

Mission Statement

To increase the timely collection of sputum samples* from Respiratory Medicine patients in General Ward (GW) isolation beds with suspected pulmonary tuberculosis from 14% to 60% (stretch goal 80%) in 6 months.

* 2nd sputum sample for acid fast bacilli smear/culture/TB PCR collected within 24 hours of admission to GW isolation bed

Team Members

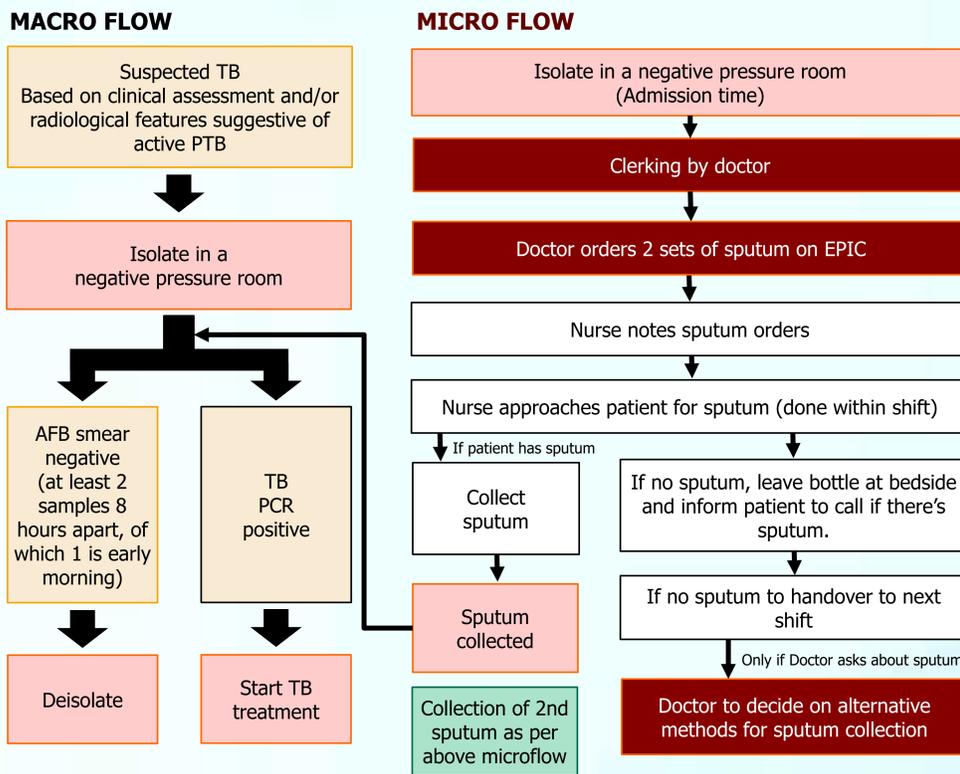
	Name	Designation	Department
Team Leaders	Dr Choong Caroline Victoria	Consultant	RCCM
	Ms Wang Xiao Na	Advanced Practice Nurse	Nursing Service
Team Members	Dr Mathew Sachin Philip	Senior Resident Physician	RCCM
	Dr Angeline Tey Jie-Yin	Senior Resident	RCCM
	Ms Tan Chong Sin	Senior Staff Nurse	Ward 8C
	Ms Jenny Pang	Senior Staff Nurse	Clinic 4A
	Ms Prema Soria Vairamoorthy	Senior Staff Nurse	Ward 5B
	Dr Ashvin Vardza Raju	Senior Resident	Emergency Medicine
	Ms Subramanian Nagajothi	Nurse Clinician	

Sponsor: Adj A/Prof Pua Ser Hon (Head of Department, RCCM)

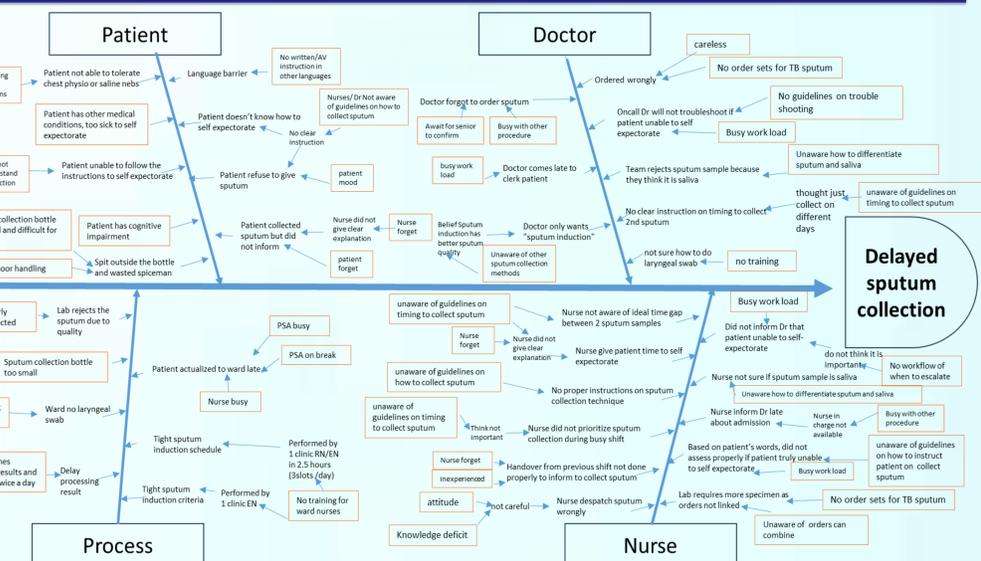
Evidence for a Problem Worth Solving

- Pulmonary Tuberculosis (PTB) is an airborne disease. Inpatients with suspected PTB are isolated until 2 sputum samples are collected. Timely sputum collection enables early diagnosis and treatment for TB cases, or prompt deisolation for non-TB cases.
- Delays in collection can prolong isolation unnecessarily which not only affects individual patient outcomes but also reduces isolation bed availability and strains hospital resources. At our institution, baseline data showed that only 14% of Respiratory Medicine inpatients had two sputum samples collected within 24 hours of admission.

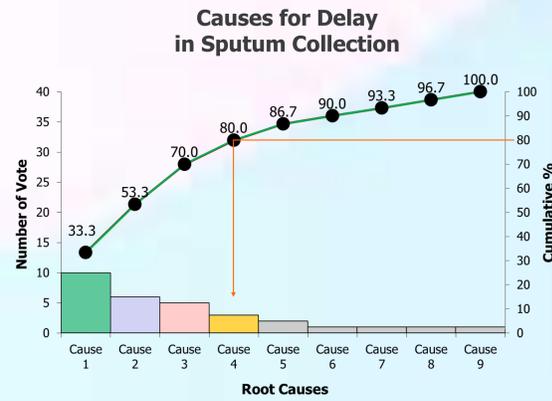
Flow Chart of Process



Cause and Effect Diagram



Pareto Chart



Rank	Causes
1	Unaware of guidelines on sputum collection (self-expectoration technique)
2	Lack of guidelines on troubleshooting if unable to self expectorate
3	Unaware of guidelines on timing of sputum collection
4	No nursing workflow on when to escalate if no sputum
5	No sputum induction training for ward nurses
6	No Epic order set for sputum
7	No written/AV instructions in different languages
8	Sputum induction in 4A has strict criteria (performed by EN)
9	Limited sputum induction slots

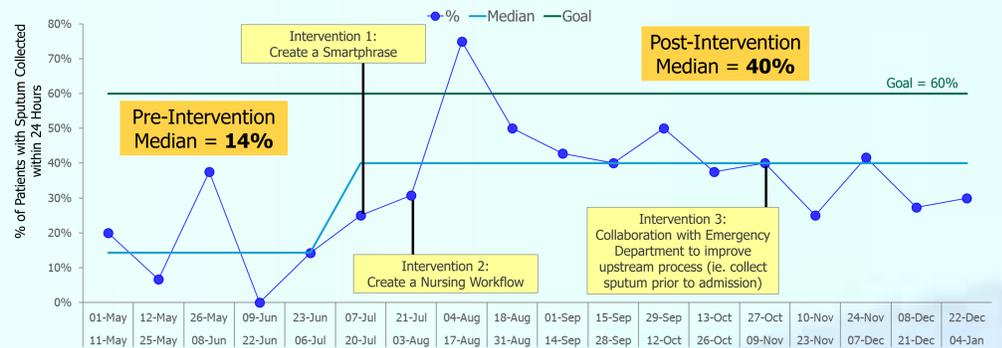
Implementation

Root Cause	Intervention	Implementation Date
Cause 1: Unaware of guidelines on sputum collection (self-expectoration technique)	Intervention 1: Create a Smartphrase	15 Jul 2024
Cause 2: Lack of guidelines on troubleshooting if unable to self expectorate	Intervention 2: Create a nursing workflow	29 Jul 2024
Cause 3: Unaware of guidelines on timing of sputum collection	Intervention 3: Collaboration with Emergency Department to improve upstream process, and to collect sputum prior to admission.	28 Oct 2024
Cause 4: No nursing workflow on when to escalate if no sputum		

Results

Percentage of Patients with 2nd Sputum Collected within 24 Hours

Period: 1 May 2024 to 14 Jan 2025



From To	01-May 11-May	12-May 25-May	26-May 08-Jun	09-Jun 22-Jun	23-Jun 06-Jul	07-Jul 20-Jul	21-Jul 03-Aug	04-Aug 17-Aug	18-Aug 31-Aug	01-Sep 14-Sep	15-Sep 28-Sep	29-Sep 12-Oct	13-Oct 26-Oct	27-Oct 09-Nov	10-Nov 23-Nov	24-Nov 07-Dec	08-Dec 21-Dec	22-Dec 04-Jan
Total	5	15	8	5	7	4	13	4	4	7	5	4	8	5	8	12	11	10
<24 Hours	1	1	3	0	1	1	4	3	2	3	2	2	3	2	2	5	3	3

Cost Savings

	Pre-Intervention	Post-Intervention
Patient-Isolation Duration	96 hours	76 hours
Patient-Isolation in terms of bed days saved in 1 Year	(96 hours – 76 hours) x 76 (patients over 8-month period) = 95 isolation bed-days saved	
In Monetary Terms	\$99,370	

Unit Cost for Isolation Bed Per Patient Day = \$1,046

Lessons Learnt

- True change comes when systems practices and culture are changed
- To stay updated on best clinical practices
- Change is never easy, however even simple interventions can make a difference to hospital bed wait time and speed up patient's care.
- Importance of multidisciplinary and multidepartment collaboration
- PDSA cycle is useful to come up with most suitable interventions

Strategies to Sustain

- Work with Epic to build collection instructions into an order set
- Create a nursing workflow and formalize a work instruction
- ED sputum collection
 - Work on posters in different language
 - Work on instructional videos