

**Assessment of Non-Communicable Disease Clinic for Early
Detection and Management of Diabetes Comorbidity with
Tuberculosis in Chomu, Jaipur**

**A Capstone project submitted to
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Background

India is experiencing a dramatic transition in its health, with the burden of non-communicable infections surpassing that of communicable diseases including tuberculosis, the human immune virus, and other water- or vector-borne infections. Non-communicable diseases such as cardiovascular disease, cancer, chronic respiratory disorders, diabetes, and so on are thought to account for over 60% of all deaths [1]. As per the report published by Nepal Family Health Survey in 2019-21, one out of each five adults in 18 states/UTs has hypertension i.e., Systolic Blood Pressure 140mmHg and/or Diastolic Blood Pressure 90mmHg or is taking blood pressure medicine [2]. Overweight/obesity (measured as BMI 25kg/m^2) affects one out of every five people in most states/UTs [2]. Cardiovascular illnesses, cancers, diabetes, and chronic respiratory disorders accounted for 57% of overall pre-mature mortality in the 30-69 age range. In 2016, cardiovascular disease was responsible for 28.1% of DALYs, chronic respiratory illness was responsible for 10.9% of DALYs, and cancer was responsible for 8.3% of DALYs [3].

The available information indicates that people with diabetes have a two to three times higher risk of active TB than people without diabetes. Diabetes is thought to be the cause of 15-20% of all TB cases in India, according to modelling research. Recent data from Tamil Nadu and Kerala show that diabetes is quite common (25-44%) among TB patients. Furthermore, preliminary evidence suggests that diabetes impairs TB treatment results in terms of higher mortality, failure, and relapse rates. Diabetes is projected to become more prevalent in the next years. This could jeopardise the country's TB control efforts [4].

Cardiovascular disease is the foremost cause of death and morbidity, followed by chronic respiratory disorders, cancer, and diabetes. Millions of individuals have died early from various NCDs because of absence of high-quality medical facility and unaffordable increasing drug costs. Physical inactivity, a poor diet, cigarette use, and excessive alcohol use are the main risk factors[5].

NCDs have inequitable impacts, including indications of a problem in the community spectrum of hazardous variables & larger financial repercussions for minor families in India. Out-of-pocket expenses for the short term and prolonged impacts of non-communicable diseases are considerable, leading to state of devastating health conditions

spending for families. Currently impose a significant economic burden, which is expected to grow exponentially over the next two decades. For instance, in terms of the macroeconomic calculations estimate a cumulative production Over the next two decades, there will be a loss of \$47 trillion owing to cardiovascular illness, chronic respiratory disease, cancer, diabetes, and mental health. In 2010, this loss accounted for 75% of world GDP (US\$ 63 trillion) [6].

Chronic illness prevention in populations is a difficult endeavour that requires the involvement of many stakeholders to reduce biological and behavioural hazard elements for non-communicable diseases. Considering this, The National Program for Control of cancer, diabetes, cardiovascular diseases, and stroke was launched by Ministry of Health and Family Welfare of the government of India during the period of 2010-11 with the goals of preventing and controlling common non-communicable diseases through behavioural and lifestyle changes, in addition providing early diagnosis and management of common noncommunicable diseases. [7].

As March 2016, all 36 states and territories were implementing the strategy. 293 district non-communicable diseases clinics have been established, and there are 298 district non-communicable disease cells. The country also has 64-day care centres for cancer treatment and 103 operable cardiac care units for emergency cardiac care. Between 2015 and 2016, more over 1.29 crore persons underwent examinations at NCD clinics with such designation. Nearly 8% and 12%, respectively, of participants who attended the NCD Clinic had diabetes and hypertension. Additionally, over 13,000 people had common cancers, including oral, cervical, and breast cancers, and about 90,000 people had cardiovascular diseases. Through various outreach initiatives, such as in sites and Primary Health Care /Sub-Centre, about 96 lakh people were screened for common non-communicable diseases, and they were referred to higher-level centres for diagnosis and management [1].

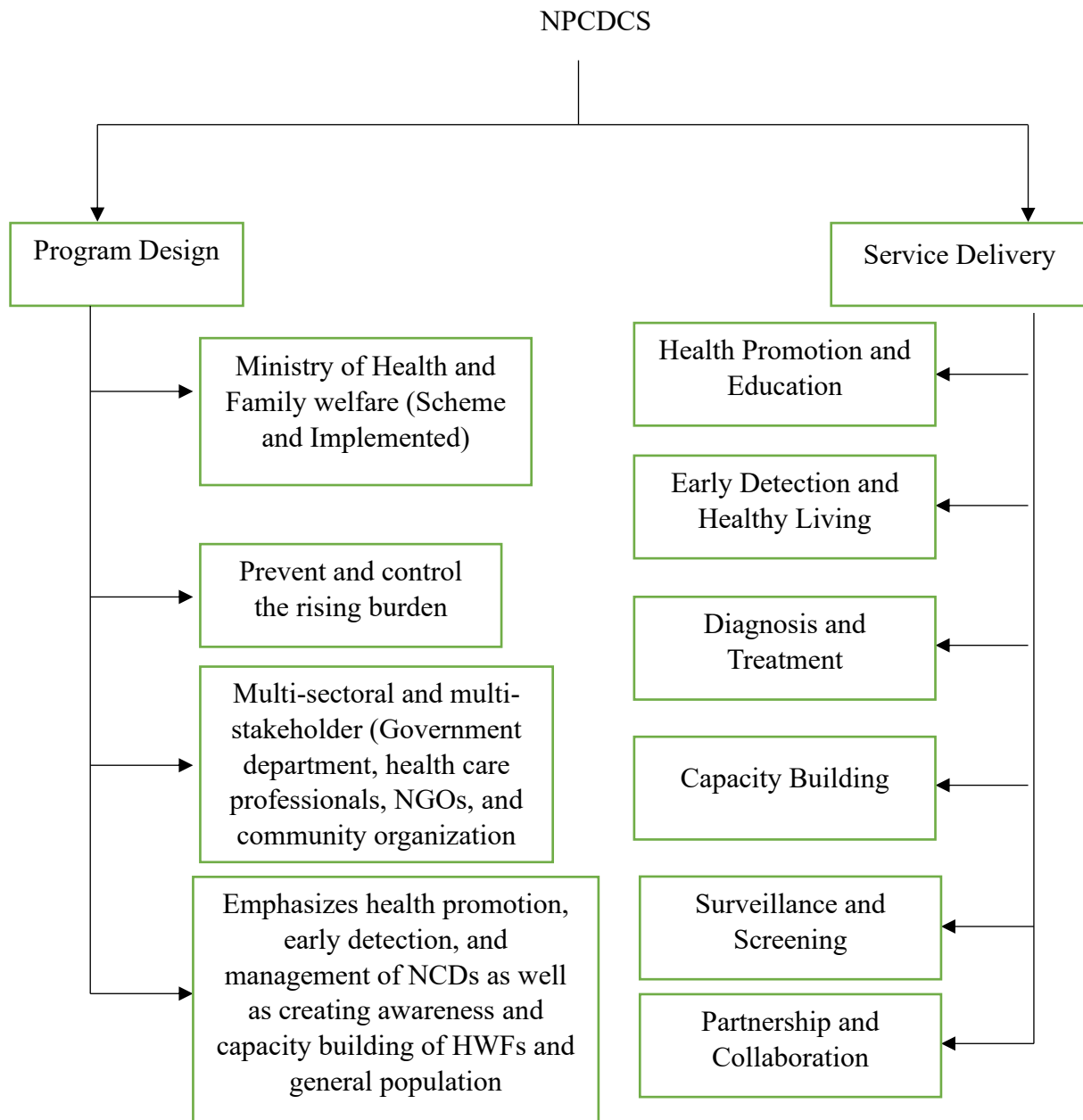
Under the NPCDCS, there have been established 5408 Community Health Centre NCD Clinics, 682 District Non-Communicable Diseases Clinics, and 191 District Cardiac Care Units. Overall, 7,04,631 Accredited Social Health Activists, 2,19,113 Auxiliary Nurse Midwives/Multipurpose Workers, 28,912 staff nurses, 76,567 Community Health Officers, and 29,648 Medical Officers have received training in the universal screening of common NCDs [2].

Similarly, NCDs raise the chance of death in patients with other infectious diseases such as tuberculosis and HIV [7]. Therefore, The Revised National Tuberculosis Control Programme and National Program for Control for Cancer, Diabetes, Cardiovascular diseases, and Stroke have been integrated as part of another initiative, and the "National Framework for Joint Tuberculosis-Diabetes Collaborative Activities" has been initiated as part of this effort to articulate a national strategy for "bi-directional screening," early detection, and better management of Tuberculosis and Diabetes Comorbidities in India [9].

Community Health Centre and general hospitals started operating non-communicable diseases clinics in 2016, and most of the staff working in these clinics was hired in 2016. How thoroughly this programme is assessed, followed, and enhanced will determine its outcome. It is now necessary to identify the obstacles in the implementation programme because the programme has been running for more than five years. [10].

Schematic Illustration depicting Program design and service delivery.

The National Program for Control of Cancer, CVDS, diabetes and stroke is institutionalising at the district level to integrate NCD interventions into the National Health Mission framework and ensure long-term sustainability. It will create a wider knowledge base in the community for effective prevention, detection, referrals, and treatment strategies, and build a strong monitoring and evaluation system [11].



Capstone work area with objectives of the Capstone Project

Millions of individuals have died prematurely from various NCDs because of absence of adequate medical services and unsustainable increasing drug costs, which is substantially impeding the social and economic growth of people, communities, nations, and the world [9]. Primary, secondary, and tertiary preventative methods are critical in reducing the burden of NCDs. Target 3.4 of the Sustainable Development Goals targets governments to reducing premature mortality from NCDs by one-third by 2030 compared to 2015 levels [8].

Objectives

The objective of capstone projects is given below: -

- To explore the implementation of Diabetes and Tuberculosis collaborative activities
- To identify the facilitating and hindering factors in the implementation of Diabetes and Tuberculosis collaborative activities

Capstone work area

The major focus work area was on “Diabetes co-infection with Tuberculosis”. Both diabetes and TB have significant global burdens, and coexistence of both diseases is a public health concern. Similarly, diabetes and tuberculosis (TB) are both major public health issues in India. Diabetes and tuberculosis are both common in India, and when they combine, they might pose distinct diagnostic and treatment issues.

Diabetes makes people more vulnerable to diseases, including tuberculosis. This is since high blood sugar levels can decrease the immune system, making the body's ability to fight infections more difficult. Furthermore, Tuberculosis might impair blood sugar control, making diabetes management harder.

Diabetes and tuberculosis co-occurrence has been identified as a significant issue in India's healthcare system. The country is projected to experience issues linked to the management and treatment of co-infected individuals.

Global health organizations, national health authorities, and healthcare systems have increased their focus on treating this co-occurrence because of the recognition of the link between diabetes and TB.

Therefore, to understand context of diabetes co-infection in terms of population background like economic, occupation, education, lifestyle and to identify implementation strategies of community health center at Chomu for the case detection, and management of the case was majorly focused as capstone working area.

Field visit documentation (Activity description)

Day-1:

- Brief meetings with community health centre supervisor regarding our objectives of CHC visit then took a tour and done introduction with each section head.

- Interview posted health professionals (counsellor, lab technician and ECG operator) in non-communicable disease clinic about the NPCDCS program.
- Observation of Lab, X-Ray, USG, ECG, and drug dispensary and filled the checklist according to format.
- Interviewed three patients of diabetes.
- Observed logistic management department.

Day-2:

- Visited to sub-centre i.e., health and wellness centre.
- Brief introduction about the objective of the visit to community health officer and conduct interview with one ANM and 2 ASHA in terms of their roles and responsibilities.

Day-3:

- Brief discussion about the objectives of our visit to CHC regarding the NPCDCS with medical officer in charge of non-communicable diseases clinic.
- Conducted interview with MO using set questionnaire after taking the consent.

Day-4:

- Conducted interview with a greater number of patients to explore more details regarding the understanding from receiver side.
- Interviewed physician in charge of the Tuberculosis clinic to understand how intra department works for strategic management of TB co-infection with diabetes and vice versa.
- At the end of visit day, met the CHC supervisor again and conduct a discussion session about the overview of the visit and voter of thanks for the support and coordination throughout the visit day.

Methods

Study area- Community Health Centre (NCDs clinic), Chomu, Jaipur, Rajasthan

Study period- 24th to 29th March 2023

Study participants- 1 Medical officer, 1 ASHAs, and 3 beneficiaries

Study design- Cross-sectional

Sampling- Purposive sampling technique

Data collection- key informant interview and observation (using open ended questionnaire and observation check list

Findings

Challenges
• Low budget allocation and utilization
• Mismanagement of patients flow in the clinic
• Lack of triage system
• Unavailability of patients record book for the common population
• Lack of regular training among health professionals of NCD clinics
• Tuberculosis stigmas discourage people from seeking care, delaying diagnosis, and starting treatment.
• Poor focus on health education and promotion
• Ineffective coordination between NCD clinic and Tuberculosis unit
• Vacant post of staff nurse as per sanctioned
• Screening of diabetes patients for Tuberculosis is not compulsion
• Accredited Social Health Activists have no formal responsibility in the delivery of NCD care.
Enablers
• Building relationships of trust with the community through ASHAs
• National framework for collaborating diabetes-tuberculosis activities
• Operational research to improve the implementation of Tuberculosis-diabetes initiatives
• Multi-sectoral approach to reduce morbidity and mortality due to NCD
• Message dissemination using many media, including electronic, multi-media, and print media
• Sensitization of field health personnel as part of routine training
• Every level of the health-care system, from sub-centres to hospitals, conduct outreach programmes for opportunity screening to identify patients who would benefit from early diabetes and tuberculosis diagnosis.
• Strengthen healthcare infrastructure particularly in rural areas

Important Challenges

1	Poor focus on health education and promotion
2	Ineffective coordination between NCD clinic and Tuberculosis unit
3	Lack of regular training among health professionals of NCD clinics mainly to Counsellor, lab technician
4	Accredited Social Health Activists have no formal responsibility in the delivery of NCD care.
5	Unavailability of patients record book for the common population

Suggestive action for challenges

Problems	Suggestive Actions	Feasibility	Priority
Poor focus on health education and promotion	Focus on active community participation and engagement for health promotion and early detection and management, basically community driven program	Swift	
	Developing IEC materials, tools, and focusing on proper counselling for individuals and community to explain the association between TB and diabetes highlighting health lifestyle, self-management, and adherence to treatment	Swift	
Ineffective coordination between NCD clinic and Tuberculosis unit	Create integrated information systems that enable patient data to be shared easily across NCD clinics and TB units.	Swift	

	• Improve the referral mechanism between the NCD clinic and the TB units to ensure prompt and appropriate patient transfer	Swift	
Lack of regular training among health professionals of NCD clinics mainly to Counsellor, lab technician	• Provision of compulsion refresh or update training	Swift	
	• Conducting webinar, conference, and so on using online media related to NCDs update and skill enhancement	Challenging	
Accredited Social Health Activists have no formal responsibility in the delivery of NCD care.	• Government should consider ASHAs as formal community health workers who provides NCDs related services	Challenging	
	• Distribution of roles and responsibility should be systematic; low workload burden	Challenging	
Unavailability of patients record book for the common population	• Provision of patients record book for general population which may help in follow-up and further treatment process too.	Swift	
	• Public private partnership for the effective digitalization record system for every individual's detail	Difficult	

Important Enablers

1	Building relationships of trust with the community through ASHAs
2	National framework for joint tuberculosis-diabetes collaborative activities
3	Operational research to improve the implementation of Tuberculosis-diabetes initiatives
4	Multi-sectoral approach to reduce morbidity and mortality due to NCD
5	Every level of the health-care system, from sub-centres to hospitals, conduct outreach programmes for opportunity screening to identify patients who would benefit from early diabetes and tuberculosis diagnosis.

Supporting action to sustain the best practices.

Best Practices	Supporting actions required to sustain the best practices
1. Building relationships of trust with the community through ASHAs	Performance-based reward for NCD-related services
	Better working conditions and more helpful supervision
	More opportunity for learning and career progression
2. National framework for joint tuberculosis-diabetes collaborative activities	Foster accountability and transparency
	Sensitized for political commitment or will
	Advocacy for allocation of budget and resources
3. Operational research to improve the implementation of Tuberculosis-diabetes initiatives	Investment on appropriate research for identify, and developing tools and strategies
	Public private partnership to conduct research
	Bringing expertise of research on board

4. Multi-sectoral approach to reduce morbidity and mortality due to NCD	Advocacy at policy level highlighting its significant
	Regular monitoring and evaluation to assess the impact of multi-sectoral approach
	Sustainable funding to support the approach
5. Outreach camps for opportunity screening across all levels of the health care delivery system, from sub-centres to hospitals, for early diagnosis of diabetes and tuberculosis.	Public private partnership to bring together resources, expertise, and funding
	Capacity building at various levels of health
	More focus on community driven program and activities

Conclusions

This report emphasized the significance of integrating diabetes screening and management into existing TB control programs to ensure early detection and proper treatment for people with both illnesses. It also emphasized the difficulties in managing diabetes and tuberculosis concurrently, such as a lack of awareness among community people, unavailability of patients record book, insufficient training of health care providers and a lack of a holistic care approach. Collaboration between the TB and diabetes programs, relationships with community healthcare professionals, and community involvement were highlighted as facilitating factors. It is critical to enhance a complete, multidisciplinary approach to TB control that includes diabetes screening, prevention, and care.

Recommendations

The following are the recommendations point: -

- To support effective and efficient health education and promotion, a multi-sectoral, multi-stakeholder initiative addressing the socioeconomic determinants should be prioritised.
- Supportive monitoring and supervision, regular training of healthcare workers, and management information system in terms of patients' record books for additional follow-up and medicines should be focused.

- Furthermore, community driven program with help of active community engagement should be highlighted to promote healthy lifestyles.

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Annexures

National Program for Control of Cancer, Diabetes, CVDs, and Stroke (NPCDCS)

PART- I -Service Statistics

	2020	2021	2022		Remarks
Eligible Population (for screening) in Catchment					
I. Persons Attending NCD Clinics (New and Follow up)					
II. Persons Newly Diagnosed with					
1. Diabetes Only					
2. Hypertension Only					
3. Diabetes & Hypertension					
4. CVDs					
III. Persons suspected of NCDs and referred to Higher facility for diagnosis					
1. Diabetes Only					
2. Hypertension Only					
3. Diabetes & Hypertension					
4. CVDs					
IV. New Patients initiated on Treatment					
1. Diabetes Only					
2. Hypertension Only					
3. Diabetes & Hypertension					
4. CVDs					

V. Patients on follow up					
1. Diabetes Only					
2. Hypertension Only					
3. Diabetes & Hypertension					
4. CVDs					
VI. Patients referred to SDH/DH for management					
1. Diabetes Only					
2. Hypertension Only					
3. Diabetes & Hypertension					
4. CVDs					
VII. Total Persons counselled from Health promotion and prevention of NCDs					

PART II- Provisions & Organization of Services

A	Laboratory	Options			
	No. of Lab Technicians	1 (NCD),			
1	Lab Technician Availability	24x7 ☒	Partial	Not Available	7 days 9:00 am-3:00 pm
2	Blood Sugar	Being Done ☒	Not Being Done	Approximate Number of Tests per day 80-100 person	If Not Done Specify Reason _____
3	Lipid Profile	Being Done ☒	Not Being Done	Approximate Number of Tests per day 10-15 person	If Not Done Specify Reason - not in NCD clinic but in main lab of CHC
4	Blood Urea	Being Done ☒	Not Being Done ☐	Approximate Number of Tests per day 40-45 person	If Not Done Specify Reason _____
5	Chest X Ray	Being Done ☒	Not Being Done ☐	Approximate Number of Tests per day 50-100 person	If Not Done Specify Reason _____
6	ECG	Being Done ☒	Not Being Done ☐	Approximate Number of ECG per day 20-25 person	If Not Done Specify Reason _____
7	USG	Being Done ☒	Not Being Done ☐	Approximate Number of ECG per day 65	If Not Done Specify Reason _____

A	Laboratory	Options			
8	a) Blood Samples: Usual Time to report (Ask the technician)				It is not done in NCD clinic but in CHC lab
	OPD Samples	Half Hrs			
	Field Samples	____Hrs			No sample from field
	b) Documentation (Check the register)				
	OPD Samples	Yes			Offline and online
	Field Samples				
9	Training of LTs in past five years	Yes	No ☒	Remarks for only LT those who works in lab except NCD clinic lab	
10	Resource Availability				
	a) Functional Glucometer	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	b) Glucometer Strips	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	c) Lancets	Yes ☒ No ☐	No issues		
	d) ECG paper Rolls	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	e) X Ray Films	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☒ No ☐		

A	Laboratory	Options			
11	There is arrangement for segregation of BMW at the site.	Yes ☐ No ☒			

B	OPD and Service Provision Area				
1	IEC Related to NCDs displayed in Facility	Yes ☒ No ☐			
2	Functional BP Apparatus	Yes ☒ No ☐			
3	Separate NCD Clinic functional	Yes ☒ No ☐			
4	Counsellor Posted	Yes ☒ No ☐			
5	Designated Nurse for NCD services at Clinic	Yes ☐ No ☒			
C	Drug Dispensing				
1	Drug Availability				
	a) Tab Aspirin	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	b) Tab Atenolol	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	c) Tab Metoprolol	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	d) Tab Amlodipine	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	e) Tab Enalapril	Yes ☐ No ☒	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒		
	f) Tab Hydrochlorthiazide	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐		

			No ☒	
	g) Inj Streptokinase 7.5 Lac / 15 Lac U	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	h) Inj Heparin Sodium 1000 IU	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	i) Inj Insulin Regular / Intermediate	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	j) Tab Metformin	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	k) Tab Isosorbide Dinitrate	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	l) Tab Digoxin	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	m) Inj Digoxin	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	n) Inj Mannitol 20% 300 ml	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	o) Inj. Adrenaline	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	
	p) Inj Atropine	Yes ☒ No ☐	Supply Issues / Stockouts in Past (Ask) Yes ☐ No ☒	