

Economic burden of Acute Respiratory Tract Infections among Children and elderly in Himachal Pradesh

**Submitted by:
Dr. Mahima Yadav**

About the Organization NHM (DCP'S), Himachal Pradesh

- For the effective implementation of National Health Mission in the State a separate Mission Directorate (NHM) has been created within the Directorate of Health headed by Mission Director. It has a Programme Management Unit (PMU) headed by a Deputy Director cum State Programme Officer and a Financial Management Unit (FMU) headed by Jt. Controller Finance. The Mission Directorate functions in close co-ordination with Directorate of Health and reports to the Principal Secretary (Health).
- In Himachal Pradesh the Mission is operating through the existing structures of Health Department upto Sub-Centre level.

Function of the organization NHM (DCP's):

- Reduction of infant mortality and maternal mortality.
- Universal access to public health services such as women's health, child health, drinking water, sanitation and hygiene, nutrition and universal immunization.
- Prevention and control of communicable and non-communicable diseases.
- To provide accessible, affordable and quality universal health care, both preventive and curative, which would be accountable and at the same time responding to the needs of the people.
- Research in medical and related sciences.
- Population stabilization, gender & demographic balance.
- Access to integrated comprehensive primary health care.
- Promotion of healthy lifestyles.

ABOUT THE ORGANIZATION IGMC (KNH)

1. Indira Gandhi Medical College (KNH) was established as an institution of State importance with the objects to develop patterns of teaching in Undergraduate and Post-graduate Medical Education in all its branches so as to demonstrate a high standard of Medical Education in Himachal Pradesh.
2. The Institute has comprehensive facilities for teaching, research and patient-care.
3. The teaching and research is conducted in all leading disciplines. In the field of medical research IGMC is lead, having more than 40 research publications by its faculty and researchers in a year.

Functions of IGMC (KNH, Hospital)

- Undergraduate and postgraduate teaching in medical and related physical biological sciences.
- Nursing and dental education
- Innovations in education.
- Producing medical teachers for the country.
- Research in medical and related sciences.
- Health care: preventive, promotive and curative; primary, secondary & tertiary.
- Community based teaching and research.

Introduction

“Acute Respiratory Infection”

Acute Respiratory Infection (ARI) is defined as an acute illness of the respiratory tract caused by an infectious agent transmitted from person to person. The onset of symptoms is typically rapid, over a period of hours to several days. Symptoms include fever, cough, and often sore throat, coryza, shortness of breath, wheezing, or difficulty breathing.

Risk Factor For ARI:

- a. Malnutrition
- b. Lack of breastfeeding
- c. Low birth weight
- d. Lack of immunisation
- e. Environmental tobacco smoke
- f. Indoor air pollution
- g. Outdoor air pollution
- h. Crowding and number of siblings
- i. Sanitation
- j. Housing quality
- k. Socio-economic status

Acute respiratory tract infection Surveillance programme

*ARI
surveillance*

URBAN

PUBLIC

PRIVATE

PRIMARY

SECONDARY

TERTIARY

PRIMARY

SECONDARY

TERTIARY

OPD

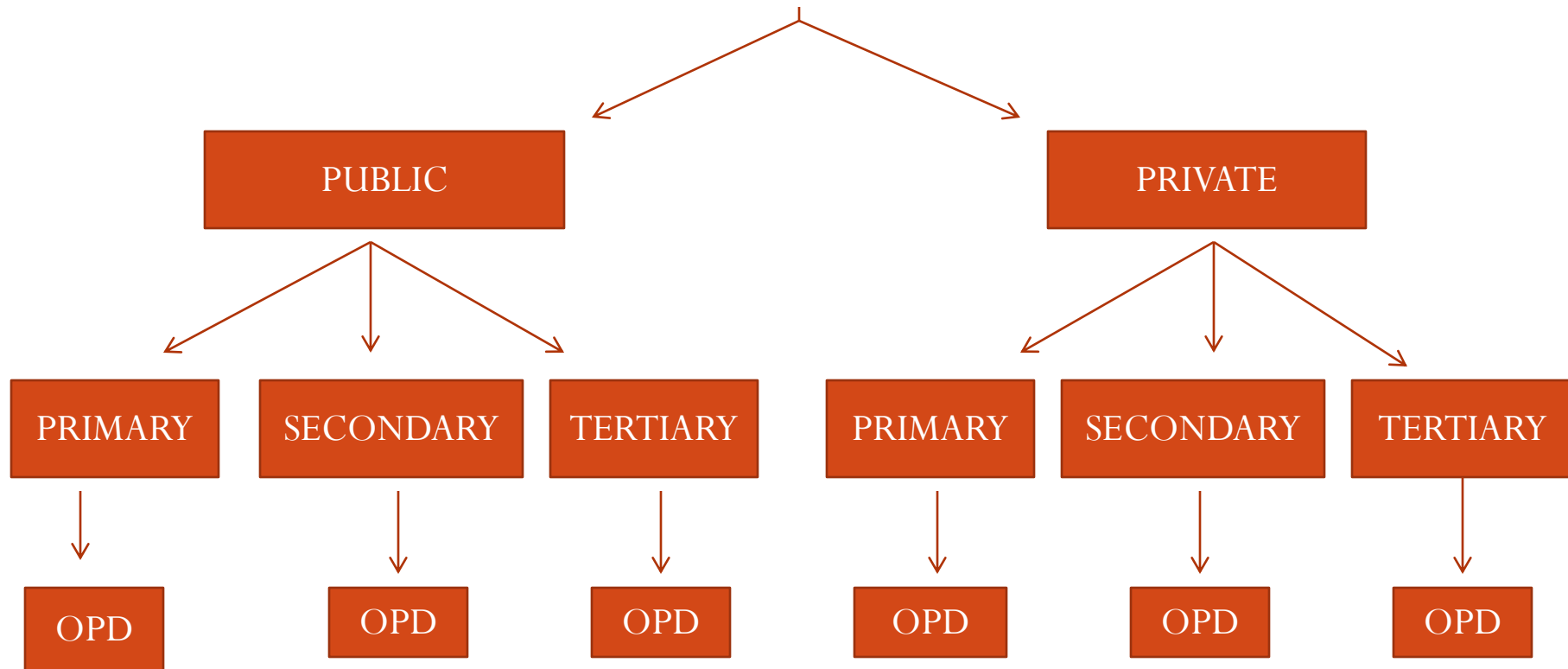
OPD

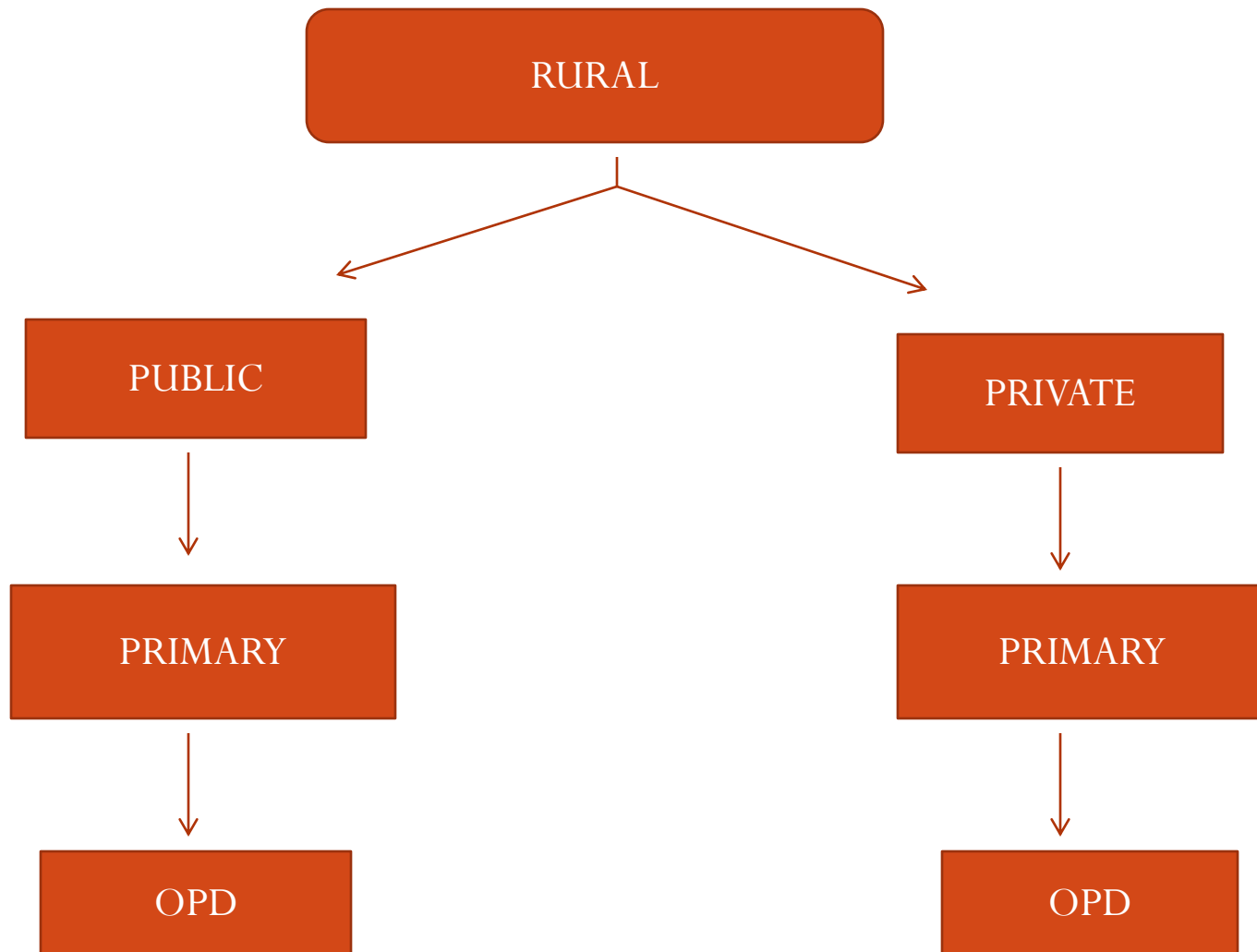
OPD

OPD

OPD

OPD





Hospital Surveillance Work flow

Start with visit to Enrolled hospital

Identify the eligible patient by looking the medical documents/file

Ask from patient and/or his relative for the symptoms to confirm the patient has ARI

STOP

NO

YES

Patient To be screened
for eligibility of enrolment

Any of the 5 symptom
present in previous week

NO

YES

Ask for date of onset, Severity and are the symptoms still present

Any of the 5 symptoms still present
and/or its severity had increased in
between today & last 6 days

NO

YES

A

A

Note down any other symptoms & perform the clinical examination and and vitals of patient

Take the background data, pre hospitalization and current hospitalization information of patient

Any past medical history

Collection of cost data

Fill the Medical record from case sheets

Sample collection of patient



SAMPLE COLLECTION

```
graph TD; A[SAMPLE COLLECTION] --> B[Age between 2 months to 1 year]; A --> C[Age between 1 year to 10 years]; A --> D[Age above 60 years]; A --> E[Age between 11 years to 59 years]; B --> F[Nasal swab for virology]; C --> G["-Nasal & throat swab for virology<br/>- Throat swab for bacteriology<br/>- Blood sample for culture sensitivity and biochemistry<br/>-Urine for binax"]; D --> G; E --> H[No sample to be taken only cost data to be collected];
```

Age between 2
months to 1 year

Nasal swab
for virology

Age between 1
year to 10 years

- Nasal & throat swab for virology
- Throat swab for bacteriology
- Blood sample for culture sensitivity and biochemistry
- Urine for binax

Age above 60
years

Age between
11 years to 59
years

No sample to be
taken only cost
data to be
collected

Economic burden of Acute Respiratory Tract Infection

The cost of treating patients with acute respiratory tract infections (ARIs) is high, especially for patients who require hospitalization. Pneumonia is one of the most frequent causes of hospitalization, accounting for many deaths each year. Information on cost of treatment provides important background information for the potential introduction of new vaccines.

Objective:

To estimate the out of pocket expenditure on acute respiratory infection outpatients of selected health facilities in Shimla & Solan (Himachal Pradesh)

Methodology

Study design:

Cross-sectional Hospital based study

Study Area & Study Population:

The cost data has been collected from;

1. Patients seeking outpatient care

PUBLIC	PRIVATE
Primary	Primary
Secondary	Secondary
Tertiary	Tertiary

Medical Facilities Enrolled with Project:

1. Civil hospital, Solan (public, secondary)
2. D. D. hospital, Shimla (public, secondary)
3. Tenzin hospital (private, tertiary)
4. Sudershan Nursing home (private, secondary)
5. Bhatia hospital (private, secondary)
6. Shri ram nursing home (private, secondary)
7. Kalra hospital (private, secondary)
8. PHC- Baddi (Solan) (public, primary)
9. PHC- Barotiwala (public, primary)
10. Dr. Aggarwal Clinic (private, primary)
11. Dr. Dua's Clinic (private, primary)
12. Zenith/ Keshav hospital (private, secondary)

Sample Size

To accommodate the inherent variability in costing data especially in private hospitals, we recruited 321 ARI patients from ongoing outpatient surveillance systems between Feb-2016 to Apr-2016. It is a convenient sample size.

Most of our tertiary care data in private sector came from Tenzin Hospital, Shimla and in public sector from IGMK(KNH), Shimla. Enrolled data as follows:

Age group	Total
<5	153
5-17	68
18-65	70
>65	30

Inclusion Criteria for sample collection :

Only patients with acute respiratory infections (ARI) are enrolled in the study. Acute Respiratory Tract infection: Acute Respiratory Infection (ARI) is defined as an acute illness of the respiratory tract caused by an infectious agent transmitted from person to person. The onset of symptoms is typically rapid, over a period of hours to several days. Symptoms include fever, cough, and often sore throat, coryza, shortness of breath, wheezing or difficulty breathing.

Sampling Technique

The study was done by using a semi-structured OPD questionnaire. It was tested and then modified accordingly.

At first we took the background data, pre hospitalization and current hospitalization information of patient (any past medical history), then we collected the past expenditure cost data, after that patients interviewed for direct and indirect cost of the current episode of the respiratory disease by a semi structured questionnaire. The patients have been followed up telephonically or by home visit a week later to identify the cost of full episode. The instrument contains questions regarding direct and indirect expenditure due to the ARI.

O.P.D. COST FLOW CHART

Subject characteristics (name , age , sex , occupation , address , contact no.)

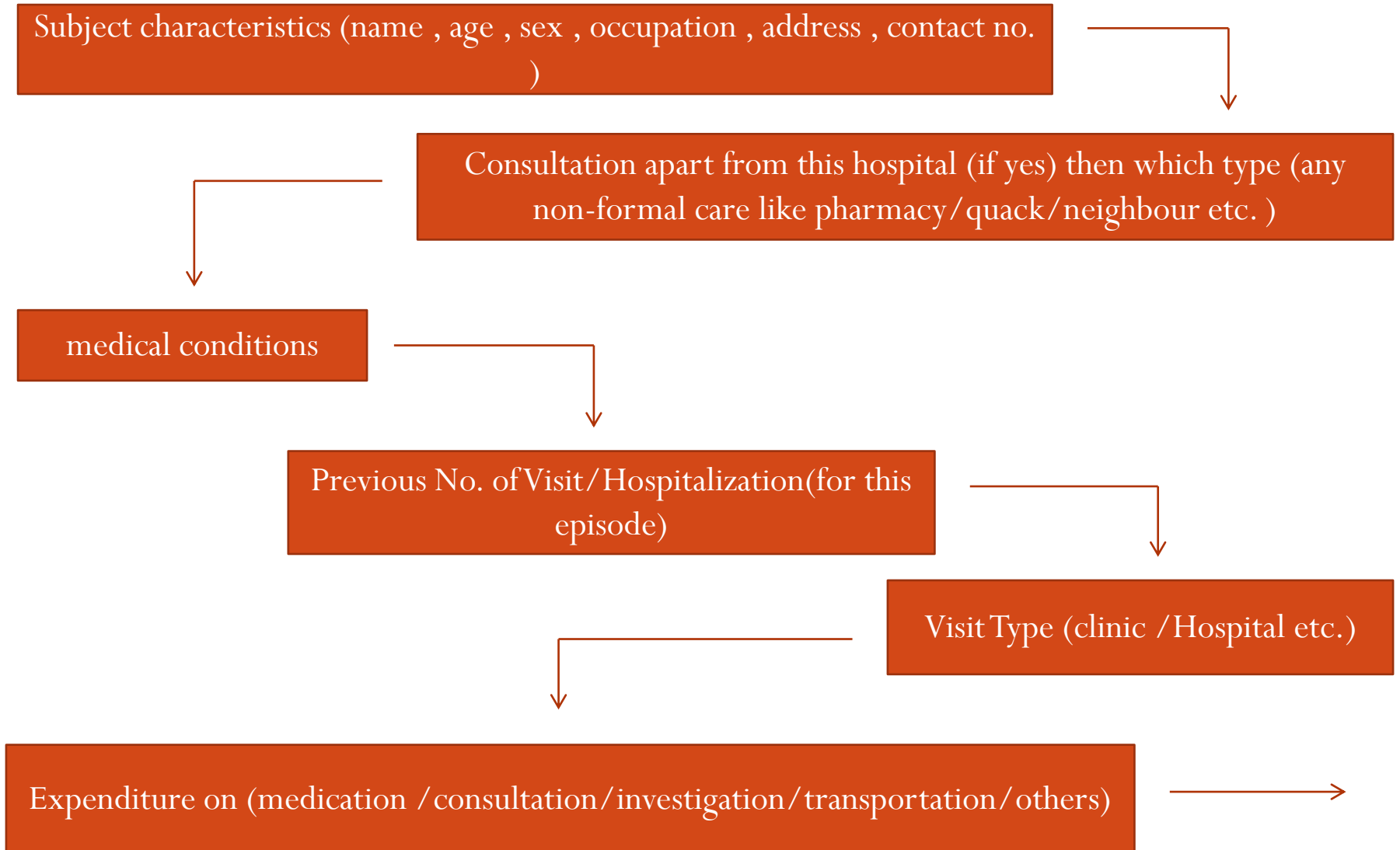
Consultation apart from this hospital (if yes) then which type (any non-formal care like pharmacy/quack/neighbour etc.)

medical conditions

Previous No. of Visit/Hospitalization(for this episode)

Visit Type (clinic /Hospital etc.)

Expenditure on (medication /consultation/investigation/transportation/others)





Consultation fees (this hospital/this visit)



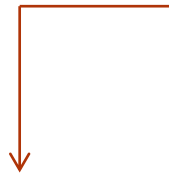
Prescribed medicine details (type of drug ,
name , doses , no. of days , total cost)



Investigation cost/X-ray cost (this visit)



Transportation cost (this visit) specify type 3-
wheeler , taxi , bus , own-vehicle



Relative expenditure(this visit)

**Follow up
flow chart**

Medication cost
(after that visit on same episode)

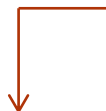
Expenditure on X-ray/
investigation

Relative work loss / No. of days

Own work loss / money loss
(Loss of wages/business days lost /leave without pay)

medical expenditure details
(by own/by loan)

influenza vaccination
(details/cost)



Study tool

There was a semi-structured OPD questionnaire. It was tested and then modified accordingly. The collection of costs data was geared towards identification of:

Direct costs	Indirect costs
costs of medications	loss of wages due to illness-
admission fee	related absenteeism of patient and relatives
consultation fees	opportunity costs
bed charges	
costs associated with investigations	
travel and lodging related to illness	

Data collection

Outpatient Cost Data: We have collected data from sites with ongoing ARI outpatient surveillance in Distt. Shimla, Solan. We recruited at least 50 patients from each age group in each site (for a total of at least 300).

We have done follow-up after 2 weeks with one-on-one interviews by way of home-visits or telephone calls. We have seek information on the number of visits it took to get well, any prescription drugs purchased, any laboratory or imaging performed, days of lost work and any transportation costs incurred.

Data analysis and findings

After collecting all the data from all the regional centers, we categorize data based on condition, age, type of facility, site, and type of ownership. We grouped data in 4 age groups (less than 5 years, 5 to 17, 18 to 64, and ≥ 65).

The cost of an outpatient case= [sum of direct medical cost (consultation, prescription, imaging, laboratory, number of visits) and indirect cost (cost of loss productivity and transportation)].

RESULTS

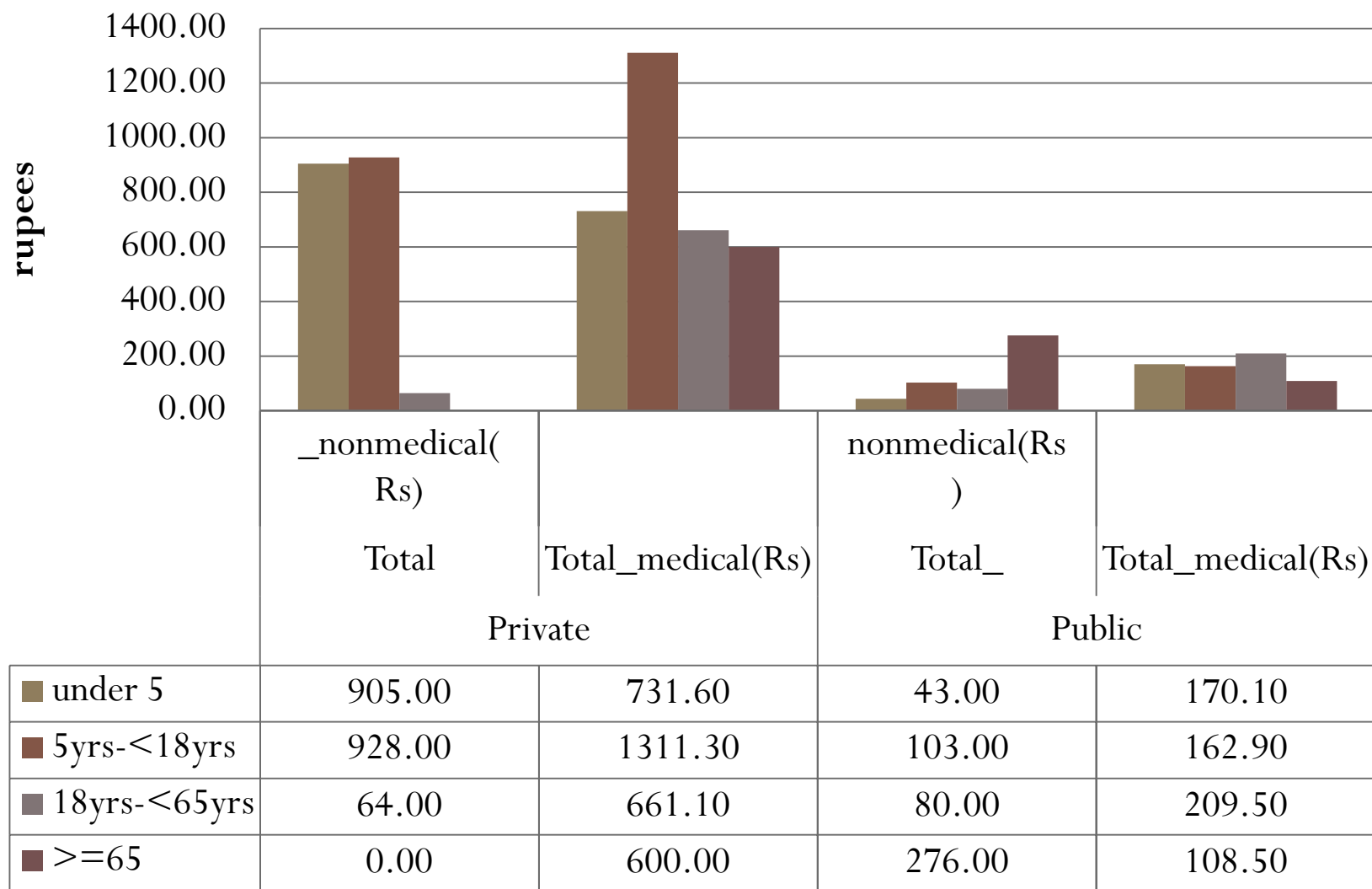
1. Out of pocket expenditure of acute respiratory infections in Himachal Pradesh (Distt. Solan & Shimla) on the healthcare.

<i>Age group</i>		<i>Total(Rs)</i>	<i>Total_nonmedical (Rs)</i>	<i>Total_medical(Rs)</i>
		<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
	<5	743.41	365.07	378.34
	5-17	624.87	253.16	371.71
	18-65	360.17	77.66	282.51
	>65	399.96	256.35	143.60

2. cost of outpatient visits in public and private facilities

		Facility type					
		Private			Public		
		<i>Total(Rs)</i>	<i>Total _nonmed ical(Rs)</i>	<i>Total_me dical(Rs)</i>	<i>Total(Rs)</i>	<i>Total_ nonmedica l(Rs)</i>	<i>Total_med ical(Rs)</i>
		<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
<i>Age group</i>	<5	1636.8	905	731.6	212.9	43	170.1
	5-17	2239.4	928	1311.3	266.1	103	162.9
	18-65	724.7	64	661.1	289.8	80	209.5
	>65	600.0	00	600.0	384.6	276	108.5

Total expenditure



3. The cost of outpatient visits in public and private facilities at primary, secondary, and tertiary level.

				Facility type					
				Private			Public		
				Total	Total nonmedical	Total medical	Total	Total nonmedical	Total medical
				Mean	Mean	Mean	Mean	Mean	Mean
Age group	1	Facility level	Primary	237.1	8	229.4	104.5	10	94.3
			Secondary	1179.5	401	778.4	134.1	39	94.8
			Tertiary	3161.9	2064	1098.1	382.0	85	299.7
	2	Facility level	Primary	50.0	0	50.0	97.5	9	88.6
			Secondary	2438.5	1013	1425.9	644.6	286	359.0
			Tertiary				270.5	120	151.0
	3	Facility level	Primary	60.0	0	60.0	292.3	83	209.6
			Secondary	745.3	60	685.3	145.5	18	127.2
			Tertiary	936.0	87	849.3	586.6	204	382.8
	4	Facility level	Primary				113.4	19	94.3
			Secondary				35.0	10	25.0
			Tertiary	600.0	0	600.0	1187.9	981	206.4

Clinical findings:

Age Group	<5yr	5-17 yr	18-65yr	>65yr
AURI	119	50	60	22
ALRI	41	16	5	8

Clinical manifestations of ARI in the outpatient settings were greater among children (<5years) of age groups as compare to other age groups of patients. Common symptoms included fever (75% of patients), cough (96% of all group of patients) , running nose (92% in children) and (70% in adult patients) and breathing difficulty (60% in children) and (37% in adult patients) . Most children had fever and cough. Pneumonia was diagnosed in (36%) of children.

Overall, 95% percent of patients in outpatient settings with laboratory-confirmed ARI infections were given a diagnosis of ARI by their providers. Of these patients with a diagnosis of ARI, some patients received a diagnosis of asthma, pneumonia, and the rest were given a nonspecific diagnosis of a viral infection.

Overall, rates of visits to clinics and hospitals attributable to ARI were highest among children <5 year of age. Altogether, visits attributable to ARI were common.

DISCUSSION

We used active, prospective surveillance over a period of three months to estimate rates of ARI infection among all age groups in outpatient settings.

Surveillance was performed in geographically diverse (in Distt.Shimla, Distt.Solan) during the three month of 2016. Additional geographically diverse sites would enhance the generalizability of the findings.

ARI illnesses cause a substantial health burden, yet most ARI infections are unrecognized clinically. Enhanced recognition of ARI can provide the opportunity for improved infection control, education about vaccination, and antiviral therapy.

CONCLUSION AND RECOMMENDATION

This study clearly shows that the wider use of available vaccines will reduce ARI mortality among young children by half to two-thirds, the cost of which is low enough to be affordable by almost any developing country. These vaccines will reduce ARI mortality by at least one third. The urgent need is to translate this information into actual implementation.

The lack of adequate surveillance systems for estimating the burden of the disease and the lack of adequate national costing and burden datasets in some of developing countries make estimation difficult.

Key pieces of information to be Generated:

1. Epidemiological and economic Burden of ARIs by age groups can be used for advocacy for ARI prevention and control.
2. Burden of ARI due to selected important viral and bacteriological agents will support decision making for introduction of vaccines or other interventions
3. Identification of major treatment seeking behavior of patients for ARIs/pneumonia towards public/private facility with an aim of identifying interventions for ARI control
4. Estimation of direct and indirect cost will be useful for policy implementation for ARI control

5. Identification of the component cost associated with outpatient treatment of respiratory tract infections will influence ongoing research to establish the clinical and economic continuum of respiratory tract infections, ultimately advancing clinical and policy decision making.

6. Better case definitions understanding of pneumonia – differentiation between viral/bacteriological pneumonias .

Thank You



Thank You