

## Supplementary Tables

**Table S1.** Percent availabilities and of originator brands (OBs) and lowest price generics (LPGs) of all medicines in public and private sector in 2017 and 2019 (%)

Names of meds	OB (Public) 2017	OB (Pvt.) 2017	LPG (Public) ) 2017	LPG (Pvt.) 2017	OB (Public ) 2019	OB (Pvt) 2019	LPG (Public ) 2019	LPG (pvt.) 2019
Acetylsalicylic Acid	0.0	25.0	56.3	25.0	18.8	75.0	50.0	18.8
Aciclovir	0.0	50.0	25.0	37.5	6.3	18.8	0.0	50.0
Amiodarone	7.1	62.5	21.4	6.3	0.0	62.5	21.4	0.0
Amitriptyline	0.0	31.3	0.0	25.0	0.0	0.0	50.0	50.0
Amlodipine	6.3	75.0	62.5	31.3	37.5	93.8	12.5	56.3
Amoxicillin	43.8	93.8	18.8	25.0	93.8	68.8	0.0	37.5
Amoxicillin (250)	18.8	100.0	12.5	31.3	50.0	87.5	0.0	37.5
Atenolol	12.5	87.5	81.3	43.8	43.8	81.3	0.0	56.3
Atorvastatin	7.1	50.0	21.4	25.0	42.9	62.5	21.4	18.8
Azithromycin	0.0	25.0	25.0	31.3	31.3	25.0	25.0	75.0
Beclometasone inhaler	0.0	6.3	35.7	12.5	35.7	43.8	0.0	0.0
Bisoprolol	6.3	87.5	18.8	25.0	37.5	81.3	0.0	56.3
Captopril	0.0	81.3	85.7	25.0	50.0	93.8	28.6	50.0
Carbamazepine	12.5	87.5	56.3	25.0	25.0	31.3	0.0	56.3
Ceftriaxone injection	14.3	68.8	71.4	31.3	21.4	75.0	50.0	87.5
Ciprofloxacin	0.0	81.3	100.0	37.5	64.3	93.8	14.3	25.0
Clarithromycin	0.0	87.5	35.7	25.0	50.0	93.8	0.0	56.3
Co-trimoxazole suspension	6.3	31.3	62.5	6.3	6.3	6.3	43.8	6.3
Diazepam	6.3	62.5	12.5	0.0	43.8	68.8	0.0	0.0
Diclofenac	42.9	50.0	35.7	6.3	85.7	93.8	0.0	81.3
Digoxin	21.4	62.5	28.6	0.0	28.6	68.8	0.0	56.3
Enalapril	0.0	68.8	62.5	18.8	12.5	68.8	12.5	50.0
Fluconazole	0.0	37.5	18.8	25.0	43.8	43.8	0.0	50.0
Fluoxetine	0.0	43.8	12.5	43.8	6.3	62.5	6.3	62.5
Fluphenazine Decanoate	0.0	0.0	0.0	12.5	0.0	0.0	7.1	6.3
Furosemide	12.5	93.8	50.0	6.3	50.0	87.5	0.0	0.0
Glibenclamide	18.8	68.8	56.3	12.5	68.8	93.8	0.0	12.5
Gliclazide	0.0	75.0	0.0	18.8	7.1	75.0	0.0	31.3
Hydrochlorothiazide	0.0	0.0	0.0	12.5	18.8	0.0	0.0	0.0
Indinavir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Insulin Isophane (NPH)	0.0	75.0	50.0	25.0	56.3	68.8	0.0	18.8
Insulin Neutral Soluble (Regular)	0.0	68.8	50.0	25.0	68.8	68.8	0.0	18.8
Losartan	7.1	43.8	14.3	43.8	0.0	43.8	42.9	43.8
Lovastatin	0.0	0.0	6.3	0.0	6.3	37.5	12.5	0.0

<b>Metformin</b>	25.0	81.3	56.3	31.3	68.8	93.8	0.0	50.0
<b>Methyldopa</b>	12.5	81.3	25.0	0.0	75.0	68.8	0.0	0.0
<b>Metronidazole</b>	25.0	93.8	56.3	37.5	75.0	87.5	0.0	56.3
<b>Nevirapine</b>	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0
<b>Nifedipine Retard</b>	0.0	75.0	28.6	12.5	0.0	31.3	14.3	12.5
<b>Omeprazole</b>	6.3	56.3	75.0	37.5	62.5	62.5	6.3	50.0
<b>Omeprazole (10)</b>	0.0	12.5	43.8	18.8	18.8	0.0	12.5	31.3
<b>Paracetamol suspension</b>	6.3	68.8	87.5	25.0	81.3	87.5	0.0	81.3
<b>Phenytoin</b>	0.0	6.3	12.5	6.3	0.0	50.0	6.3	0.0
<b>Propranolol</b>	12.5	68.8	12.5	6.3	18.8	87.5	0.0	25.0
<b>Pyrimethamine with sulfadoxine</b>	0.0	75.0	21.4	6.3	21.4	68.8	0.0	6.3
<b>Ranitidine</b>	0.0	81.3	31.3	25.0	50.0	100.0	0.0	50.0
<b>Salbutamol inhaler</b>	0.0	81.3	56.3	31.3	62.5	68.8	0.0	12.5
<b>Simvastatin</b>	0.0	25.0	21.4	56.3	0.0	37.5	7.1	25.0
<b>Spirolactone</b>	6.3	62.5	25.0	0.0	12.5	93.8	6.3	43.8
<b>Zidovudine</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Mean availabilities</b>	6.8	55.0	35.1	20.3	33.1	58.3	9.0	32.3

**Table (S2).** Change in availability at different levels of healthcare (Public Sector).

	Primary level (n=2 outlets)		Secondary level (n=13 outlets)		Tertiary level (n=1 outlet)	
	All medicines (n=50)		All medicines (n=50)		All medicines (n=50)	
	OB	LPG	OB	LPG	OB	LPG
<b>Mean Availability 2017 (SD), %</b>	0.0 (0.0)	25.8 (44.5)	7.1 (11.2)	35.2 (27.5)	12.0 (32.8)	50.0 (50.5)
<b>Mean Availability 2019 (SD) , %</b>	21.0 (31.0)	3.2 (18)	32.3 (29.1)	7.4 (13.4)	68.0 (47.1)	22.0 (41.8)
<b>Change in mean percent availability, %</b>	21.0	-22.6	25.2	-27.8	56.0	-28.0

**Table S3.** Change in median unit prices (MUPs) and median price ratios (MPRs) of the Originator Brands (OBs) at private sector.

Sr. no.	Medicines (OB)	MUPs 2017 (PKR)	MPR 2017	Adjusted MUP in 2019	MPR 2019	Percentage change in MUPs/MPRs
1	Acetylsalicylic Acid	1.16	0.8	1.12	0.7	-3.41%
2	Aciclovir	70	20	72.5	21	3.48%
3	Amiodarone	17.78	2.2	17.4	2.2	-2.15%
4	Amlodipine	11.93	7.3	12.6	7.7	5.1%
5	Amoxicillin	8.616	2.8	8.46	2.7	-1.83%
6	Amoxicillin (250)	3.56	2.1	3.63	2.2	1.83%
7	Atenolol	6.19	5.6	6.14	5.5	-0.81%
8	Atorvastatin	201.9	18	197	18	-2.6%
9	Azithromycin	40	1.7	118	5	66.2%
10	Beclometasone inhaler	1.25	1.2	1.84	1.8	32%
11	Bisoprolol	11.28	1.2	16.2	1.7	30.2%
12	Captopril	7.66	3	8.22	3.2	6.81%
13	Carbamazepine	4.91	2.6	4.84	2.5	-1.55%
14	Ceftriaxone injection	672	16	757	18	11.2%
15	Ciprofloxacin	50.4	13	50.8	13	0.72%
16	Clarithromycin	65.7	2.5	76.4	2.9	14%
17	Co-trimoxazole suspension	0.29	0.6	0.44	0.9	33.4%
18	Diazepam	2	2	1.93	1.9	-3.41%
19	Diclofenac	5.625	12	5.61	12	-0.29%
20	Digoxin	2.52	2.4	2.59	2.5	2.76%
21	Enalapril	5.85	5.4	6	5.6	2.43%
22	Fluconazole	442	61	566	78	21.9%
23	Fluoxetine	43.42	9.7	43	9.6	-0.9%
24	Furosemide	1.89	3	2.34	3.7	19.2%
25	Glibenclamide	1.69	2.9	2.09	3.5	19.1%
26	Gliclazide	7.6	1.5	16.4	3.3	53.8%
27	Insulin Isophane (NPH)	64.5	1.1	73.4	1.3	12.1%
28	Insulin Neutral Soluble (Regular)	64.5	1.1	73.4	1.2	12.1%
29	Losartan	51.67	4.3	50.3	4.2	-2.76%
30	Metformin	1.54	1	1.62	1	5.21%
31	Methyldopa	6.38	1.9	7.83	2.3	18.5%
32	Metronidazole	1.57	1.3	1.52	1.2	-3.41%
33	Nifedipine Retard	5.69	2.7	5.8	2.8	1.93%
34	Omeprazole	49.78	34	50.6	35	1.55%
35	Paracetamol suspension	0.85	1.6	2.2	4.1	61.4%
36	Phenytoin	5.2	4.8	23.2	22	77.6%
37	Propranolol	1.55	2.2	3.06	4.3	49.3%

<b>38</b>	Pyrimethamine with sulfadoxine	5.83	1.4	11.6	2.8	49.8%
<b>39</b>	Ranitidine	8.8	3.7	8.51	3.6	-3.41%
<b>40</b>	Salbutamol inhaler	1	1	1.03	1.1	3.35%
<b>41</b>	Simvastatin	67.13	12	65.8	12	-2.09%
<b>42</b>	Spiroonolactone	8.6	0.8	10.1	1	14.5%
	Medians	6.99	2.5	8.49	3.2	4.29%

**Table S4.** Change in median unit prices (MUPs) and median price ratios (MPRs) of the lowest price generics (LPGs) in private sector.

Sr. no.	Medicines	MUPs 2017 (PKR)	MPR 2017	Adjusted MUP in 2019	MPR 2019	Percentage change in MUPs/MPRs
1	Acetylsalicylic Acid	1.015	0.7	1.06	0.7	4.58
2	Aciclovir	12.4	3.6	13.5	3.9	8.41
3	Amitriptyline	1.19	1.4	1.24	1.4	3.86
4	Amlodipine	1.8	1.1	6.29	3.8	71.4
5	Amoxicillin	5.8	1.9	8.32	2.7	30.3
6	Amoxicillin (250)	3	1.8	3.48	2.1	13.8
7	Atenolol	2.05	1.8	2.47	2.2	16.9
8	Atorvastatin	37.5	3.4	35.8	3.2	-4.8
9	Azithromycin	40	1.7	19.3	0.8	-107
10	Bisoprolol	6.55	0.7	6.56	0.7	0.1
11	Captopril	6.5	2.5	6.77	2.7	3.97
12	Carbamazepine	3.3	1.7	4.35	2.3	24.2
13	Ceftriaxone injection	280	6.8	290	7	3.48
14	Ciprofloxacin	11	2.8	24.2	6.2	54.5
15	Clarithromycin	36	1.4	42.7	1.6	15.8
16	Co-trimoxazole suspension	0.21	0.4	2.32	4.7	91
17	Diclofenac	3.5	7.5	4.79	10	26.9
18	Enalapril	2.05	1.9	2.84	2.6	27.8
19	Fluconazole	145.5	20	145	20	-0.3
20	Fluoxetine	13.8	3.1	13.5	3	-1.9
21	Fluphenazine Decanoate	90.5	1	93.8	1.1	3.5
22	Glibenclamide	1.57	2.7	1.42	2.4	-10
23	Gliclazide	4.75	0.9	5.8	1.1	18.1

24	Insulin Isophane (NPH)	48	0.8	62.3	1.1	22.9
25	Insulin Neutral Soluble (Regular)	48	0.8	62.3	1	22.9
26	Losartan	11	0.9	13.1	1.1	15.7
27	Metformin	1.5	1	1.86	1.2	19.2
28	Metronidazole	1.5	1.2	1.93	1.6	22.4
29	Nifedipine Retard	2.65	1.3	5.14	2.4	48.4
30	Omeprazole	15.35	10	11.4	7.8	-35
31	Omeprazole (10)	12.14	0.9	5.13	0.4	-137
32	Paracetamol suspension	0.47	0.9	1.02	1.9	53.7
33	Propranolol	0.66	0.9	2.03	2.8	67.5
34	Pyrimethamine with sulfadoxine	5	1.2	4.84	1.2	-3.4
35	Ranitidine	6.93	2.9	7.78	3.3	11
36	Salbutamol inhaler	0.64	0.7	0.68	0.7	5.45
37	Simvastatin	8.5	1.6	16.6	3	48.7
	<b>Medians</b>	<b>5.8</b>	<b>1.4</b>	<b>6.29</b>	<b>2.3</b>	<b>15.7</b>

**Table S5.** Affordability of originator brands (OBs) for different diseases in 2017 and 2019, in private sector.

Disease	Medicine	Strength	Dosage form	No. of units needed per treatment	Duration of treatment	MTP 2017 (PKR)	NDWs 2017	MTP 2019 (PKR)	NDWs 2019
<b>ASTHMA</b>	Salbutamol Inhaler	100mcg/dose	Inhaler	200	As needed	200	0.4	214	0.4
	Beclomethasone	50mcg/dose	inhaler	200	As needed	250	0.5	380	0.8
<b>Cardiovascular Diseases</b>	Bisoprolol	5mg	tab	60	30	676.8	1.5	1003	2
	Atenolol	50mg	tab	30	30	185.7	0.4	190.5	0.4
	Captopril	25mg	tab	60	30	459.6	1	510	1
	Amlodipine	5mg	tab	60	30	715.8	1.5	780	1.6
	Amiodarone	200mg	tab	60	30	1066.8	2.3	1080	2.2
	Losartan	50mg	tab	60	30	3100.2	6.6	3120	6.2
	methyl dopa	250mg	tab	90	30	574.2	1.2	729	1.5
	Nifedipine retard	20mg	tab	90	30	512.1	1.1	540	1.1

	Spironolactone	100mg	tab	30	30	258	0.5	312	0.6
	Propranolol	40mg	tab	90	30	139.5	0.3	284.4	0.6
	Acetylsalicylic acid	75mg	tab	30	30	34.8	0.1	34.8	0.1
<b>Anti hyperlipidemics</b>	Simvastatin	20mg	Cap/tab	30	30	2013.9	4.3	2040	4.1
	Atorvastatin	20mg	Cap/tab	30	30	6057	13	6105	12
<b>Infections-Adult respiratory tract infection</b>	Ceftriaxone Injection	1g/vial	Inj.	1	1	672	1.4	783	1.6
	Ciprofloxacin	500mg	tab	14	7	705.6	1.5	735	1.5
	Azithromycin	500mg	tab	3	3	120	0.3	367	0.7
	clarithromycin	500mg	tab	28	14	1839.6	3.9	2212	4.4
	Amoxicillin	500mg	cap	42	14	361.87	0.8	367.5	0.7
	Amoxicillin	250mg	cap	84	14	299.04	0.6	315	0.6
<b>Fungal Infection</b>	Fluconazole	200mg	cap	1	1	442	0.9	585	1.2
<b>Viral Infection</b>	aciclovir	200mg	tab	25	5	1750	3.8	1875	3.8
<b>Amoebiasis</b>	metronidazole	400mg	tab	21	7	32.97	0.1	32.97	0.1
<b>CNS Drugs-Anti epileptics</b>	Carbamezipine	200mg	tab	60	30	294.6	0.6	300	0.6
	Phenytoin	100mg	tab	90	30	468	1	2160	4.3
<b>Anxiety</b>	diazepam	5mg	tab	90	30	180	0.4	180	0.4
<b>Anti Diabetics</b>	Metformin	500mg	tab	90	30	138.6	0.3	151.2	0.3
	Glibenclamide	5mg	tab	90	30	152	0.3	194.4	0.4
	Gliclazide	80mg	tab	60	30	456	1.5	1020	2
	Insulin Isophane (NPH)	100IU/ml	vial	10	30	645	1.4	758.8	1.5
	Insulin Neutral Soluble (Regular)	100IU/ml	vial	10	30	645	1.4	758.8	1.5
<b>Ulcer Treatment</b>	Omeprazole	20mg	cap	30	30	1493.4	3.2	1569	3.1
	ranitidine	150mg	tab	120	30	1056	2.3	1056	2.1
<b>Pain/Inflammation</b>	Paracetamol	24mg/ml	susp	45	3	38.25	0.1	102.6	0.2
<b>Arthritis</b>	Diclofenac	50mg	tab	90	30	506.25	1.1	522	1

Where, MTP: Median treatment price, NDWs: Number of days' wages

**Table S6.** Affordability of lowest price generics (LPGs) for different diseases in 2017 and 2019, in private sector.

Disease/Condition	Medicine	Strength	Dosage form	No. of units needed per treatment	Duration of treatment	MTP 2017 (PKR)	NDWs 2017	MTP 2019 (PKR)	NDWs 2019
ASTHMA	Salbutamol Inhaler	100mcg/dose	Inhaler	200	As needed	128	0.3	140	0.3
Cardiovascular Diseases/ Anti Hypertensives	Bisoprolol	5mg	tab	60	30	393	0.8	406.8	0.8
	Atenolol	50mg	tab	30	30	61.5	0.1	76.5	0.2
	Captopril	25mg	tab	60	30	390	0.8	420	0.8
	Amlodipine	5mg	tab	60	30	108	0.2	390	0.8
	Losartan	50mg	tab	60	30	660	1.4	810	1.6
	Nifedipine retard	20mg	tab	90	30	238.5	0.5	478.4	1
	Propranolol	40mg	tab	90	30	59.4	0.1	189	0.4
Anti hyperlipidemics	Acetylsalicylic acid	75mg	tab	30	30	30.45	0.1	33	0.1
	Simvastatin	20mg	Cap/tab	30	30	255	0.5	513.8	1
Infections-Adult respiratory tract infection	Atorvastatin	20mg	Cap/tab	30	30	1125	2.4	1110	2.2
	Ceftriaxone Injection	1g/vial	Inj.	1	1	280	0.6	300	0.6
	Ciprofloxacin	500mg	tab	14	7	154	0.3	350	0.7
	Azithromycin	500mg	tab	3	3	120	0.3	60	0.1
	clarithromycin	500mg	tab	28	14	1008	2.2	1238	2.5
Fungal Infection	Amoxicillin	500mg	cap	42	14	243.6	0.5	361.2	0.7
	Amoxicillin	250mg	cap	84	14	252	0.5	302.4	0.6
Viral Infection	Fluconazole	200mg	cap	1	1	145.5	0.3	150	0.3
Amoebiasis	aciclovir	200mg	tab	25	5	310	0.7	350	0.7
CNS Drugs-Anti epileptics	metronidazole	400mg	tab	21	7	31.5	0.1	42	0.1
	Carbamezipine	200mg	tab	60	30	198	0.4	270	0.5
Depression	Amitriptyline	25mg	tab	60	30	71.4	0.2	76.8	0.2

Anti Diabetics	Metformin	500mg	tab	90	30	135	0.3	180	0.4
	Glibenclamide	5mg	tab	90	30	141	0	132.3	0.3
	Gliclazide	80mg	tab	60	30	285	0.8	360	0.7
	Insulin Isophane (NPH)	100IU/ml	vial	10	30	480	1	644	1.3
	Insulin Neutral Soluble (Regular)	100IU/ml	vial	10	30	480	1	644	1.3
	Ulcer Treatment	Omeprazole	20mg	cap	30	30	460.5	1	353.7
ranitidine		150mg	tab	120	30	831.6	1.8	966	1.9
Pain/Inflammation	Paracetamol	24mg/ml	susp	45	3	21.15	0	47.25	0.1
Arthritis	Diclofenac	50mg	tab	90	30	315	0.7	445.5	0.9