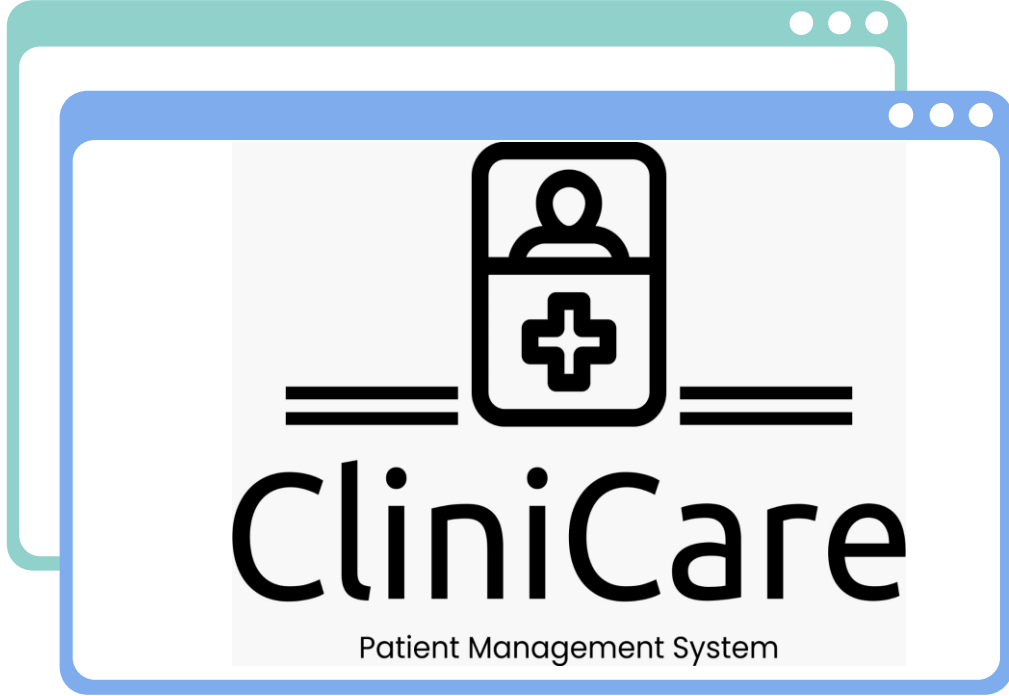# PATIENT MANAGEMENT SYSTEM

A presentation by:
- Manas Lathkar
- Pratik Turaga

CliniCare

- CliniCare is an easy and accessible method for doctors and health institutions to store patient data locally.
- With high reliability, easy accessibility and a simple to use UI, CliniCare aims to bring the convenience of technology so that it can be used by anyone.

WHY CliniCare?

- CliniCare addresses a need for improvement in technologies across clinics in underprivileged areas
- It is a safe, secure, efficient alternative and is easy-to-use.
- CliniCare also allows clinics to cut down on usage of paper.
- It thus cuts down all the risks of bad management of patient data that include privacy safety risks, data loss, missed diagnoses, etc.

PROS AND CONS OF CLINICARE

PROS

The application provides easy access to patient records.

The patient data is secure and accessible only by the practitioner.

The chances of the patient data being lost or permanently destroyed is extremely low.

It is convenient to use and is a very affordable option for all.

CONS

This is currently only limited to smaller clinics of general practitioners, and not major, big-scale hospitals.

Healthcare providers and staff may resist the transition from familiar manual processes to digital systems.

FUTURE SCOPE

- Rural and suburban clinics: Being the primary market, CliniCare provides much needed digital solution for managing patient records in areas with limited access to proper health care.
- Medical camps and mobile clinics: CliniCare can be utilised by camps and other outreach initiatives to manage patient data and provide better care to distant and underserved communities.
- Pharmacies: CliniCare can help with patient data management and medication records in places where pharmacies offer basic healthcare services.
- Non-profits and NGOs: CliniCare can make data management and record-keeping easier in volunteer healthcare services in rural and underdeveloped areas.
- Nursing homes: In these situations, CliniCare can be used to manage residents' medical information and enhance the standard of care given.

PROBLEM STATEMENT

- Many local clinics across rural and suburban areas generally maintain patient records in physical form such as books and files. Many complications can arise such as loss or damage of patient records.
- While written data may not be as reliable, it is also not an efficient way to store in large number. As the number of records may increase, so would the unnecessary use of resources like paper, space, time, etc.
- The problem of data security, ineffectual healthcare systems, poor disaster recovery and time-inefficiency of maintaining physical records can be overcome by the following solution.

KEY NUMBERS

Approximately,

86% of medical visits in India are from individuals living in rural areas, with a majority travelling over 100 km to reach available healthcare facilities.*

And, nearly

90% of the population in rural and suburban areas in India is not covered by insurance.*

IDEA/APPROACH DETAILS

CliniCare is an apt solution for the said problem. It is an easy and accessible method for doctors to store the patient data locally. It addresses a need for improvement in technologies across clinics in underprivileged areas, and better treatment of patients' information. It also contains the following added features:

01.
Accessibility

Accessibility features in the app have been added so it is easy-to-use for everyone.

02.
Telemedicine integration

Patients can upload their prescription on the app and will be notified in advance when a stock refill is needed

03.
Patient Care

Patient data is constantly reviewed for trend changes, appointment-scheduling and prescriptions

04.
Financial aid

A renewed billing model is created where we integrate with external institutions like insurance providers, pharmacy outlets for better workflow.

TECHNOLOGY STACK

FLASK

Flask was used to build the web-applications

02

SQL

SQL has been used for database storage

04

01

HTML

HTML has been used to define the structure of the web content

03

CSS

CSS was used for the user-interface part of the program

05

PYTHON

Python to run the function. The updates on the site were added to the database
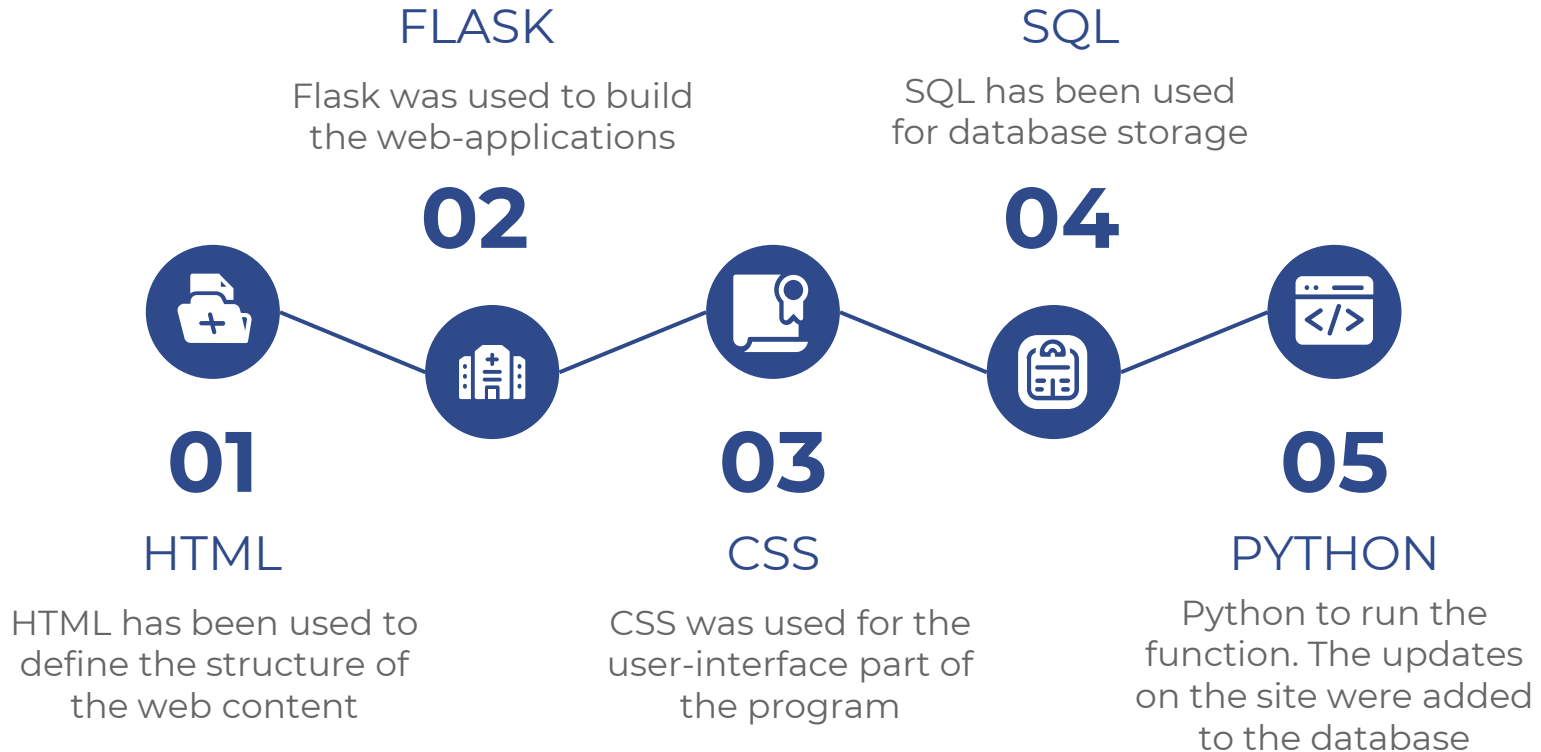
NOVELTY & FUTURE SCOPE

- <u>Market Expansion:</u> As the advancing digitization of healthcare continues to grow, the need of efficient data management grows with it. CliniCare can be used not only in rural and suburban areas but eventually in major hospitals and larger clinics.
- <u>Mobile apps:</u> Developing applications for CliniCare can make it more accessible and convenient for healthcare providers and users.
- AI and machine learning for predictive analytics and decision support to assist healthcare providers in diagnosis.
- Government healthcare initiatives create potential collaborations with larger healthcare programs.

According to **Rural Health Statistics, 2021-22**

Table 8.

SHORTFALL IN HEALTH FACILITIES AS PER MID YEAR POPULATION (as on 1st July 2022) IN INDIA IN RURAL AREAS

S.No.	State/UT	Estimated mid-year Population for Rural areas	Estimated mid-year Population for Tribal areas	Sub Centres R	P	S	% Shortfall	PHCs R	P	S	% Shortfall	CHCs R	P	S	% Shortfall
1	Andhra Pradesh	33904000	2235578	7078	11073	*	*	1167	1142	25	2	291	139	152	52
2	Arunachal Pradesh	1156000	856243	345	355	*	*	52	126	*	*	13	57	*	*
3	Assam	29996000	4101442	6546	4667	1879	29	1068	920	148	14	78	211	95	36
4	Bihar	110184000	1516410	22238	9375	12863	58	3698	1492	2206	60	924	269	655	71
5	Chhattisgarh	21892000	8073397	5454	5124	330	6	864	770	94	11	216	167	49	23
6	Goa	390000	61949	86	219	*	*	14	24	*	*	3	6	*	*
7	Gujarat	36601000	8462631	8448	9132	*	*	1361	1474	*	*	340	344	*	*
8	Haryana	17469000	0	3493	2653	840	24	582	394	188	32	145	129	16	11
9	Himachal Pradesh	6677000	404760	1389	2114	*	*	229	553	*	*	57	93	*	*
10	Jharkhand	28936000	9086894	6998	3848	3150	45	1115	291	824	74	278	171	107	38
11	Karnataka	37689000	3449898	7997	8757	*	*	1313	2138	*	*	328	182	146	45
12	Kerala	9312000	230835	1893	4933	*	*	314	780	*	*	78	211	*	*
13	Madhya Pradesh	61051000	16584104	14421	10287	4134	29	2311	1266	1045	45	577	332	245	42
14	Maharashtra	64945000	9501900	14255	10673	3582	25	2323	1853	470	20	580	256	324	56
15	Manipur	2168000	848401	546	393	153	28	86	74	12	14	21	8	13	62
16	Meghalaya	2640000	2378890	845	459	386	46	127	122	5	4	31	28	3	10
17	Mizoram	555000	536021	182	300	*	*	27	57	*	*	6	9	*	*
18	Nagaland	1222000	1134576	395	434	*	*	59	129	*	*	14	23	*	*
19	Odisha	37461000	9635546	8776	6688	2088	24	1409	1288	121	9	352	377	*	*
20	Punjab	17876000	0	3575	2951	624	17	595	422	173	29	148	150	*	*
21	Rajasthan	59111000	9977780	13152	13523	*	*	2136	2133	3	0	534	616	*	*
22	Sikkim	357000	130572	88	147	*	*	14	24	*	*	3	2	1	33
23	Tamil Nadu	35757000	634163	7235	8713	*	*	1202	1422	*	*	300	385	*	*
24	Telangana	20076000	2733521	4379	4229	150	3	714	578	136	19	178	28	150	84
25	Tripura	2533000	1043625	645	956	*	*	101	108	*	*	25	21	4	16
26	Uttarakhand	7445000	280175	1526	1785	*	*	252	531	*	*	63	52	11	17
27	Uttar Pradesh	178073000	1182140	35772	20781	14991	42	5955	2919	3036	51	1488	829	659	44
28	West Bengal	62707000	4896019	13194	10357	2837	22	2171	915	1256	58	542	348	194	36
29	A & N Islands	226000	25465	48	124	*	*	7	22	*	*	1	4	*	*
30	Chandigarh	1000	0	N App	N App	N App	N App	N App	N App	N App	N App	N App	N App	N App	N App
31	D & N Haveli and Daman & Diu	235000	153009	67	94	*	*	10	12	*	*	2	3	*	*
32	Delhi	105000	0	21	12	9	43	3	5	*	*	0	0	0	0
33	Jammu & Kashmir	9427000	1291499	2057	94	*	*	335	891	*	*	83	56	27	33
34	Ladakh	208000	208000	69	288	*	*	10	32	*	*	2	7	*	*
35	Lakshadweep	2000	1904	0	9	*	*	0	4	*	*	0	3	*	*
36	Puducherry	485000	0	97	53	44	45	16	24	*	*	4	3	1	25
	All India/ Total	898870000	101657344	193310	157935	48060	25	31640	24935	9742	31	7894	5480	2852	36

Note: The requirement is calculated using the prescribed norms on the basis of rural population estimates for the year 2022.
All India shortfall is derived by adding statewise figures of shortfall ignoring the surplus in some of the states.
Total year Tribal population for the year 2022 calculated based on the percentage of Tribal population in the Rural areas in Census 2011.
*R: Required; P: In Position; S: Shortfall; * : Surplus*
N App: Not Applicable

Comparative Statement 1.

NUMBER OF SCs, PHCs & CHCs FUNCTIONING in Rural Areas– I

S. No.	State/UT	2005 Sub Centre	PHCs	CHCs	2022 Sub Centre	PHCs	CHCs
1	Andhra Pradesh	12522	1570	164	11073	1142	139
2	Arunachal Pradesh	379	85	31	355	126	57
3	Assam	5109	610	100	4667	920	172
4	Bihar	10337	1648	101	9375	1492	269
5	Chhattisgarh	3818	517	116	5124	770	167
6	Goa	172	19	5	219	24	6
7	Gujarat	7274	1070	272	9132	1474	344
8	Haryana	2433	408	72	2653	394	129
9	Himachal Pradesh	2068	439	66	2114	553	93
10	Jharkhand	4462	561	47	3848	291	171
11	Karnataka	8143	1681	254	8757	2138	182
12	Kerala	5094	911	106	4933	780	211
13	Madhya Pradesh	8874	1192	229	10287	1266	332
14	Maharashtra	10453	1780	382	10673	1853	256
15	Manipur	420	72	16	393	74	8
16	Meghalaya	401	101	24	459	122	28
17	Mizoram	366	57	9	300	57	9
18	Nagaland	394	87	21	434	129	23
19	Odisha	5927	1282	231	6688	1288	377
20	Punjab	2858	484	116	2951	422	150
21	Rajasthan	10512	1713	326	13523	2133	616
22	Sikkim	147	24	4	147	24	2
23	Tamil Nadu	8682	1380	35	8713	1422	385
24	Telangana	-	-	-	4229	578	28
25	Tripura	539	73	10	956	108	21
26	Uttarakhand	1576	225	44	1785	531	52
27	Uttar Pradesh	20521	3660	386	20781	2919	829
28	West Bengal	10356	1173	95	10357	915	348
29	A&N Islands	107	20	4	124	22	4
30	Chandigarh	13	0	1	0	0	0
31	Dadra & Nagar Haveli	38	6	1	94	12	3
32	Daman & Diu	21	3	1			
33	Delhi	41	8	0	12	5	0
34	Jammu & Kashmir	1879	334	70	2429	891	56
35	Ladakh	-	-	-	288	32	7
36	Lakshadweep	14	4	3	9	4	3
37	Puducherry	76	39	4	53	24	3
	All India/ Total	146026	23236	3346	157935	24935	5480

Notes: Telangana came to existence in 2014 after bifurcation of Andhra Pradesh
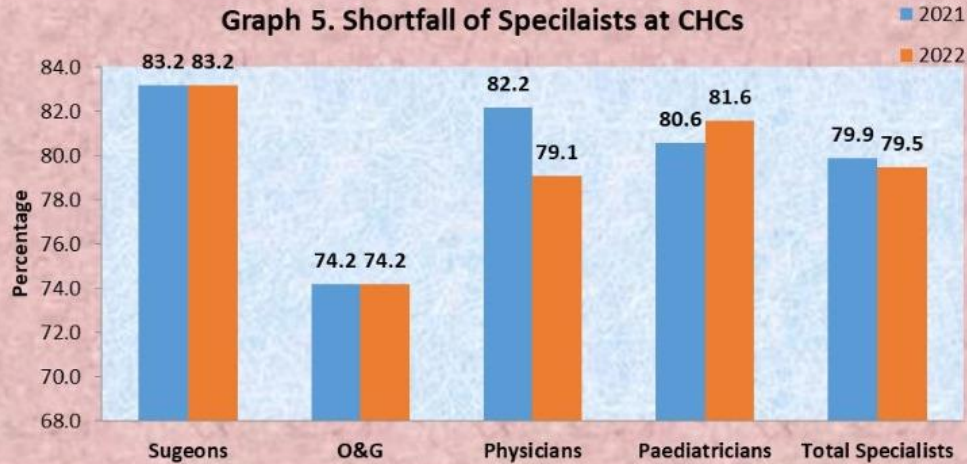*Jammu & Kashmir and Ladakh bifurcated and became UTs during Aug 2019.*
Dadra & Nagar Haveli and Daman Diu merged as single UT during Jan 2020.
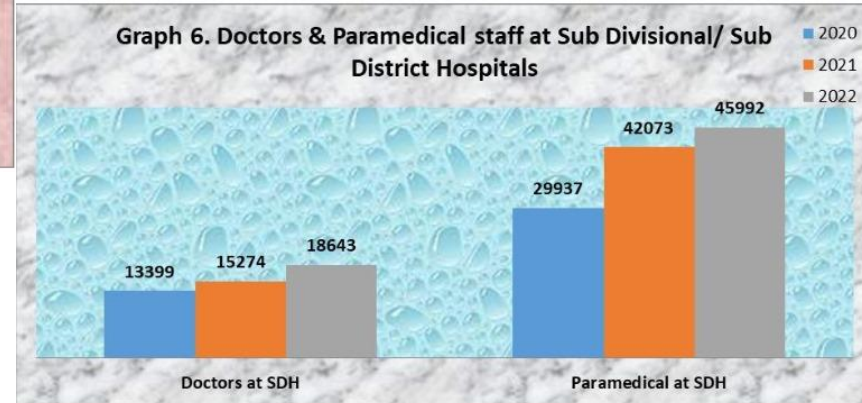
Description: *The given two tabular graphs showcase the total number of SCs, PHCs, CHCs in rural areas and the "Shortfall in health facilities in rural areas in mid-2022". This highlights why a more efficient, digitalized infrastructural alternative like CliniCare is required, despite arbitrary technological advances*

According to **Rural Health Statistics, 2021-22**

Graph 5. Shortfall of Specilaists at CHCs

- 2021
- 2022

	Sugeons	O&G	Physicians	Paediatricians	Total Specialists
2021	83.2	74.2	82.2	80.6	79.9
2022	83.2	74.2	79.1	81.6	79.5

Graph 6. Doctors & Paramedical staff at Sub Divisional/ Sub District Hospitals

- 2020
- 2021
- 2022

	Doctors at SDH	Paramedical at SDH
2020	13399	29937
2021	15274	42073
2022	18643	45992

Description: *The given two bar graphs indicate the shortfall of specialists at CHCs and doctors and paramedics at sub-district hospitals. The data has been derived from Rural Health Statistics for the year 2021-22 on January 12, 2023 by the Ministry of Health and Family Welfare, Govt. of India.*

CONCLUSION

CliniCare is an easy-to-use, effective patient database where users can access telemedicine facilities, data security and patient care at its finest. Especially beneficial for those in rural and sub-urban areas, CliniCare strives to be a sustainable and resourceful alternative to the conventional manual process of data entry.

THANK YOU!

A presentation by: Manas Lathkar and Pratik Turaga