RAWALPINDI MEDICAL UNIVERSITY
DENGUE MANAGEMENT MODEL

DENGUE EPIDEMIC REPORT 2022

DEPARTMENT OF INFECTIOUS DISEASES
HOLY FAMILY HOSPITAL
RAWALPINDI MEDICAL UNIVERSITY

DENGUE EPIDEMIC REPORT 2022

CLINICAL & OPERATIONAL MANAGEMENT

By

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Message from the Vice Chancellor

With the COVID pandemic finally over, the world is recovering and re-defining 'normal' once more. The COVID pandemic changed the way we practice medicine; however, we still face old challenges. Pakistan, as a nation, has been fighting against Dengue Epidemics since data keeping begin in the nation. With the monsoon season on the horizon, we must prepare for this yearly epidemic by introducing the practices with learnt during COVID.

This year, like every year, has been tough on the region, with regards to Dengue Fever. The social distancing and isolation practices during previous years, seemed to have blunted the impact of the epidemic, however now that restrictions have been lifted, the epidemic reared its head. Being one of the hardest hit area soft heregion, Rawalpindi Medical University has always played its role in providing quality healthcare to those visiting the hospital. We pride ourselves on our innovative and evolving approach to the high patient numbers, all while maintaining quality and patient safety. With innovations in immune therapy and vaccination technology, we hope to see an affordable vaccination for the masses soon. Considering the high worldwide disease burden, we have collected data and hope to analyze this data to producer search to further our contribution to society.

I congratulate all the healthcare workers, support staff and administrative staff on another successful handling of the epidemic and appreciate their effort and hard work. I'm thankful to the district administration and DEAG for their never-ending support and most of all I thank the families of those afflicted for their support and cooperation with the healthcare staff.

AdminstrativeTeam
RMU Allied Hospitals

Dr. Shazia Zaib

Dr. Farzana Zafar

Dr. Syed Tahir Rizvi

Dr. Muhammad Riaz Akbar

Dr. Imran Ali

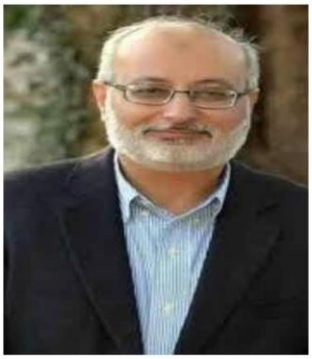
Dr. Inayat ur Rehman

Clinical Team
RMU Allied Hospitals

Dr. Muhammad Khurram

Dr. Muhammad Mujeeb Khan

Dr. Muhammad Ali Khalid



Dr. Shehzad Manzoor

Dr. Saima Ambreen

Dr. Abrar Akbar

Dr. Arshad Rabbani

Dr. Lubna Meraj

Dr. Arif Mehmood

Dr. Safi ullah

Dr. Nida Anjum

Dr. Iqra Ashraf

Dr. Nouman Zafar

Dr. Mudassir Latif

Dr. Umar Daraz

Dr. Nargis Barkat

Mst. Rubina Kausar

Mst. Uzma Shazia

Introduction

Nearly 3.6 billion individuals live in dengue infested regions throughout the world. Around 400 million of these individuals end up with the virus, with nearly 100 million becoming symptomatic. Annually about 21,000 deaths can be attributed to dengue each year. All these numbers lead it to be the most prevalent arbo viral infection worldwide.

Most individuals stay asymptomatic; a major portion ends up symptomatic. The illness itself may be self-limiting or may progress to more severe forms, dengue hemorrhagic fever or dengue shock syndrome, which are now known as either uncomplicated dengue or severe dengue.

The Dengue viruses are members of the genus Flavi virus in the family Flavi virus. Along with dengue virus. This genus also includes several the viruses transmitted by mosquitoes and ticks that are responsible for human diseases. Flavi viruses include the yellow fever, West Nile, Japanese encephalitis, and tick-borne encephalitis viruses.

In 1943, Ren Kimura and Susumu Hotta first isolated the dengue virus. These two scientists were studying blood samples of patients taken during 1943 dengue epidemic in Nagasaki, Japan. A year later, Albert B. Sabin and Walter Schlesinger independently isolated the dengue, Virus. Both pairs of scientists had isolated the virus now referred to as dengue virus1 (DEN-1).

Department of Infectious Diseases (DID)

Rawalpindi Medical University is the only Public Sector University, in the country, with a purpose-built Department of Infectious Diseases (DID), The Department was established in August 2015, under the leadership of the Vice Chancellor of RMU. The Vice Chancellor directly supervises the department. The Department is headed by Dr. Muhammad Mujeeb Khan, Associate Professor of Infectious Diseases. The department is at the forefront of most epidemics and deals with many endemic Infectious Diseases from all over Pakistan, including the Dengue epidemics, Influenza outbreaks, Crimean Congo Hemorrhagic Fever outbreaks, Tuberculosis and Leptospirosis patients, amongst many others.

Department of Infectious diseases, Holy Family Hospital, Rawalpindi

RMU Allied Hospitals Introduction

Holy Family Hospital was established in 1948 and has been affiliated with Rawalpindi Medical University since 1977. It is a 1000 bedded hospital situated in Satellite Town. Benazir Bhutto hospital is situated on the ever-busy Murree Road. It houses besides all the other departments of Medicine, Surgery, Eye, ENT, Paediatrics, Gynecology & Obstetrics, Urology and dermatology. District Head quarter hospital provides health care to the inner city of Rawalpindi and also serves as referral center for trauma patients. it has departments of Medicine, Surgery, Gynecology and obstetrics, otorhinolaryngology, ophthalmology, Neurosurgery, Chest Diseases and orthopedics.

Dengue Fever, now being endemic to the region, has been wreaking havoc on the twin cities for many years now. The number of patients presenting with features of Dengue Fever and being confirmed to have Dengue Fever, have increased greatly this year. In order to make sure the Allied Hospitals are ready to deal with the worst-case scenario, 1000 Beds have been dedicated exclusively for patients of Dengue Fever. These beds are spread throughout the Allied Hospitals, which was recently acquired for this purpose.

Holy Family Hospital
400 dengue dedicated beds

Benazir Bhutto Hospital
400 dengue dedicated beds

District Head Quarter Hospital
200 dengue dedicated beds

The Dengue Virus

The dengue virus genome is a single strand of RNA. It is referred to as positive-sense RNA. The viral genome encodes ten genes. The genome is translated as single, long poly peptide and then cut into ten proteins. Three are structural proteins: the capsid (C), envelope (E), and membrane (M) proteins. Seven are nonstructural proteins: NS1, NS2A, NS2B, NS3, NS4A, NS4B, and NS5. These nonstructural proteins play roles in viral replication and assembly. The structure of the dengue virus is roughly spherical; with a diameter of approximately 50nm (1nm is one millionth of 1mm). The core of the virus is the nucleocapsid, a structure that is made of the viral genome along with C proteins. The nucleocapsid is surrounded by a membrane called the viral envelope, a lipid bilayer that is taken from the host. Embedded in the viral envelope are 180copies of the E and M proteins that span through the lipid bilayer. These proteins form a protective outer layer that controls the entry of the virus into human cells.

Discovery and Epidemics

Severe dengue was first recognized in 1950s during dengue epidemics in Philippines and Thailand. Today, severe dengue affects most Asian and Latin American countries and has become a leading cause of hospitalization and death among children and adults in these regions.

The first epidemic of dengue hemorrhagic fever was described in Southeast Asia, Manila in 1953. After that outbreak of dengue fever became more common. In 1950s, 9 countries reported dengue outbreaks. Epidemic dengue has become more common since1980s.

Dengue originated in monkeys and spilled over into humans as long as 800 years ago. It was restricted to Africa and Southeast Asia until mid of 20th Century. The dengue viruses in viremic individuals and their Aedesa egypti mosquito vectors spread throughout tropical Southeast Asia via maritime shipments.

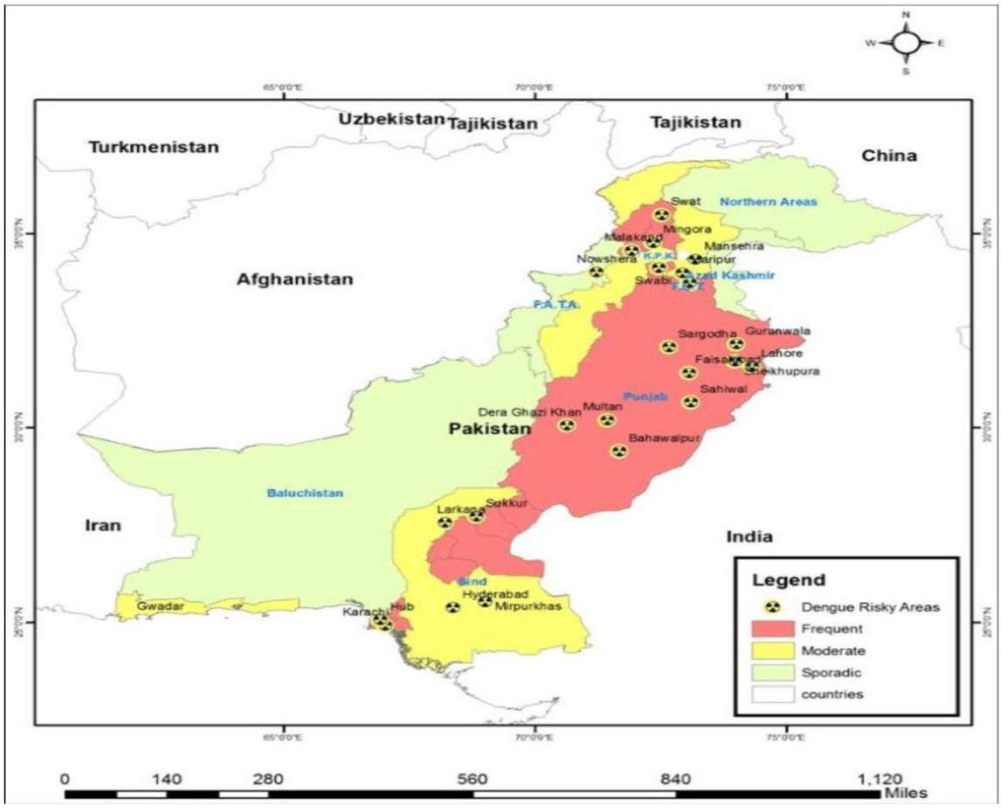
Dengue Epidemics and Pakistan

The First documentation of Dengue infection in Pakistan was in 1982 in Punjab, reportedin12 patients out of sample of 174.Dengue Fever was then recorded in 1994,1995 and 1997.

Two deaths due to Dengue fever were reported in Karachi in 1995. Dengue the re-emerged in Pakistan after about 10 years. When 395 cases were noted all from Karachi. In 2006, the disease expanded to the North of Pakistan and 5800 cases were reported from all over Pakistan, with 60 deaths almost. It was followed by an epidemic in 2007 which caused significant mortality and morbidity.

In 2009, the number of people suffering from Dengue halved as compared to the previous years, in 2010/11, Pakistan faced a major outbreak. More than 21,204 cases were reported from all over the country, mainly from Punjab. Since then, Pakistan has faced a major Dengue Epidemic every third year on average.

Unfortunately, these epidemics take a huge toll on the population and healthcare system as whole, with the system being pushed to the edge. Over population, unsafe drinking water, inadequate sanitation facilities and many refugees, are some of the reasons why Pakistan faces these epidemics.



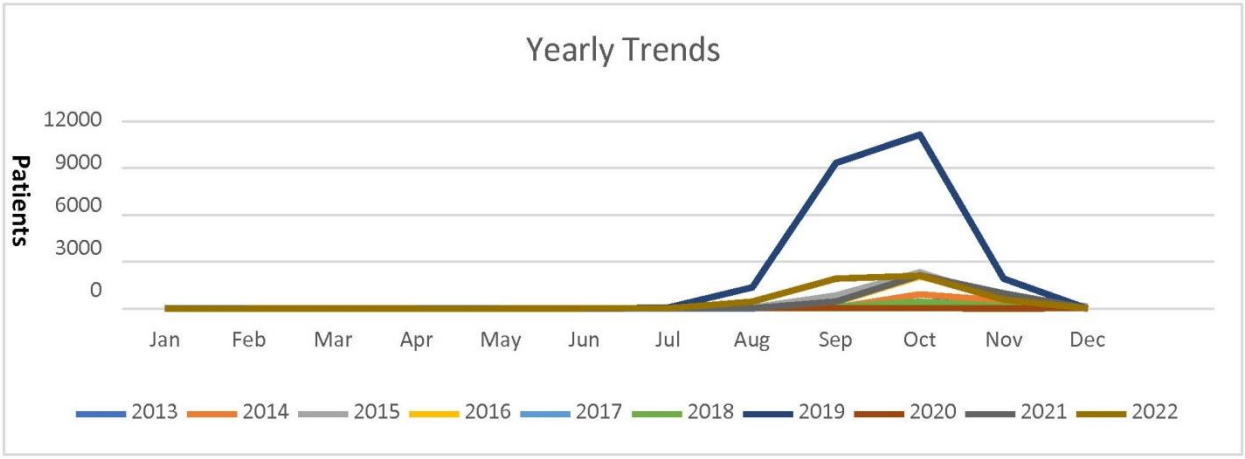
Dengue Hotspots In Pakistan

Rawalpindi and Dengue

With Dengue now considered to be endemic in Pakistan and Punjab, mainly due to its climate, is often the worst hit. Lahore and Rawalpindi are the usually the most affected, with hospitals often facing a shortage of beds and healthcare workers shortage due to the over whelming disease burden each year.

Historical data shows that the disease has been present in the area long before official record keeping begun. It is often mentioned in historical scriptures, thought to have been introduced to the region by merchants and traders transferring the Silk Road. With diagnostic equipment becoming more affordable and readily available, tracking the yearly epidemic became possible.

Data shows a rapid increase in the number of cases from 2013, attributed to the influx of individuals migrating from rural areas and the rapid urbanization, coupled with poor local healthcare policies. The total number of confirmed cases in 2013 was more than 1200. The following years saw an increase in the number of confirmed cases, likely attributed to social awareness of the disease, as evidenced by the influx of patients to the OPDs. 2015 was previously the peak year for the epidemic, with nearly 4000 confirmed cases, however this year, and the number of cases in the ongoing epidemic has crossed 8000 cases. The year's following 2015 showed a sudden drop in the cases, likely due to proper surveillance, preventive and containing practices. The past year, 2018, saw a little over 650 cases, which was almost the same as 2017. The effectiveness of the measures was evidenced in 2017, when the number of patients testing positive was about one fifth of 2016.



Last 10 year Dengue Epidemic trends 2013 to 2022

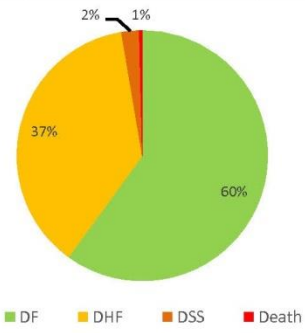
The Dengue Epidemic 2019 in Rawalpindi

This was the biggest epidemic faced by not only the city, but also the country. Healthcare facilities and personal were pushed to the limit and the exhausted workforce was then left to the mercy of the emerging COVID-19 pandemic. The unexpected early onset of the epidemic in mid-August caught everyone off guard. By the end of September, nearly 10,000 cases had been identified and treated, the average turnover of Holy Family Hospital was nearing about 400 cases a day, with nearly all departments involved in managing dengue patients, causing a backlog of elective surgeries and reduced capacity for medically sick patients. With the disease burden usually equally divided between the twin cities, this year the suburbs of Rawalpindi were the worst hit. The increased burden was attributed to a failure in implementing preventive measures in a timely fashion, a new serotype in circulation and lack of public awareness amongst the public due to reduced awareness campaigns. By the end of the epidemic, nearly 15,000 patients had been treated in a period of 4 months, from August to November and nearly 80,000 individuals had been screened in the OPDs of the teaching hospitals of Rawalpindi Medical University.

- Worldwide Epidemic–4.7million cases world wide
- Pakistan had more than 54000 cases, worst nits history
- RMU alone provided care for nearly 12000 of these cases.
- Attributed to lax in Dengue readiness planning and increased breeding area for mosquitoes.
- The world wide mortality rate is 0.8-2.5%, RMU boasted a mortality rate of0.6.

Dengue Epidemic - 2019

OPD	Admissions	Confirmed	DHF	DSS	Deaths
87170	14793	11983	4488	274	47



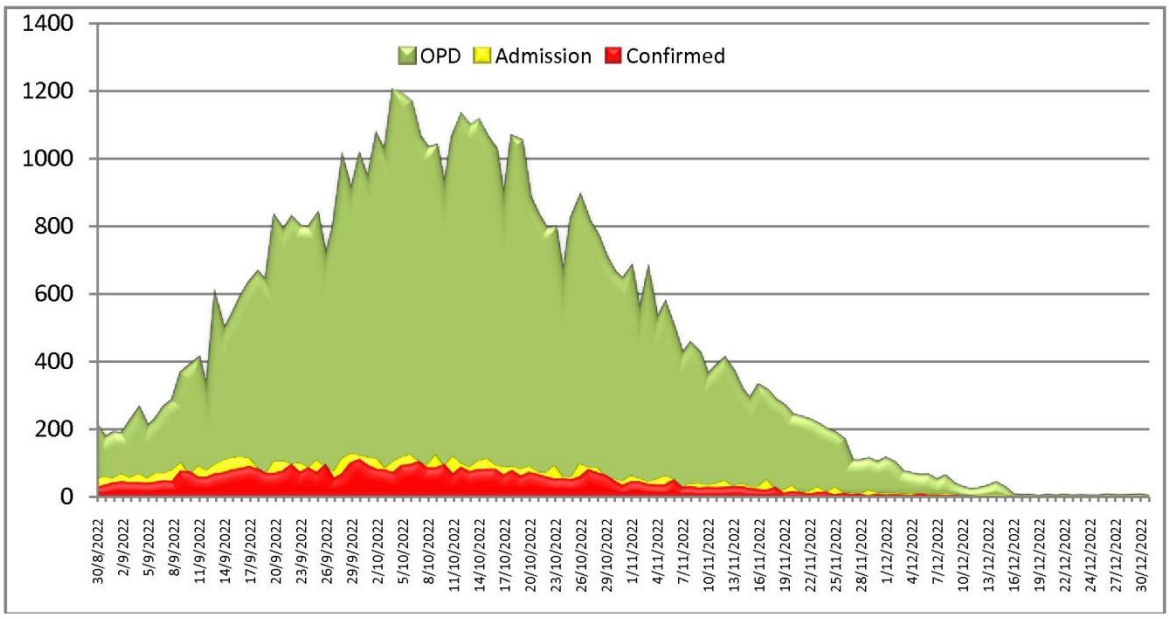
The Dengue Epidemic 2022 in Rawalpindi

With the COVID-19 pandemic under control and the return of outdoor activities, Dengue returned with numbers close to pre pandemic levels. Once again, the epidemic struck in August, a month early, with a trend forming in the epidemic pattern. Nearly 60,000 symptomatic individuals presented to the OPDs of the teaching hospitals of Rawalpindi Medical University.

The low admission rate and high positivity rate amongst the admitted population can be explained by the effectiveness of the screening algorithm. Nearly 5000 confirmed patients were cared for, and 22 individuals lost the fight against Dengue, with a mortality rate being a low 0.4%.This number does not represent the fiscal and economic losses to the city.

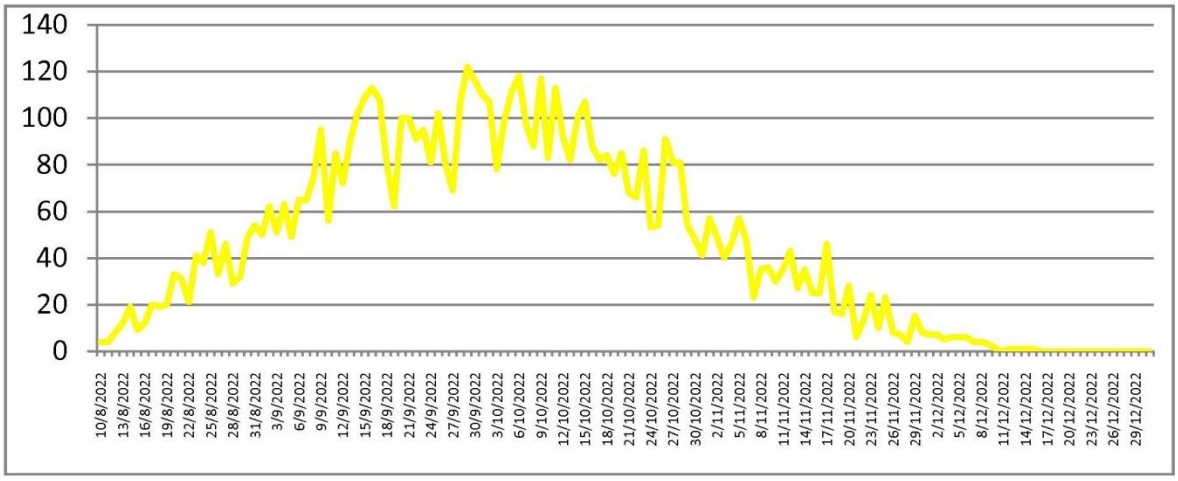
2022 Dengue Epidemic Data

	OPD	Admission	Confirmed	DHF	DSS	Deaths
HFH	32342	3464	2249	695	15	05
BBH	18170	2336	1816	895	78	15
DHQ	8711	1259	974	441	08	03
	59223	**7059**	**5039**	**2031**	**101**	**23**

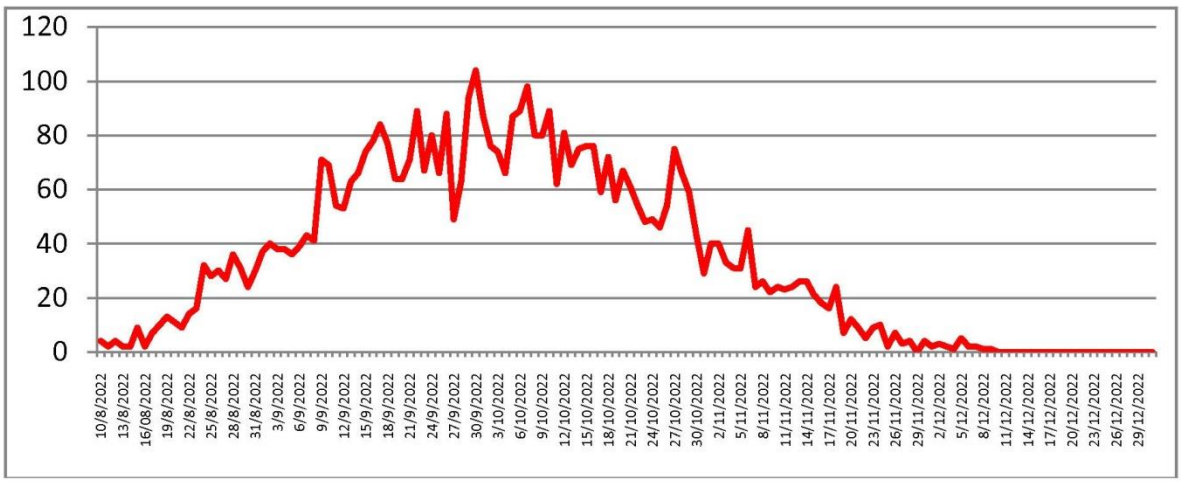


Dengue epidemic 2022 trend in RMU Allied Hospitals

Trend of Dengue Patients OPD, RMU Allied Hospitals



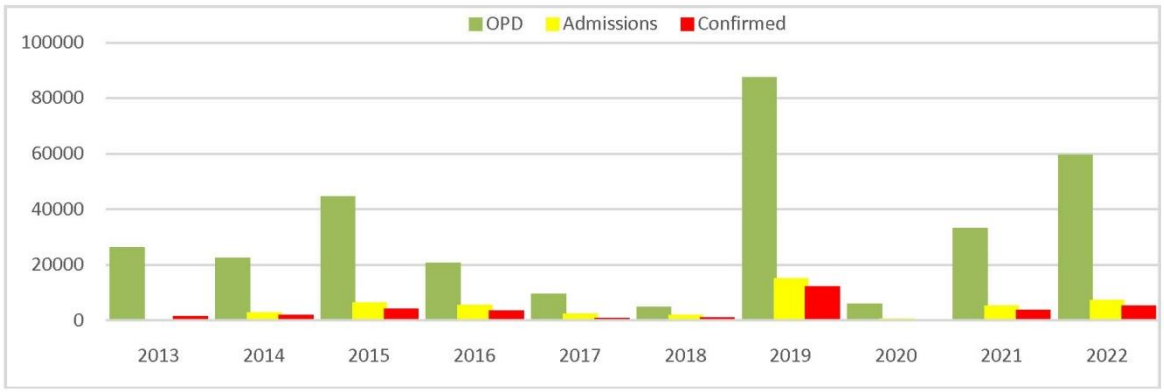
Trend of Dengue Patients Admissions, RMU Allied Hospitals



Trend of Dengue Confirmed Patients, RMU Allied Hospitals

Comparative Analysis of Dengue Status 2013 to 2022

Over time a pattern has emerged in dengue epidemics, with single large-scale epidemics often followed by 2-3 years of mild epidemics. This is thought to be attributed to the long-term positives effects of the steps taken during the major epidemic. It can also be associated to variations of the circulating serotypes, with larger epidemics normally associated with more than a single dominant serotype in circulation. As shown below, the trends over the years can be seen. Since data collection started in 2013, it has also been observed that ratio between patients presenting to the OPD and those confirmed to have Dengue Fever has been nearly10:1, with the gap slowly widening. The psychological impact and the effectiveness of the awareness campaigns can be noted. The wide ratio in 2020 is explained by the con current ongoing COVID-19 pandemic and the precautions taken.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
OPD	25914	22126	44337	20449	9131	4516	87170	5648	32940	59223
Admissions		2422	6139	5258	2116	1561	14793	350	5050	7059
Confirmed	1223	1571	3917	3306	651	717	11983	38	3526	5039
Ratio	21:1	14:1	11:1	6:1	14:1	6:1	7:1	148:1	9:1	14:1
DHF	339	570	1384	992	217	120	4488	18	1714	2031
DSS		32	84	55	13	1	274	01	92	101
Expiries	7	2	8	3	3	2	47	Nil	24	23
Predominant Genotype	DEN-2	DEN-3(85.9%)	DEN-2(62%)	DEN-2(48%)DEN-3(42.1%)	DEN-2(72%)	N/A	DEN-1(5%)DEN-2(94%)DEN-3(1%)	N/A	DEN 2 (23%)	DEN 1 (40%) DEN 2 (60%)

Post COVID Dengue Epidemic

With a large portion of the population still staying indoors to protect themselves due to COVID-19, the incidence of Dengue Fever remained low in the years following the onset of the pandemic. The COVID-19 pandemic also led to a reduced incidence of cases of influenza and pneumonia, both thought to be due to the precautions taken by the population against COVID-19. Following the pandemic, numbers were low mostly due to the precautionary measures taken during the pandemic. Hand hygiene, social distancing, cleaning of surfaces all played a role in decreasing breeding grounds and reducing vectors.

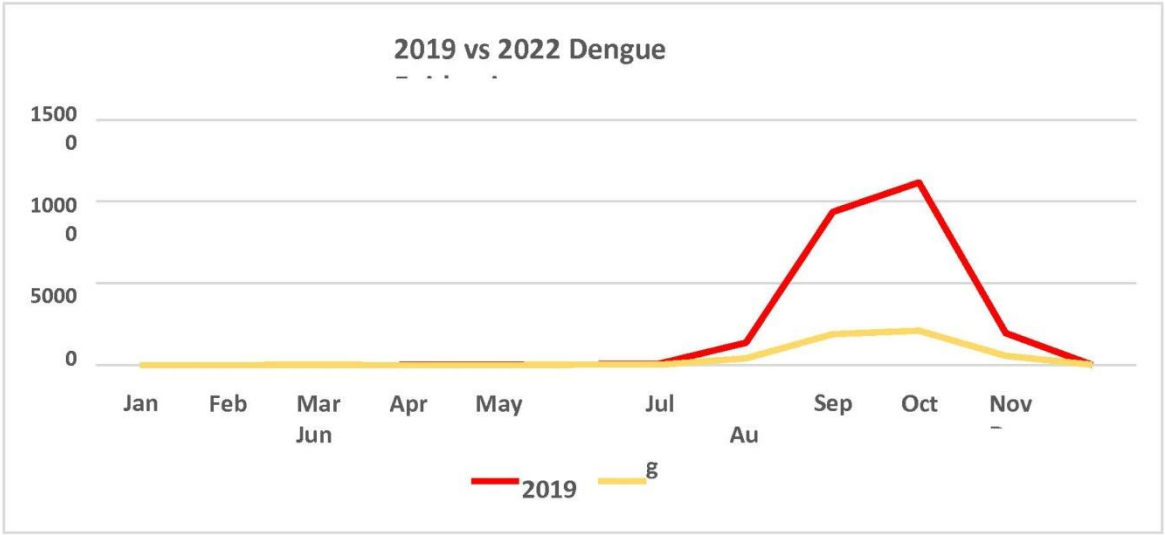
2019 vs 2022 Dengue Epidemics

The 2019 Dengue Epidemic will go down as the worst epidemic in the history of Pakistan, as well as many other countries. This is mostly attributed to increased pollution, which interpleads to more breeding grounds for Dengue and ill preparedness of authorities.

The 2022 Dengue Epidemic is the first major epidemic following the COVID pandemic.

The first two years following the pandemic reported a small number of dengue patients, mostly due to the extra precautions taken during the pandemic. Following the lifting of the COVID precautions, the numbers are slowly returning to pre-pandemic levels.

Following previous trends, the numbers are expected to return to previous levels if precautions are not taken in a timely and appropriate manner.



Human Resource Dengue Management Training

The most precious resource in all epidemics or pandemics is the presence of trained staff and this often proves to be the game changer in the pursuit of providing quality and effective healthcare. Rawalpindi Medical University prides itself in maintaining a well trained and equipped staff all year round to manage epidemics and pandemics. The university has also regularly been providing free of cost hands on training to both, public and private sector, healthcare providers. One of the objectives is to reach the rural healthcare settings and private setups, so this disease can be treated according to standardized guidelines and reported as so. This uniformity also guides the way to identify and treat the local disease burden. The certificate course in Dengue management was held on a weekly basis and was done in accordance with DEAG guidelines and hands training around the clock.

		2014	2015	2016	2017	2018	2019	2020	2021	2022
Doctors	Govt.	303	598	397	145	342	528	431	275	410
	Private	128	61	136	36	27	65	57	0	0
Nurses	Govt.	377	273	216	100	264	552	415	208	319
	Private	07	37	26	55	34	72	21	0	0
Paramedic	Govt.	11	09	79	0	0	0	0	0	0
	Private	21	10	17	0	1	0	0	0	0
Total		**847**	**988**	**871**	**336**	**668**	**1217**	**924**	**483**	**729**

Allied Department

The healthcare service deliveries of dengue at the Allied Hospitals of RMU were supported around the clock by the Radiology, Pathology, and the Blood bank. Given the acute nature of the disease and rapid influx of patients around the clock, it was vital to have the backing of the radiology team, to assess the patients for progression to the hemorrhagic phase. The blood bank insured the availability of blood products around the clock and the pathology lab made a makeshift unit within the department of Infectious Diseases on the ward for prompt provision of services.

Pathology Services

NS1 tests detect the non-structural protein NS1 of dengue virus. NS1 tests have been developed for use in serum. Most of these tests use synthetically labeled antibodies to detect dengue NS1 protein.

Dengue virus-specific IgM and neutralizing antibodies typically develop toward the end of the first week of illness. IgM levels are variable, but generally are positive starting 4-5 days after onset of symptoms and continuing for approximately 12 weeks post symptom onset but may persist longer.

During the epidemic season dengue serologies were sent to the main pathology department of hospital.PCR tests of all NS1 positive patients were performed. A total of 7058 viral serologies were done during the2022epidemic.

CBC machine is available round the clock in the department of infectious diseases. All other necessary lab investigations are done on daily basis e.g., RFTs, LFTs, Serum Electrolytes, Urine R/E, PT, aPTT, ESR. Special investigations including cardiac enzymes, cholesterol, albumin and ABGs are done in DHF and DSS patients only.

Lab Test 2022	
Blood CP	**Viral Serology**
75744	**7058**

Radiology Services

Ultrasound abdomen/ chest is performed daily in all dengue admitted patients. Department also provide bedside USG and X-ray to reduce complication along with early detection of vascular leakage. Nearly 884 Chest X-rays were ordered in admitted patients along with 18817 ultrasounds for early identification of complications. Common findings in ultrasound assessment were Pleural fluid collection, Gall bladder wall thickness, Pericholecystic fluid, Hepatomegaly, and splenomegaly.

Radiological test 2022	
CXR	**Ultrasound**
884	**18817**

Blood Bank Services

Holy Family hospital provides blood to patients of Dengue Fever on a 'non donor' basis, as patients of Dengue Fever have the tendency to bleed out and immediately arranging and transfusing blood is mandatory to save human lives. The blood banks of all 3 hospitals workday and night to ensure the availability of all blood groups, even the rarer blood groups always.

2022 Dengue Epidemic Blood products usage

RCC	Whole Blood	FFP	Platelets	Platelets mega unit	Dextran
164	04	42	24	01	759

Information Technology and Live Dashboard

RMU has a dedicated Information Technology department which has stations in the Dengue Wards of the Allied Hospitals. The system is connected to the PITB live dashboard which is updated in real-time from the hospital end. As the dashboard is updated, the concerned authority, the primary healthcare department is notified. Once notified, the prevention eam is activated and using the demographic information, visits the area to assess the prevalence of the disease, mosquitoes and larvae present. Preventive measures are then taken, which play a large role in source control of the epidemic. Sprays, removal of breeding grounds and education are some of the ways utilized to both prevent spread and educate the masses.

Mortality Trends

Dengue has a relatively low mortality rate with simple dengue fever having a mortality of less than 1% and dengue hemorrhagic fever has a mortality of 2-5% but dengue shock syndrome has a mortality of nearly 50%. Rawalpindi Medical University boasts a mortality rate of less than 0.1%. All deaths were patients of Dengue Shock Syndrome. Each and every mortality was scrutinized in the mortality meeting of the respective hospitals and a clinical mortality /post mortem audit was provided to DEAG and health department of Punjab on prescribed mortality Performa.

2022 Dengue Epidemic Mortality

Mortality	Status		Sex	
	Dengue	Non-Dengue	Male	Female
23	13	10	11	12

Financial Burden

Rising inflation and the economic crunch both have played a role in pushing up the healthcare provision cost. RMU has itemized and audited the total cost and is working with clinician sand the administration to reduce cost without compromising healthcare provision.

Condition	Hospital Stay(Days)	Cost/Day	Total Cost
Dengue Fever	03	5,025	15,075
DHF	06	8,025	48,150
DSS	12	17,925	215,100

Health Department Supervisory Roll

High ranking officials from various departments often visited the department and interacted with the doctors and staff to combat the issues being faced. High level meetings were held on daily basis with vice chancellor and MS of to strategize management of resources.

No	Supervisory Visits	Visit date
1.	Agha Nabeel Akhtar(Additional secretary development-SHC&ME)	-
2.	Mr. Ali Jan Khan(Secretary-SHC&ME)	6 June 2022
3.	Mr. Tariq Farooq (DC Rawalpindi)	24 Aug 2022
4.	Dr. Akhtar Malik (Minister of Primary and Secondary health)	15 Sep 2022
5.	Saqib Manan (Administrative secretary)	24 Sep 2022
6.	Khalid Jadoon (Chairman Complaint Cell Rawalpindi)	15 Oct 2022
7.	Prof. Tanvir us Salam (Chairperson DEAG)	22 Dec 2022
8.	Dr. Amir Mufti (Director Communicable disease and Epidemic Control)	22 Dec 2022

RMU & Dengue Epidemic

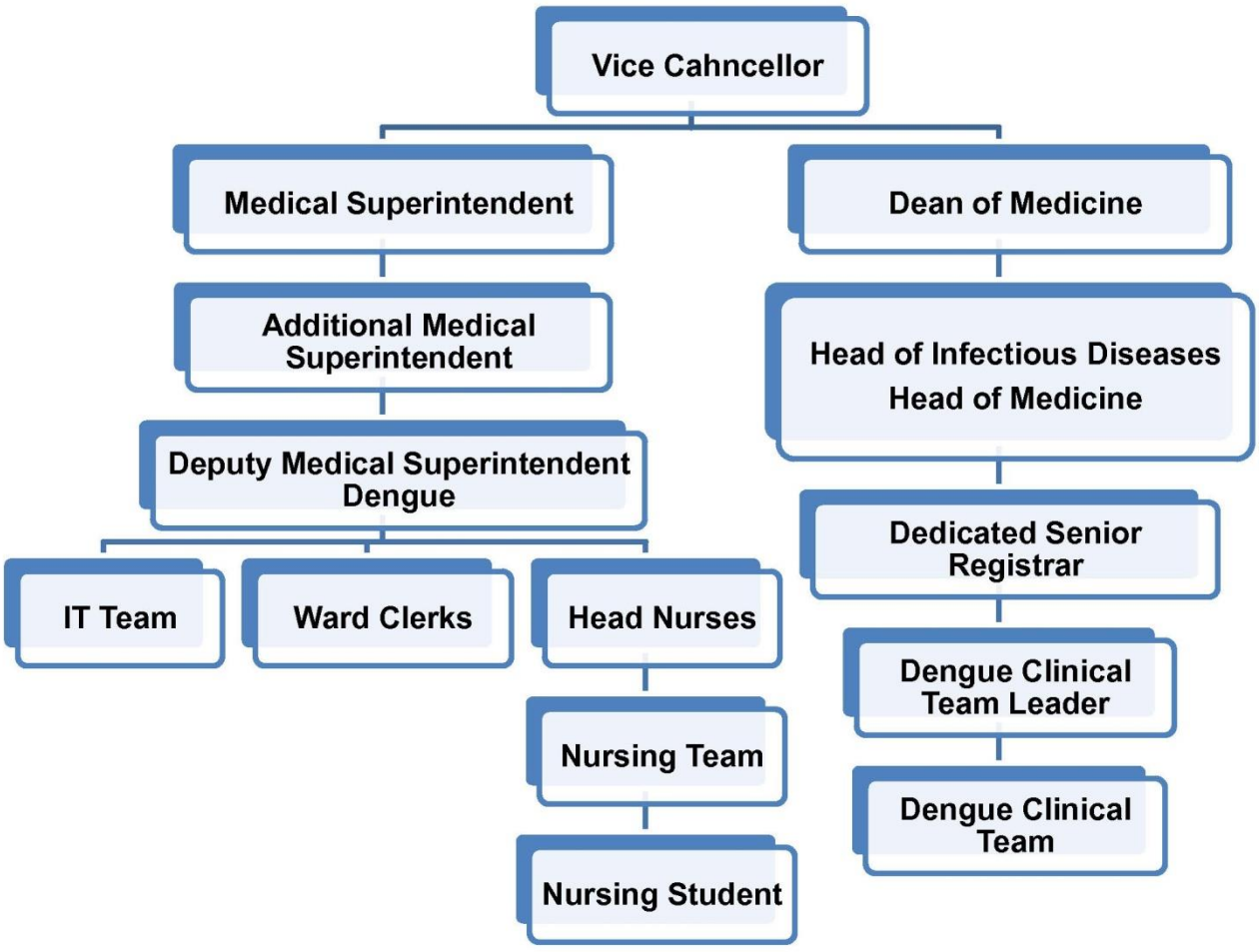
During the dengue epidemic, The Vice Chancellor of Rawalpindi Medical University visited the different wards of all 3 Allied Hospitals at least two times a day, early in the morning and midnight. He would usually visit 3 times a day, including Sundays and public holidays. A meeting was chaired by him every morning with Professors (Medicines/Infectious Diseases, Pathology & Radiology), MS, AMS and DMS of each hospital, to review the situation daily and make decisions accordingly.

The vice Chancellor actively participated in the Dengue Epidemic, both administratively and clinically. He would personally assess the situation at different times of the day and solve in gering issues which interfered with patient care, on a priority basis. He would meet the on duty doctors, during his round and would make the required changes to make sure the doctors were facing no problems. He would also interact with the patient in the wards and OPD, he would listen to their suggestions and give his valuable input on how to streamline patient care and played a great part in the acquisition of resource to ensure optimum patient care.

Vice Chancellor RMU /Allied Hospitals in DID,
Reviewing Clinical Progress

Meeting with Commissioner and Deputy Commissioner,
Rawalpindi in RMU regarding dengue epidemic 2022

Management Hierarchy of Dengue Epidemic 2022
RMU Allied Hospitals



RMU Dengue Awareness, Prevention and Training Program for Healthcare Professionals

Each year the University organizes a seminar for the healthcare staff in which the latest developments and treatment changes and challenges are revisited. They have proven to be a great tool for keeping the team up to date and rekindles the spirit of teamwork for all. Training sessions are organized on a regular basis. The training is provided by senior faculty members in accordance with DEAG guidelines. These sessions are attended by the local staff as well as visiting staff from provincial hospitals.

Dr. Muhammad Umar VC RMU, Sharing his thoughts

Dr Muhammad Khurram, Dean of Medicine briefing the audience on the current Dengue situation

Dr. Muhammad Mujeeb Khan reviewing the latest guidelines and treatment for Dengue Fever

Guest Speaker sand Faculty Members

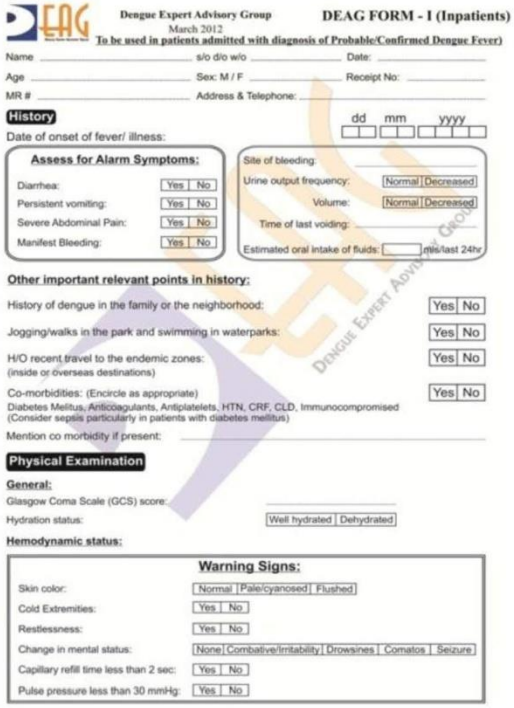
RMU Model of Dengue Patient Management Algorithms

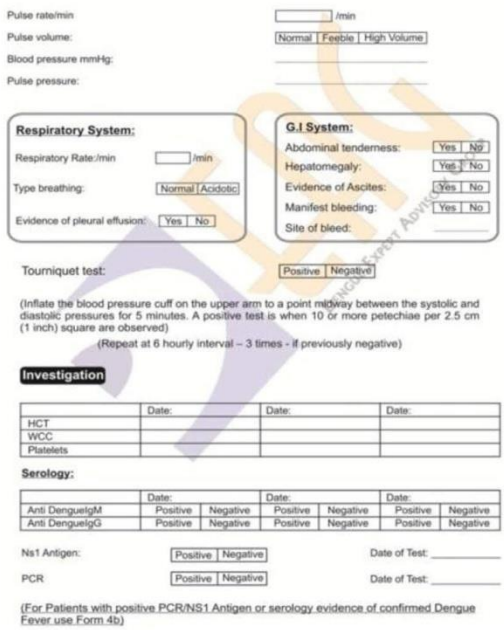
Following the new guidelines offered by DEAG there are two registration forms. The R-form is of the admitted patients and the O- form is of OPD follow up patients. Both forms help professions in Dengue diagnosis and management. For prompt management and identification of severe cases department holds three different files including red, green, and yellow files for representing the severity of dengue fever. Red file is allocated to DSS patients, Yellow to DHF patients and green for DF patients. Each file gives an overview of all the important details of patient including serologic test results, Diagnosis, starting and ending of critical period. It also includes USG blocks which represents daily results of USG abdomen/chest.

DEAG Data & Management Forms


DEAG FORM - R
Revised, March 2018
Dengue Expert Advisory Group
Filling of all fields is compulsory
Hospital
Name
NIC #
Home Address
Workplace Address
MR #
s/o d/o w/o
Unit:
Date:
Age & Sex:
Profession
Contact #
Essential Criterion
Fever > 2 and < 10 days
Associated symptoms
Headache
Retro orbital pain
Myalgia
Arthralgia/ severe backache/ bone pains
Irritability in infants
Rash
Bleeding manifestations (epistaxis, gum bleed, bloody stools, hematemesis, hemoptysis, menorrhagia, hematuria)
Severe abdominal pain
Decreased urinary output despite adequate fluid intake
Presence of any 2 associated symptoms in addition to fever
Declared Suspected Case
Record vitals: Temperature: HR: BP: PP:
Request CBC, HCT & Look for presence of any Warning Signs
DoF
HCT
WBC
Platelet
Any 2 or more
OR
Warning Signs (one or more)
Declared Probable Case
Name, Signature Registrar
Name, Signature Sr. Registrar
Name, Signature Focal Person
Received by Focal Person
Patient Name
MR #


DEAG FORM - O
Revised, March 2018
Dengue Expert Advisory Group
Filling of all fields is compulsory
Hospital
Name
NIC #
Home Address
Workplace Address
MR #
s/o d/o w/o
Unit:
Date:
Age & Sex:
Profession
Contact #
Essential Criterion
Fever > 2 and < 10 days
Associated symptoms
Headache
Retro orbital pain
Myalgia
Arthralgia/ severe backache/ bone pains
Irritability in infants
Rash
Bleeding manifestations (epistaxis, gum bleed, bloody stools, hematemesis, hemoptysis, menorrhagia, hematuria)
Severe abdominal pain
Decreased urinary output despite adequate fluid intake
Presence of any 2 associated symptoms in addition to fever
Declared Suspected Case
Record vitals: Temperature: HR: BP: PP:
Request CBC, HCT & Look for presence of any Warning Signs
DoF
HCT
WBC
Platelet
Any 2 or more
OR
Warning Signs (one or more)
Declared Probable Case
Admit Patient & fill Reporting Form R
If Admission is not indicated, explain warning signs and advise treatment and followup.
Name, Signature and Date
PTO


Dengue Expert Advisory Group
March 2012
DEAG FORM - I (Inpatients)
To be used in patients admitted with diagnosis of Probable/Confirmed Dengue Fever)
Name
s/o d/o w/o
Date:
Age
Sex: M / F
Receipt No:
MR #
Address & Telephone:
History
Date of onset of fever/ illness:
dd mm yyyy
Assess for Alarm Symptoms:
Diarrhea: Yes No
Persistent vomiting: Yes No
Severe Abdominal Pain: Yes No
Manifest Bleeding: Yes No
Site of bleeding:
Urine output frequency: Normal Decreased
Volume: Normal Decreased
Time of last voiding:
Estimated oral intake of fluids: ml/last 24hr
Other important relevant points in history:
History of dengue in the family or the neighborhood: Yes No
Jogging/walks in the park and swimming in waterparks: Yes No
H/O recent travel to the endemic zones: (inside or overseas destinations) Yes No
Co-morbidities: (Encircle as appropriate) Yes No
Diabetes Mellitus, Anticoagulants, Antiplatelets, HTN, CRF, CLD, Immunocompromised
(Consider sepsis particularly in patients with diabetes mellitus)
Mention co morbidity if present:
Physical Examination
General:
Glasgow Coma Scale (GCS) score:
Hydration status: Well hydrated Dehydrated
Hemodynamic status:
Warning Signs:
Skin color: Normal Pale/cyanosed Flushed
Cold Extremities: Yes No
Restlessness: Yes No
Change in mental status: None Combative/Irritability Drowsines Comatos Seizure
Capillary refill time less than 2 sec: Yes No
Pulse pressure less than 30 mmHg: Yes No


Pulse rate/min /min
Pulse volume: Normal Feeble High Volume
Blood pressure mmHg:
Pulse pressure:
Respiratory System:
Respiratory Rate:/min /min
Type breathing: Normal Acidotic
Evidence of pleural effusion: Yes No
G.I System:
Abdominal tenderness: Yes No
Hepatomegaly: Yes No
Evidence of Ascites: Yes No
Manifest bleeding: Yes No
Site of bleed:
Tourniquet test: Positive Negative
(Inflate the blood pressure cuff on the upper arm to a point midway between the systolic and diastolic pressures for 5 minutes. A positive test is when 10 or more petechiae per 2.5 cm (1 inch) square are observed)
(Repeat at 6 hourly interval – 3 times - if previously negative)
Investigation
Date: Date: Date:
HCT
WCC
Platelets
Serology:
Date: Date: Date:
Anti DengueIgM Positive Negative Positive Negative Positive Negative
Anti DengueIgG Positive Negative Positive Negative Positive Negative
Ns1 Antigen: Positive Negative Date of Test:
PCR Positive Negative Date of Test:
(For Patients with positive PCR/NS1 Antigen or serology evidence of confirmed Dengue Fever use Form 4b)

Holy Family Hospital, Rawalpindi

Teaching Hospital of Rawalpindi Medical College

Department of Infectious Diseases (Dengue Ward)

DF	DHF	DSS	

MR NO. _____ Date _____

Patient Name _____

Age _____ Sex _____ Occupation _____

Address _____

Travel History _____

Ward _____ Bed No. _____ Admission No. _____

Date of Admission _____ Date of Discharge _____

HO / PGT Incharge _____ Final Diagnosis _____

Bases _____

Critical Period Started on (Date & Time) _____

Critical Period Ended on (Date & Time) _____

Ns1 +ve _____ -ve _____

IGM +ve _____ -ve _____

IGG +ve _____ -ve _____

Co Morbid _____

Registrar Incharge _____

Holy Family Hospital, Rawalpindi

Teaching Hospital of Rawalpindi Medical College

Department of Infectious Diseases (Dengue Ward)

DF	DHF	DSS	

MR NO. _____ Date _____

Patient Name _____

Age _____ Sex _____ Occupation _____

Address _____

Travel History _____

Ward _____ Bed No. _____ Admission No. _____

Date of Admission _____ Date of Discharge _____

HO / PGT Incharge _____ Final Diagnosis _____

Bases _____

Critical Period Started on (Date & Time) _____

Critical Period Endeded on (Date & Time) _____

Ns1 +ve _____ -ve _____

IGM +ve _____ -ve _____

IGG +ve _____ -ve _____

Co Morbid _____

Registrar Incharge _____

Holy Family Hospital, Rawalpindi

Teaching Hospital of Rawalpindi Medical College

Department of Infectious Diseases (Dengue Ward)

DF	DHF	DSS	

MR NO. _____ Date _____

Patient Name _____

Age _____ Sex _____ Occupation _____

Address _____

Travel History _____

Ward _____ Bed No. _____ Admission No. _____

Date of Admission _____ Date of Discharge _____

HO / PGT Incharge _____ Final Diagnosis _____

Bases _____

Critical Period Started on (Date & Time) _____

Critical Period Ended on (Date & Time) _____

Ns1 +ve _____ -ve _____

IGM +ve _____ -ve _____

IGG +ve _____ -ve _____

Co Morbid _____

Registrar Incharge _____

DISCHARGE FORM

Patient's Information

Patient's Name: _____ Father's Name: _____

Age: _____ Contact No: _____

Address: _____

CNIC No: _____ Hospital Reg No: _____

All fields must be filled by duty doctor while contemplating discharge of a dengue patient.

Afebrile for 48 hours (without antipyretics) Yes ☐ No ☐

Stable general condition and vital signs

✓ Pulse: <90/min Yes ☐ No ☐

✓ Pulse Pressure: >30mmHg Yes ☐ No ☐

No or minimal visible bleeding

✓ Bleeding in Last 24hrs Yes ☐ No ☐

No dyspnea or respiratory distress attributable to pleural effusion or ascites

✓ Pleural effusion on USG: Yes ☐ No ☐

Stable hematocrit for at least 24 hours Yes ☐ No ☐

✓ HCT: Previous_____, Recent_____

Rising trend in platelet count (PLTs > 40,000) Yes ☐ No ☐

✓ PLT: Previous _____, Recent_____

Fully recovered organ dysfunction

✓ ALT, AST < 2 times normal Yes ☐ No ☐

✓ S. Creatinine < 1.5mg/dL Yes ☐ No ☐

Doctor Name: _____ Signature: _____

Department of Infections Diseases
Holy Family Hospital Rawalpindi.

0 - 24 Hours

Revised: October 2021

Monitoring Chart III to be used during the Peak of leakage and during Shock

(Patient to be monitored every 15 minis)

Name of the patient: ..... Hospital: ..... Ward: ..... MR#.....

Fluid Boluses Given

Normal Saline: .....

Dextran: ..... Maximum 3 per 24h / 6 per 48h

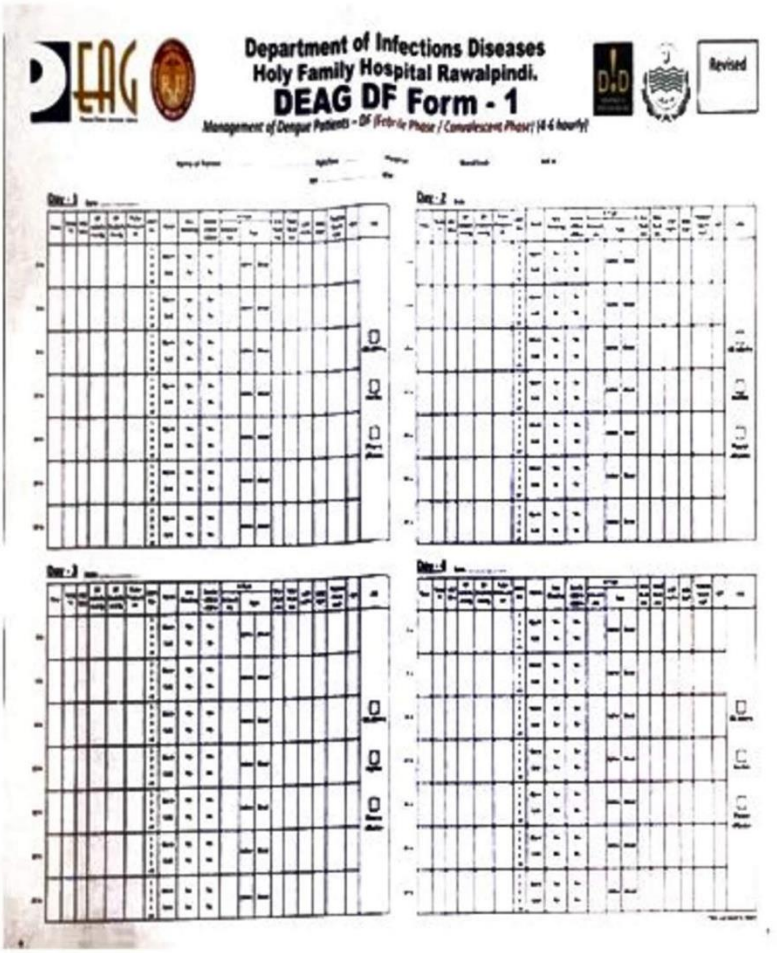
Starch: ..... Maximum 5 per 24h / 10 per 48h

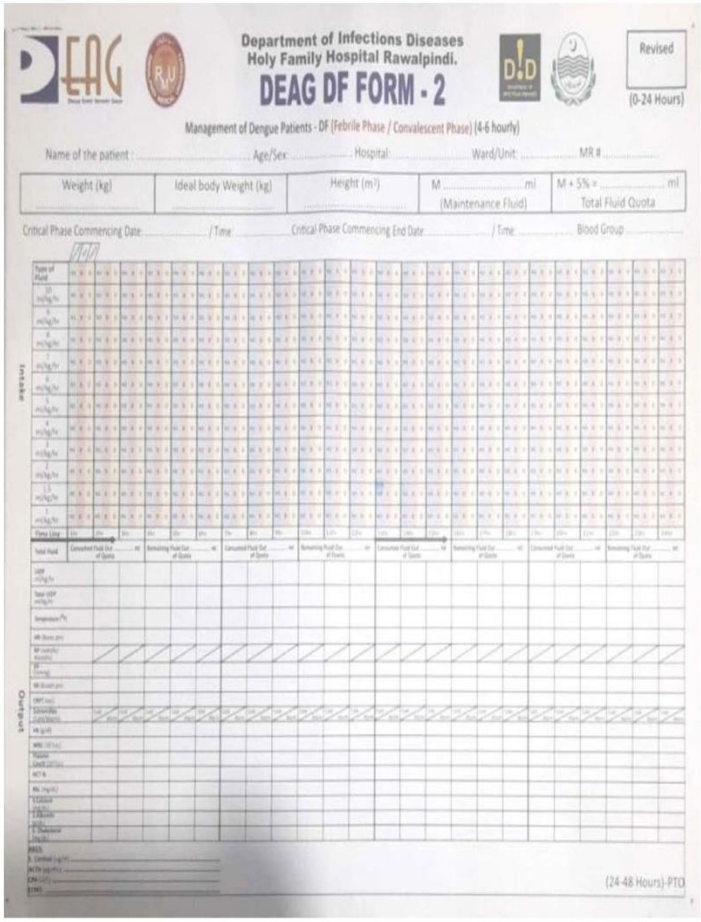
Other fluid: PRC/WB .....

M+ 5% = ... ml for 24 hours

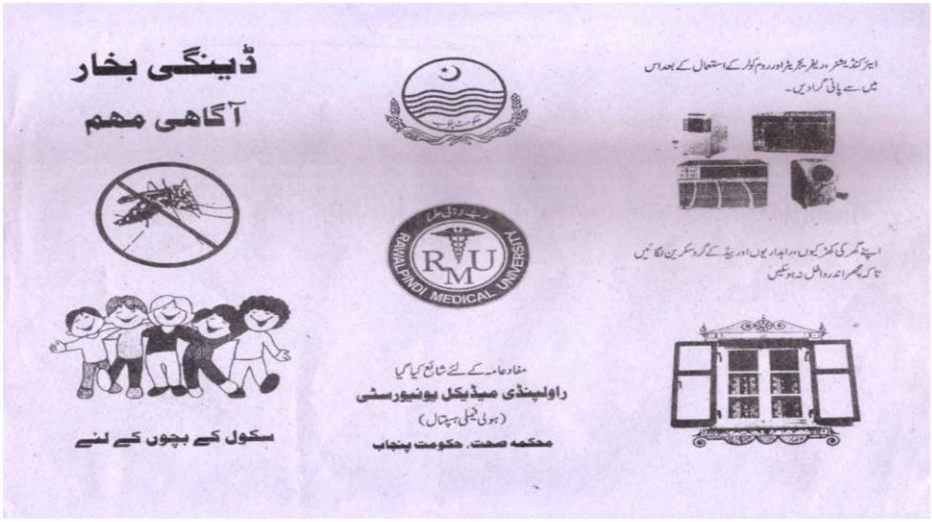
Fluid ml/kg/hr	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B	S/D/B
20																									
10																									
9																									
8																									
7																									
6																									
5																									
4																									
3																									
2																									
1																									
time																									
HCT																									
Fluids Used																									
Remaining																									
HR																									
BP																									
Pulse Pressure																									
RR																									
CRFT																									
Extremities																									
UOP Ml/kg/hr																									
Platelet count																									

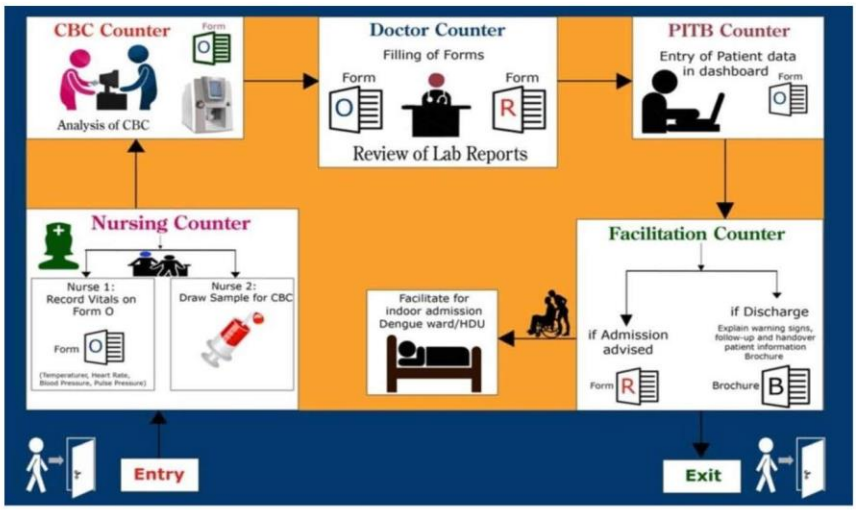
Revised: October 2021






ڈینگی خطرناک نہیں
بلکہ لاپرواہی خطرناک ہے
ڈینگی کی علامات اور انکا علاج
علامات
بخار
سردرد، جسم، ہڈیوں اور آنکھوں میں درد
زکام کی کیفیت
شدید متلی، الٹی آنا
جسم پر سرخ دھبے نظر آنا
خطرے کی علامات
طبیعت کا مسلسل بگڑتے جانا
مسلسل الٹی یا متلی کی کیفیت
ناک، مسوڑھوں سے خون آنا یا پاخانے، پیشاب، الٹی یا کھانسی کے ساتھ خون آنا
شدید چکر یا آنکھوں کے آگے اندھیرا
علاج
پیراسیٹامول کی ایک یا دو گولیاں ہر چار گھنٹے بعد دیں
(چوبیس گھنٹوں میں چھ سے زیادہ گولیاں نہ دیں)
پانی اور نمکول کا استعمال کریں
نارمل خوراک جاری رکھیں
تیز بخار کی صورت میں پٹیاں کریں
خطرے کی علامات ہوں تو:
فوراً قریبی ہسپتال رجوع کریں
مزید معلومات و رہنمائی کے لئے ہیلپ لائن پر رابطہ کریں۔
051-9260984
051-9267580
وزارت صحت حکومت پاکستان کے اقدامات
ڈینگی کی موجودہ وبا کو دیکھتے ہوئے ایک ہیلتھ ایمرجنسی رسپانس یونٹ قائم کیا گیا ہے جو دن رات متحرک ہے۔
وبائی علاقوں میں تمام گورنمنٹ یا نجی ڈینگی کے تشخیص، ٹیسٹ اور علاج کی خدمات، ماہر عملے کے ذریعے مفت فراہم کر رہے ہیں۔
ڈینگی کے پھیلاؤ کو روکنے کے لئے عوام کا آگاہ ہونا اور ہدایات پر عمل کرنا ضروری ہے۔ ایک موثر حکمت عملی کے تحت تمام ملک میں آگاہی پھیلائی جا رہی ہے۔
World Health Organization


ڈینگی بخار
آگاہی مہم
سکول کے بچوں کے لئے
ایئر کنڈیشنر، واٹر کولر، واٹر کولنگ پیڈ اور روم کولر کے استعمال کے بعد اس میں سے پانی گرا دیں۔
اپنے گھر کی کھڑکیوں، دروازوں اور پنکھے کے گرد جالیاں لگائیں تاکہ مچھر اندر داخل نہ ہو سکیں
RMU
RAWALPINDI MEDICAL UNIVERSITY
مفاد عامہ کے لئے شائع کیا گیا
راولپنڈی میڈیکل یونیورسٹی
(ہولی فیملی ہسپتال)
محکمہ صحت، حکومت پنجاب


CBC Counter
Form
Analysis of CBC
Doctor Counter
Filling of Forms
Form
Form
Review of Lab Reports
PITB Counter
Entry of Patient data in dashboard
Form
Nursing Counter
Nurse 1: Record Vitals on Form O
Form
(Temperature, Heart Rate, Blood Pressure, Pulse Pressure)
Nurse 2: Draw Sample for CBC
Facilitate for indoor admission Dengue ward/HDU
Facilitation Counter
if Admission advised
Form
if Discharge
Explain warning signs, follow-up and handover patient information Brochure
Brochure
Entry
Exit

Rawalpindi Medical University Dengue Management Model

The Rawalpindi Medical University Dengue Management Model is derived in accordance with DEAG guidelines, with modifications based on learning throughout the year. The effectiveness of the model can be appreciated by reviewing data over the years.

A dedicated staff is designated and trained throughout the year. To be more effective, training is provided all year round to staff members. With the increasing unpredictability of the starting of the annual Dengue Epidemic, the ward remains equipped all year round, with expansion plans in place and medication readily available.

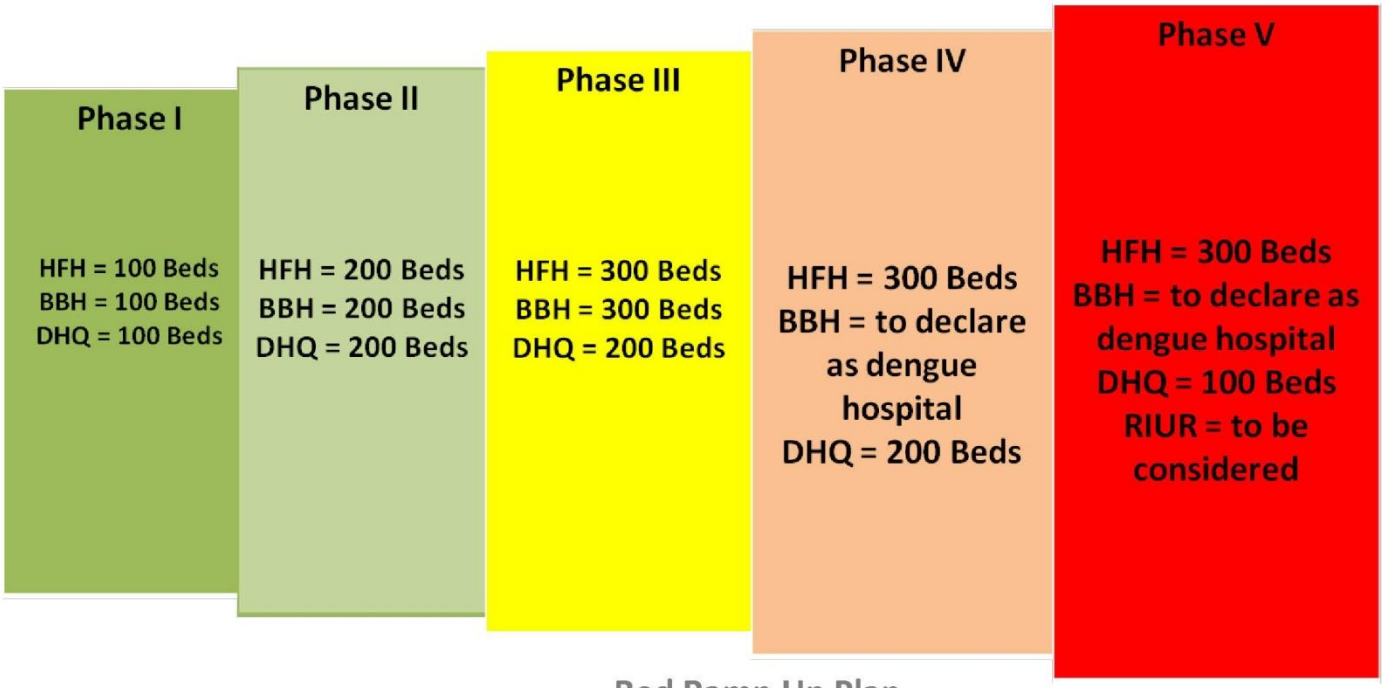
The teams work as a single cohesive unit, providing administrative, clinical, and technological support. Years of experience have allowed an increase in efficiency and effectiveness. Direct supervision and direction from the Vice Chancellor pave an easy road to ensure the highest standard of care.

Each bed is fully equipped with mosquito netting and every patient is sent home with education and flyers, cases are uploaded to a live dashboard for prompt action and a well-trained clinical and nursing staff work together to ensure excellence.

RMU Allied Hospitals Infrastructure Ramp up Plan

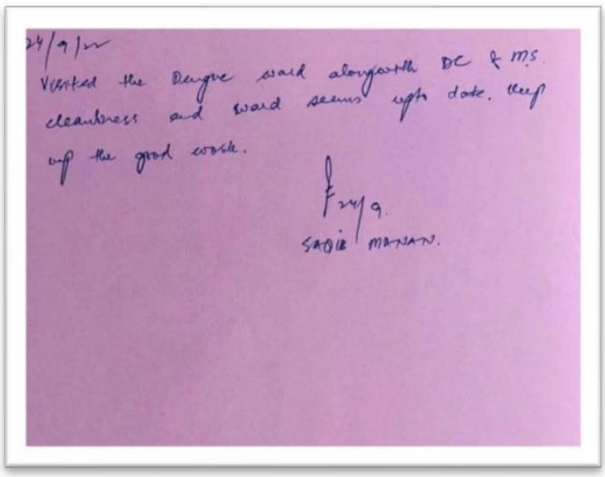
The sudden influx of dengue patients seems to overwhelm the available sources in allied hospitals of RMU including HFH, BBH, DHQ. To combat this surge with the help of health department to deal with future epidemic by arranging one thousand exclusive beds in these hospitals.

In phase 1, 100 beds were established in each hospital and increased to 200 to cope with continuous patient surge. Ultimately in last phase 300 beds were raised with 100 more to be considered in RIU.

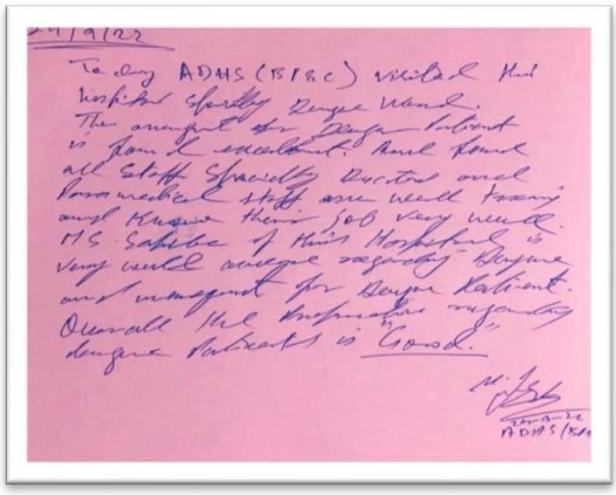


Bed Ramp Up Plan

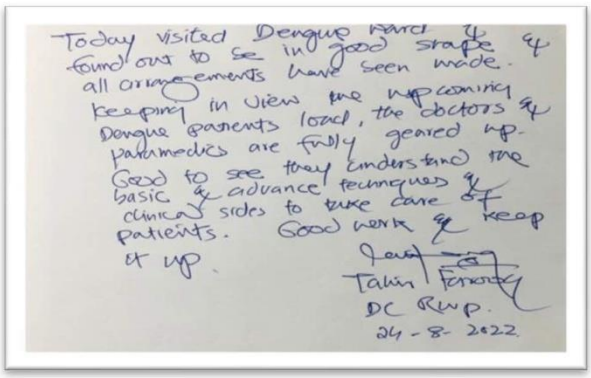
Visitors Reflections



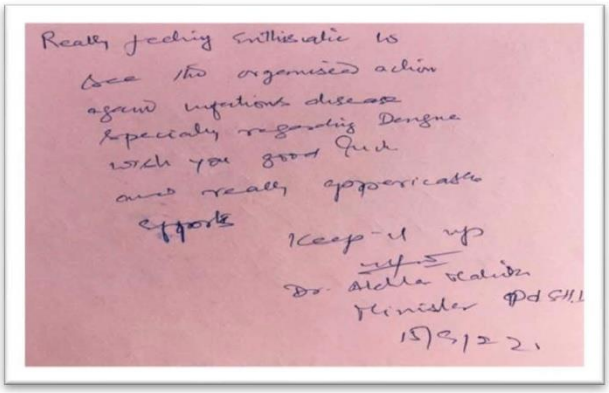
Saqib Manan (Administrative Secretary)



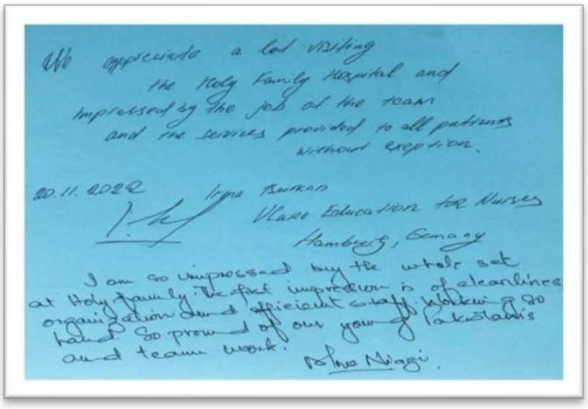
Khalid Jadoon (Chairperson Complaint Cell)



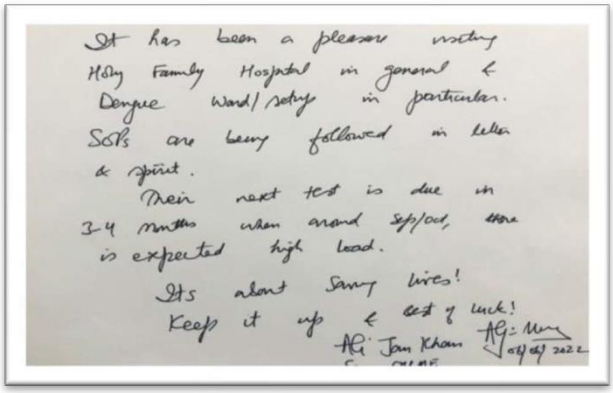
Mr. Tariq Farooq
(DC Rawalpindi)



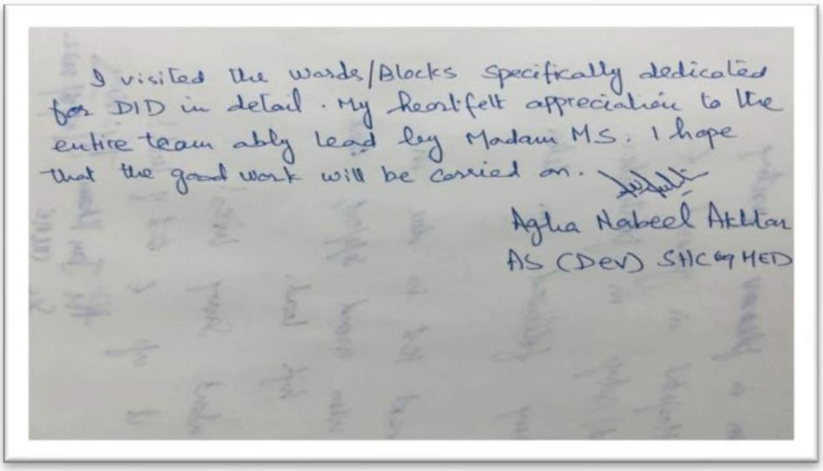
Dr. Akhtar Malik
(Minister of Primary and Secondary Health)



Nursing Superintendent



Mr. Ali Jan Khan (Secretary-SHC&ME)

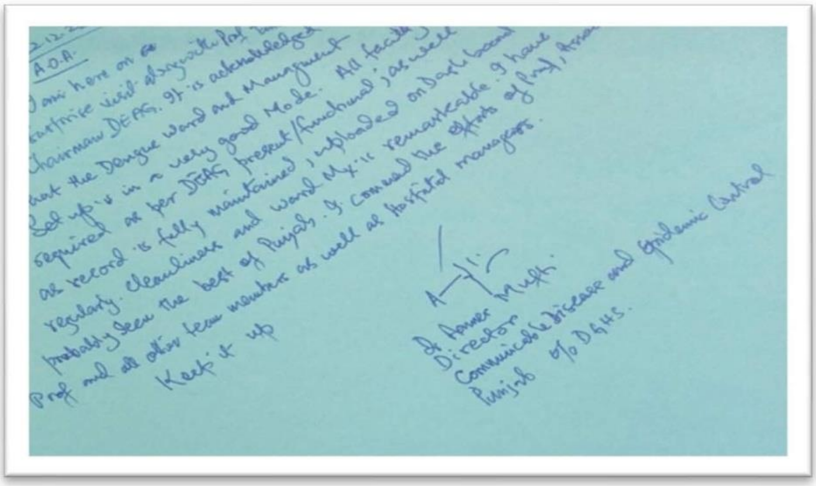


I visited the wards/Blocks specifically dedicated for DID in detail. My heartfelt appreciation to the entire team ably lead by Madam MS. I hope that the good work will be carried on.

Agha Nabeel Akhtar
AS (Dev) SHC&ME D

Agha Nabeel Akhtar
(Additional secretary)

Prof. Tanvir us Salam
Chairperson DEAG)



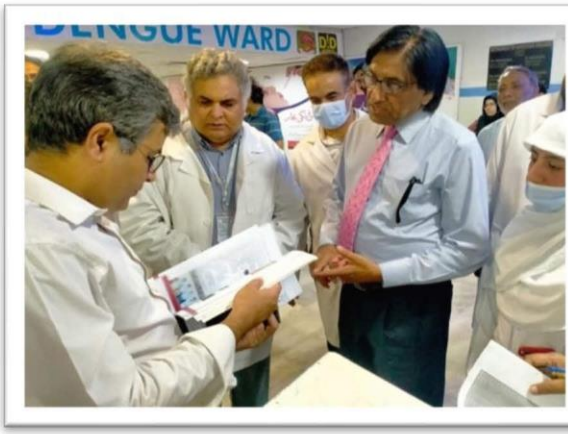
A.O.A.
I am here on a surprise visit along with Prof ... Chairman DEAG. It is acknowledged that the Dengue Ward and Management Set up is in a very good Mode. All facility required as per DEAG present/functional; as well as record is fully maintained, uploaded on Dash board regularly. Cleanliness and Ward My is remarkable. I have probably seen the best of Punjab. I commend the efforts of Prof, ... Prof and all other team members as well as hospital managers.
Keep it up

Dr Ameer Mufti
Director
Communicable Disease and Epidemic Control
Punjab O/o DGHS.

Dr. Amir Mufti
(Director Communicable disease and Epidemic Control)

Visitors Gallery

Dr Yasmeen Rashid (Health Minister)



Mr Ali Jan Khan (Secretary SHC&ME)

Mr Ali Jan Khan
(Secretary SHC&ME)

Mr Akhtar Malik
(Minister of Primary and Secondary Health)

Mr. Saqib Manan
(Administrative Secretary)

Mr. Saqib Manan
(Administrative Secretary)

Chairman DEAG Punjab & Director Communicable Diseases & Epidemic Control Punjab Visiting DID

Letter of Appreciation

Office of the DEAG

Dengue Expert Advisory Group/SIMS, Jail Road, Lhr
Ph # *042-99205404* Email: *deag.punjab@gmail.com*
Website: *deag.punjab.gov.pk*

No. DEAG/SIMS/2023/ 105-1038 /COD Dated: 03/02/2023

To,

Dear,

Prof. Muhammad Khurram
&
Dr. Muhammad Mujeeb Khan

The Dengue Focal Teams,
Holy Family Hospital, Rawalpindi

- This is in reference to my visit in Holy Family Hospital regarding quality assurance of clinical management of dengue fever and its epidemic preparedness in the hospitals of Punjab.

On the behalf of Dengue Expert Advisory Group Punjab, I wish to express my sincere appreciation for your excellent work in reporting and managing dengue fever cases in Holy Family Hospital, Rawalpindi. Dengue cases from HFH were timely reported, well managed and with best possible outcome. Moreover, it was observed that all the DEAG' SOPs and Forms are being followed and filled properly.

DEAG always encouraged every appropriate step taken and fulfillment of responsibilities for the patients. Therefore, I desire you to continue your efforts with more spirts. If there is any input or feedback regarding trained staff, dengue counter and dengue HDUs, Provincial DEAG will be more than happy to help you in this regard.

PROF. TANVIR US SALAM, (MD, FACP, FCCP)
Professor of Medicine/
Chairperson DEAG

Copy for the information to

1. Secretary to the Government of the Punjab, Specialized Healthcare & Medical Education, Lahore.
2. Secretary to the Government of the Punjab, Primary & Secondary Healthcare, Lahore.
3. The Director General Health (CD&EPC), DG Health Office, Lahore.
4. The Chief Executive Officer, Punjab Healthcare Commission, Lahore
5. All the Team Leaders, Dengue Focal Teams, from Teaching Institutions in Punjab
6. Office / Official concern / Master File**

Daily rounds of Vice Chancellor RMU

Vice Chancellor RMU
Examining the dengue patient

1. **Hemorrhagic Manifestations among dengue patients in Tertiary care Hospitals of Rawalpindi Medical University Pakistan**
   DOI: Infectious Diseases Journal of Pakistan, Volume 30 Issue 02, Apr-Jun 2021.
   Rizwana Shahid, Shazia Zeb, Sadia Khan, Muhammad Umar, Sumaira Yasmeen, Muhammad Mujeeb Khan, Muhammad Khurram.

2. **Dengue and Chikungunya virus co-infection in major metropolitan cities of provinces of Punjab and Khyber Pakhtunkhwa: A multi-center study**
   DOI: 10.1371/Journal.pntd.0009802
   Faiz Ahmed Raza, Hasnain Javed, Muhammad Mujeeb Khan, Obaid Ullah, Areeba Fatima, Muhammad Zaheer, Saima Mohsin, Shahida Hasnain, Ruqqya Khalid, Arslan Ahmed Salam

Journal of Medical Case Reports and Reviews 3:6
Available online at: - www.jmcrr.info ISSN: [Online] 2589-8655
[Print] 2589-8647

DENGUE PREDICTIVE MODEL 2020 FOR RAWALPINDI DISTRICT PAKISTAN

Dr. Rizwana Shahid, Dr. Shazia Zeb, Prof. Dr. Muhammad Umar (Vice Chancellor RMU), Dr. Asim Noor, Dr. Syed Usama Khalid, Prof. Dr. Muhammad Khurram and Dr. Muhammad Mujeeb Khan

Rawalpindi Medical University, New Teaching Block, Holy Family Hospital, Satellite Town, Rawalpindi.

Article Info

Received 27 May 2020

Accepted 28 June 2020

Publish 30 June 2020

***Corresponding Author:**

Dr.Rizwana Shahid

Email: drriz_shahid@yahoo.com

Abstract

Objectives: To draw dengue predictive model 2020 for Rawalpindi district in response to dengue epidemic 2019 for timely arrest and mitigation of dengue cases.

Methods: Predictive model was drawn by using machine learning technique. Numerous tools like Pandas, Numpy, Matplotlib, Sklearn, Pylab were use for data wrangling. Residential data of 12,192 dengue cases admitted in 3 teaching hospitals (Holy Family Hospital, Benazir Bhutto Hospital and District Head Quarters Hospital) affiliated with Rawalpindi Medical University was employed for this

3. **Dengue Predictive Model 2020 for Rawalpindi District, Pakistan**
DOI: JMCRR 2020, 3:5, Page No: 683-692
Rizwana Shahid, Dr Shazia Zeb, Prof. Dr Muhammad Umar, Dr Asim Noor, Dr Syed Usama Khalid, Prof Dr Muhammad Khurram, Dr Muhammad Mujeeb Khan


International Journal of Medicine in Developing Countries

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« Previous Article Next Article »

Original Research (Original Article)

IJMDC. 2019; 3(3): 272-278 doi: 10.24911/IJMDC.51-1544507442

Najia Mahmood et al, 2019;3(3):272-278.

International Journal of Medicine in Developing Countries

Characteristics of probable severe fever with thrombocytopenia syndrome patients: a perspective study from Pakistan

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Original Article

Management of Adult Dengue Shock Syndrome Patients Not Improving with DEAG Guidelines Based Therapy

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Abstract

Background: Dengue Expert Advisory Group (DEAG) guidelines are used for management of dengue patients in our scenario. It was observed in last consecutive dengue epidemics at Rawalpindi that some of the dengue shock syndrome (DSS) patients don't improve unless modifications in DEAG guidelines are made. This study was conducted to evaluate modified DEAG management guidelines in DSS patients with decompensated shock who were not improving with treatment based on standard DEAG guidelines.

Methods: *This* quasi experimental study was conducted at Dengue Units of Hospitals attached with Rawalpindi Medical College during Rawalpindi dengue epidemic 2015. Dengue Shock Syndrome (DSS) patients who were not improving with DEAG guidelines based treatment, were managed as per modified treatment *plan* i.e., continuing with colloid or blood depending on HCT in tapering way for initial few hours after hemodynamic stabilization is achieved. Outcome

Introduction

Dengue has emerged as important healthcare issue in Pakistan during last two decades.[1,2,3]Hyper-immune response and plasma leakage are hallmarks of complicated version of dengue infection which is termed as dengue hemorrhagic fever (DHF).[4,5]Dengue shock syndrome (DSS) is worst form of dengue infection.[4,5] It occurs when shock develops in DHF scenario.

Plasma leakage leading to depletion of intravascular volume is hallmark of DHF/DSS. Fluid resuscitation is thus main stay of therapy in DHF/DSS management.[8]Preventing shock and overload along with maintenance of hemodynamics are goals of DHF/DSS treatment. Dengue patients in Punjab province of Pakistan are managed according to the guidelines issued by Dengue Expert Advisory Group (DEAG).[4]On the basis of these guidelines,fluid quota is calculated for every DHF/DSS patient during critical phase in order to achieve the desired goals of DHF/DSS management. It is calculated by formula: maintenance + 5% of body weight. For an adult ≥50Kg, it is 4600 ml.[4]

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