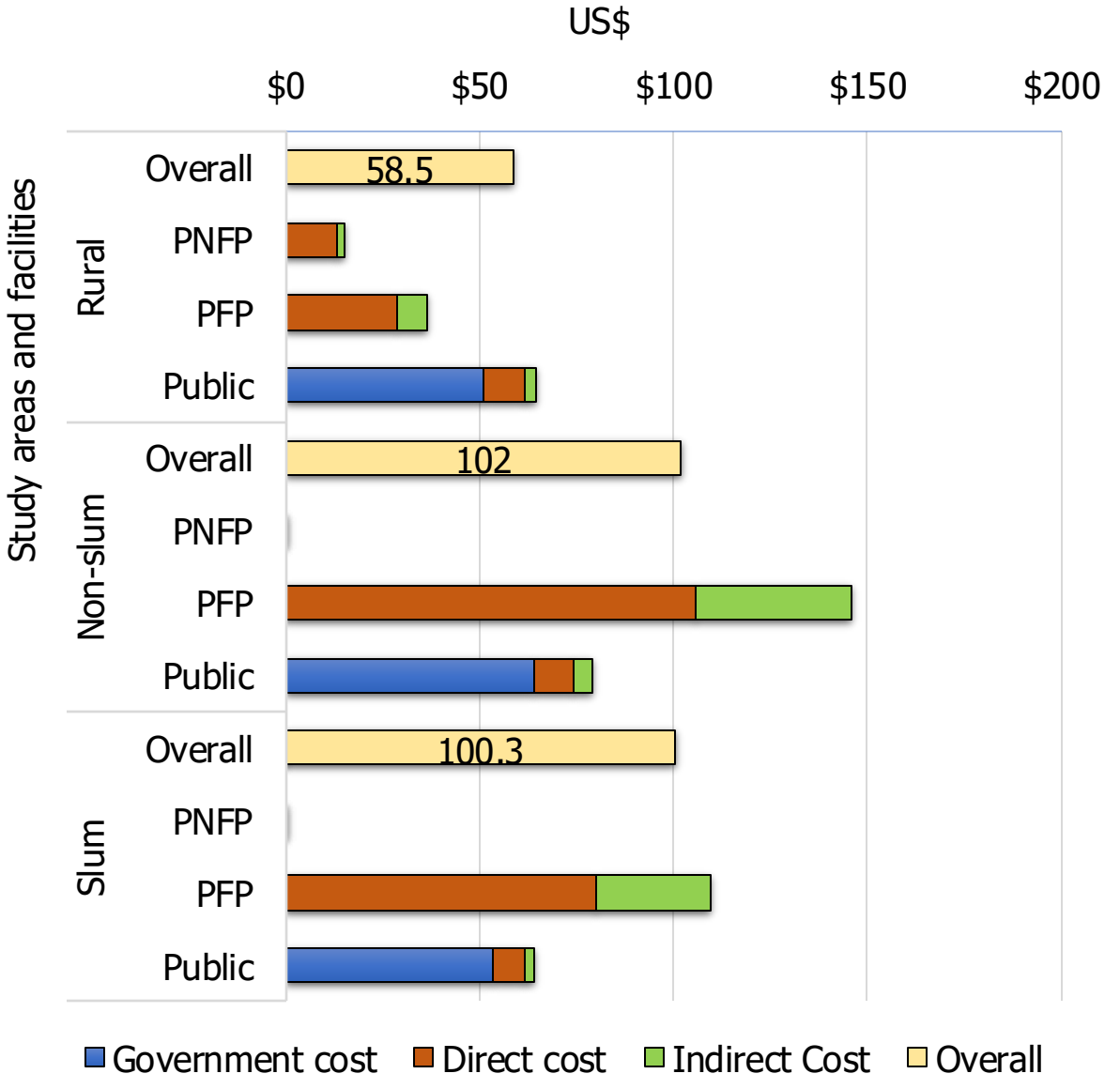
Overall providers' costs per patient by cost items

- ✓ **Overhead:** Telephone, electricity, and transport
- ✓ **Capital:** Floorspace and capital equipment

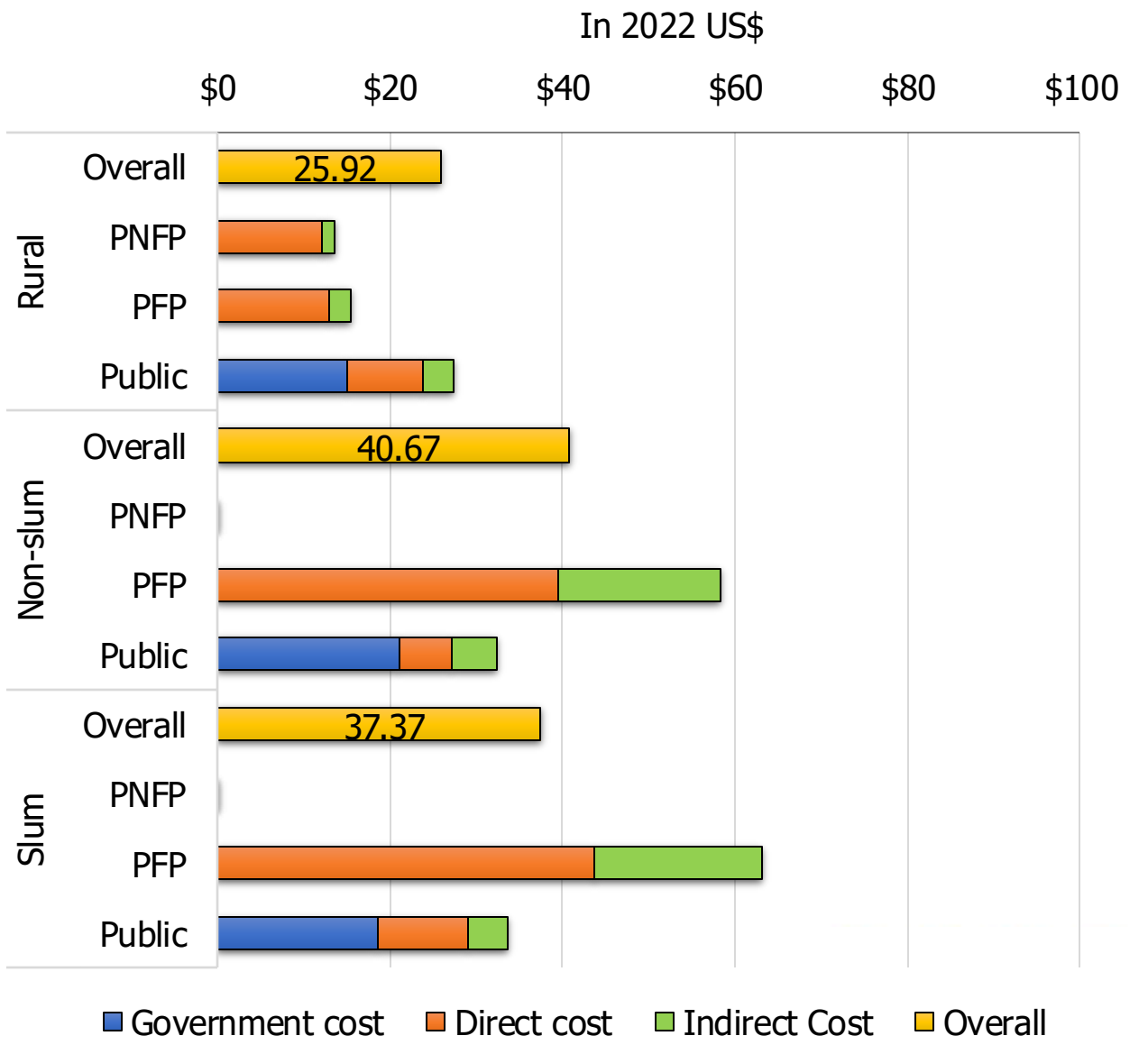


Societal costs per patient

Diarrhoea

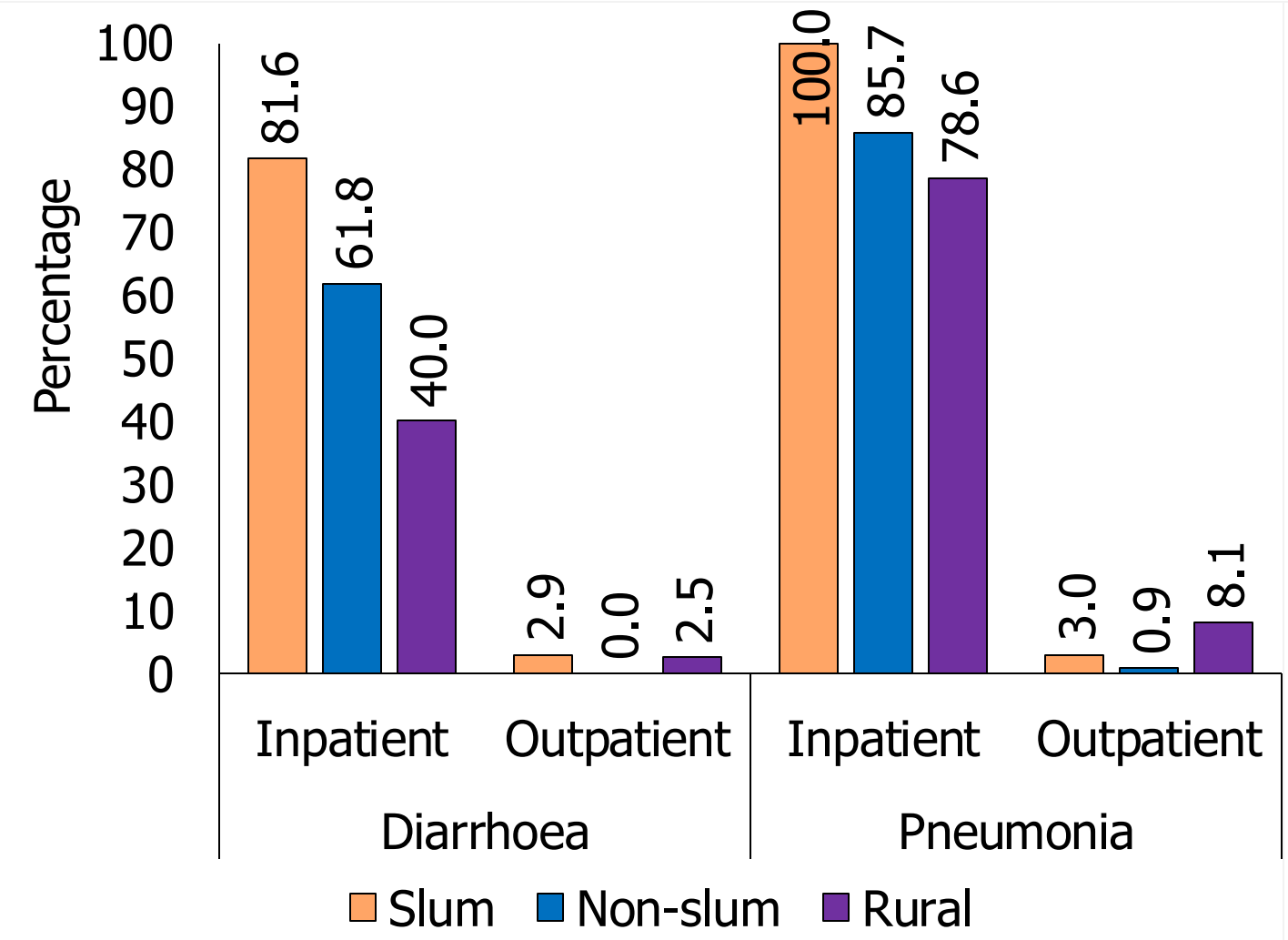


Pneumonia

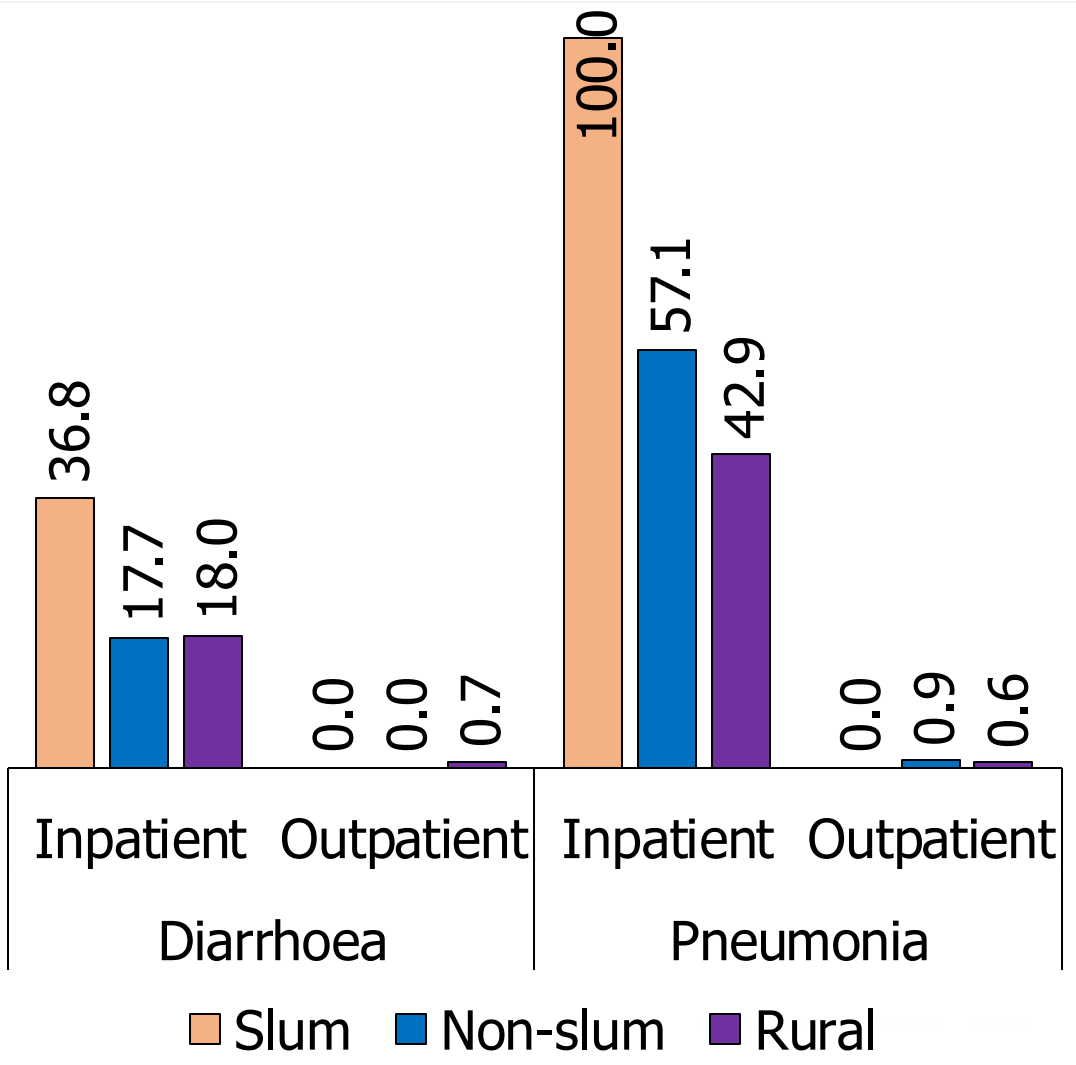


Incidence of CHE by illnesses and study areas

10% of income as threshold



25% of income as threshold



Conclusions

- The burden of OOP expenditure for pediatric care in urban areas was higher among the poor
- The rates of CHE in urban slums households were more than double than those found in rural areas
- With the rapid urbanization slum populations are expected to increase and these populations will be at increasing risk of facing CHE if disease burden reduction and financial risk protection measures are not expanded into urban slums
- Treatment cost of the study diseases was significantly higher in private for-profit facilities compared to public facilities

Policy implications

- Prioritize intervention such as vaccination to reduce inpatient episodes of diarrhoea and pneumonia
- Financial risk protection strategies among the poor in urban areas should be strengthened and expanded into slum areas
- The govt should take initiatives to reduce the OOP expenditure for medicine especially for pneumonia cases
- Additional research needed to understand why people prioritize private-for-profit facilities over public facilities; whether the cost differences are justified

Leading teams

Johns Hopkins Bloomberg School of Public Health

Bryan Patenaude
Deborah Odihi
Gatien de Broucker

icddr,b

Md. Jasim Uddin
Zahid Hasan
Tasnuva Wahed
Zerin Jannat
Hemel Das
Md. Wazed Ali
Arif Ahmed
Sayem Ahmed

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md.zahid@icddrb.org

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