PP18

IMPROVING SPECIMEN MANAGEMENT VIA HOSPITAL INFORMATION SYSTEM (eHIS) IN PATHOLOGY DEPARTMENT, HOSPITAL SUNGAI BULOH

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1. SELECTION OF OPPORTUNITIES FOR IMPROVEMENT

• In Hospital Sungai Buloh, every **in-house specimen** that has been ordered needs to be recorded as **collected** and **dispatched** in Hospital Information System (eHIS). Specimens sent to the lab that were not recorded properly in eHIS will be **unrecognized and unable to be registered** in Laboratory Information System (LIS). Late in registration will cause delay in analyzing and reporting the test. Hence, this causes a significant delay in patient care including monetary and time wastage.

1.1 PROBLEM IDENTIFICATION & PRIORITISATION

Problem	S	M	A	R	T	Score
High rate of rejection for clotted or lysed specimens	15	15	15	10	15	70
High number of inappropriate request for vitamin B12 and folate	15	10	15	10	15	65
High volume of unmanaged in-house specimens	15	15	15	15	15	75
Poor smear quality of external FBP slides	15	10	15	10	15	65
High incidence of elevated temperature for external specimens	15	10	15	10	15	65
Rating scale: Low - 1, Medium - 2, High – 3			5 group members			

1.2 PROBLEM VERIFICATION

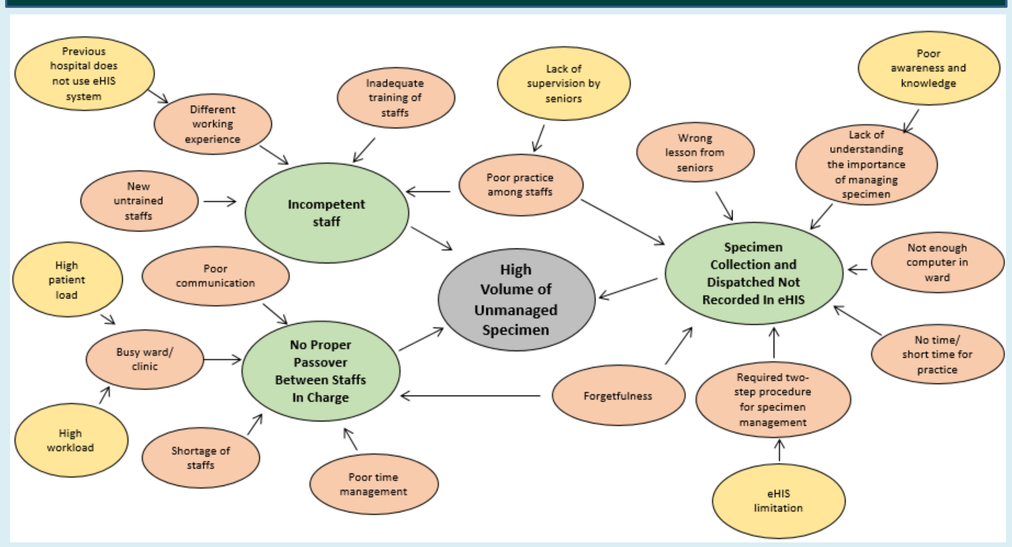
No	Problem	Problem Verification
1.	High rate of rejection for clotted or lysed specimens	1.9% of specimens received were rejected due to clotted or lysed from Jan-Feb 2022. Throughout 2021, the data for clotted & lysed samples were <1%.
2.	High number of inappropriate request for vitamin B12 and folate	61% of vitamin B12 and folate assay specimens were noted to be inappropriate request. Clinical audit done in 2020 showed reduction in inappropriate request to 32% post intervention.
3.	High volume of unmanaged in-house specimens	**1.04%** (**6477** specimens, estimating **RM19431** monetary wastage & **2159 hours**) of total in-house specimens received throughout 2021 were unmanaged. Clinical audit in 2019 showed **no changes** in the percentage of unmanaged specimen pre and post intervention.
4.	Poor smear quality of external FBP slides	21% of external FBP slides showed poor smear quality in 2021. Virtual workshop on preparation of blood film done in August 2021 with Hospital Tanjung Karang. Post intervention showed 75% improvement in quality of blood smear (21% → 15.7%).
5.	High incidence of elevated temperature for external specimens	2.9% of external specimens had elevated temperature upon arrival to Pathology department Hospital Sungai Buloh (>8'C) in 2020. Clinical audit done showed 64% improvement post intervention (2.9% → 1.2%).

1.3 PROBLEM STATEMENT

- Data taken from January to February 2022 in Pathology Department showed high volume of in-house unmanaged specimens in eHIS.
- This will cause delay in patient's care and unnecessary monetary and time wastage.
- Multiple factors including poor understanding and lack of awareness among doctors and staffs involves in ordering test and managing in-house specimens, and Hospital Information System (HIS) limitation contributed to this problem.
- This study aim to improve in-house specimen management via eHIS in Hospital Sungai Buloh.

2. KEY MEASURES FOR IMPROVEMENT

2.1 PROBLEM ANALYSES CHART



2.2 STUDY OBJECTIVES

GENERAL

• To reduce the percentage of unmanaged in-house specimens via eHIS in Hospital Sungai Buloh

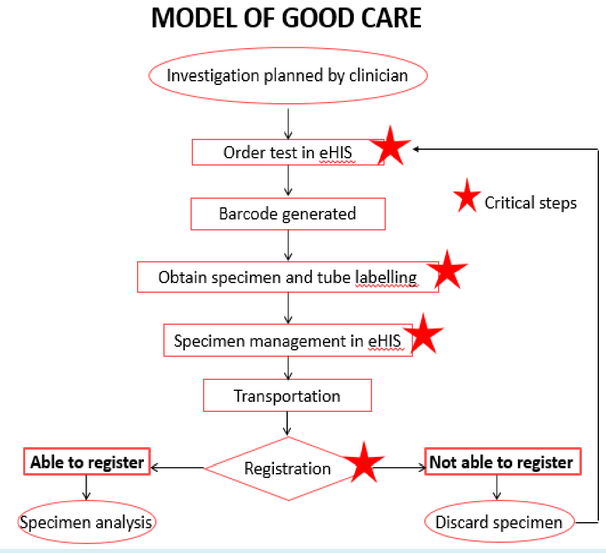
SPECIFIC

• To **verify** the percentage of in-house specimen management via eHIS
• To **identify** the contributing factors to high percentage of unmanaged in-house specimens via eHIS
• To **formulate** and **implement** remedial action in improving in-house specimen management via eHIS
• To **evaluate** the effectiveness of the remedial actions taken

2.3 INDICATOR AND STANDARD

INDICATOR	Percentage of unmanaged in-house specimens via eHIS in Hospital Sungai Buloh
FORMULA	Number of unmanaged in-house specimens / Total of in-house specimens received by laboratory X 100 %
STANDARD	To achieve <0.3% of unmanaged in-house specimens [1]

2.4 WORK PROCESS FLOW CHART



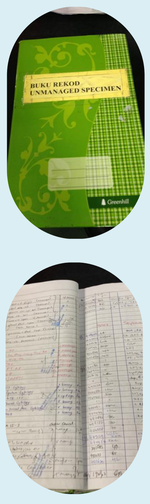
1.4 KEY TERMS & DEFINITION

Key Terms	Definition
In-house specimen	Specimen that are ordered by clinicians using the Hospital Information System (eHIS) for their patients in Hospital Sungai Buloh.
Specimen management	Once specimen is ordered, specimen is managed by recording it as collected and dispatched. Both options are done by clicking specific buttons in the Hospital Information System (eHIS).
Unmanaged specimen	Unrecognized and unable to be registered specimen in Laboratory Information System (LIS) due to incomplete specimen management

Scan QR Code for step by step on how to manage specimen

3. PROCESS OF GATHERING INFORMATION

Study Design	Quality improvement study
Sampling technique	• Convenient sampling
Inclusion Criteria	• All in house specimen received at the Hospital Sungai Buloh laboratory ordered by clinicians using the Hospital Information System (eHIS)
Exclusion criteria	• External specimens – specimen
Method of collecting data	• Hospital Information System (eHIS) • Laboratory Information System (LIS) • Record book
Duration of study	• 2 months: Verification study (Jan – Feb 2022) • 2 months: Remedial measures (Mar-Apr 2022) • 2 months: Post remedial data analysis Cycle 1 (May – June 2022) • 2 months: Post remedial data analysis Cycle 2 (May – June 2023) • 2 months: Post remedial data analysis Cycle 3 (Nov – Dec 2023)

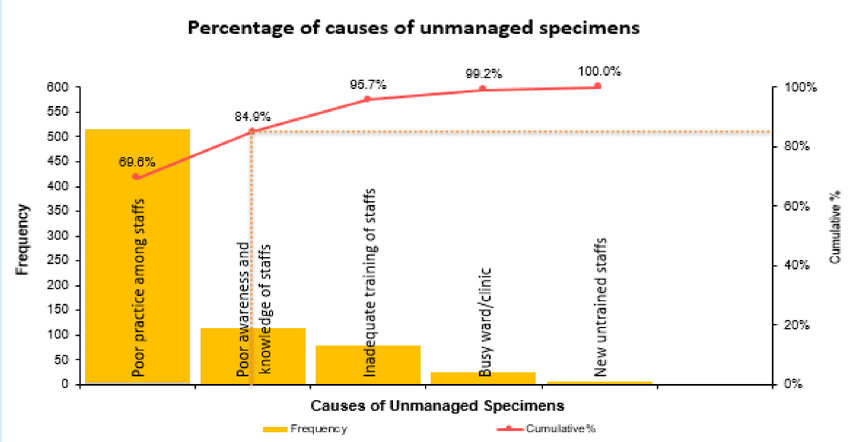


4. ANALYSIS & INTERPRETATION

4.1 VERIFICATION TOOLS

Problem	High volume of unmanaged specimens via eHIS in Hospital Sungai Buloh	
Factors identified	Staff knowledge, awareness	Staff adherence to SOP and proper practices
Variables need to be collected	• Level of knowledge and awareness on process of managing specimen	• Standard of practice applied in clinics and wards
Data collection tool	• Questionnaire (via Google forms to clinicians) • Phone interview	• Ward/clinic visits

4.2 PARETO CHART

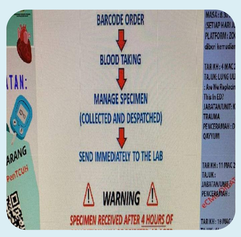


MODEL OF GOOD CARE

No	Critical Steps	Criteria	Standard	Verification	Post Remedial Action Cycle 1 (May-June '22)	Post Remedial Action Cycle 2 (May-June '23)	Post Remedial Action Cycle 3 (Nov -Dec'23)
1.	Order test in eHIS	Investigation planned by clinician during ward round	100%	100%	100%	100%	100%
		Plan documented properly in eHIS	100%	65%	85%	87%	89%
2.	Obtain specimen and tube labelling	Proper passover between clinicians to obtain specimen	100%	50%	89%	91%	93%
		Specimen obtained by clinicians and labelled properly	100%	85%	95%	94%	95%
3.	Specimen management in eHIS	Clinician must record collection and dispatched the specimen in eHIS immediately	100%	30%	99%	99%	99%
4.	Registration	All managed specimens able to be registered in LIS within 2 hours from collection time	100%	85%	98%	99%	99%

5. STRATEGIES FOR CHANGE

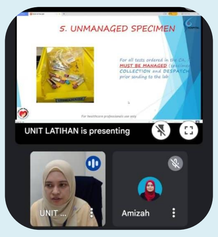
Whatsapp Group with clinicians and person in-charge of ward/ED/clinic



Desktop reminder

Computer at Lab counter for clinicians to manage the samples immediately

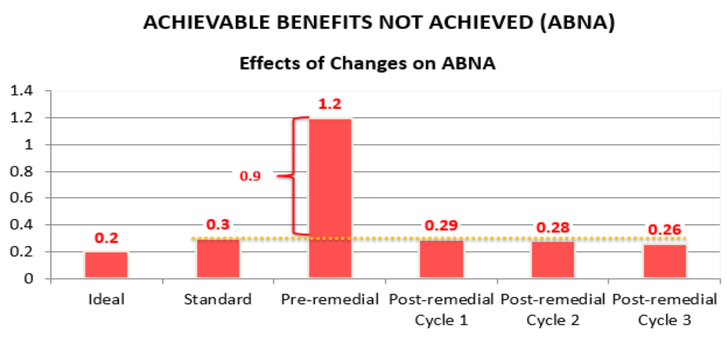
Reminder Sticker on pneumatic tube



Hospital CME

House Officers' Orientation

6. EFFECTS OF CHANGE



Percentage of unmanaged specimens improves from **1.2% to 0.29%** and sustained at 0.28% and 0.26%.

ESTIMATED AMOUNT AND TIME THAT HAVE BEEN WASTED

Year	Number of Unmanaged Specimens	Material Cost (RM)	Time Wasted (Hours)
2019	7514	22542.00	2505
2020	4591	13773.00	1530
2021	6477	19431.00	2159
2022	3582	**10746.00** ↓	**1198** ↓
2023	3306	**9918.00**	**1102**

Note:- RM3.00 per specimen wasted (tube + syringe + needle + alcohol swab + gloves)
- Total time spent: 20 min per specimen

7. LESSON LEARNT AND NEXT STEPS

- This project is cost and time saving and improves patient's care. However, it is limited by eHIS system and is beyond the scope of Pathology department.
- Moving forward, we can spread more awareness (i.e. bunting, poster) and do regular audit on specimen management in collaboration with clinicians
- We plan to share ideas to overcome similar problem to other hospital through technical meetings

Acknowledgements

Dr Sahlawati Mustakim (Head of Pathology Department)	Dr Imran & Dr Dhaniah (Facilitator Unit Kualiti Hospital Sungai Buloh)
Counter & Outsource Unit, Pathology Department	Jawatankuasa Kualiti, JKN Selangor

Scan our Pathology Service Handbook QR code!

Reference:
1. Hawkins R. Managing the pre- and post-analytical phases of the total testing process. *Ann Lab Med*. 2012;32(1):5-16. doi:10.3343/alm.2012.32.1.5

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