



Spirometry in Primary Care: A new service model

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Background

Spirometry is an essential investigation tool in the diagnosis of lung diseases whereby the volume of air that the patient expels from the lungs after a maximal inspiration, is measured. It is the best standardized, reproducible, and objective measurement of airflow limitation and have withstood the test of time since its introduction in 1846. In the context of asthma, spirometry is helpful in establishing the diagnosis by confirming the presence of variable expiratory airflow. For COPD, the objective assessment of post spirometry FEV1/FVC is required to confirm the diagnosis.

It has been reported that spirometry is under-utilised in primary care worldwide. In Singapore alone, only 2% of all COPD cases had spirometry performed. The under-utilisation of spirometry leads to missed intervention opportunities or inappropriate treatment given to patients. In primary care setting, several reasons for the underuse of spirometry have been reported such as time constraints, staffing issue, equipment quality and control, and inadequate training in data interpretation. This study evaluated a new program at Sengkang General Hospital offering direct referral pathways for spirometry testing by primary care physicians.

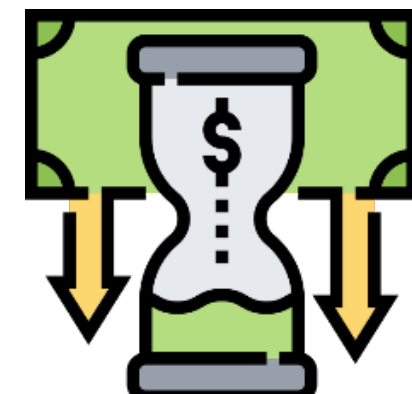
Aim

- To offer an avenue for primary care physicians to refer patients for direct spirometry
- To allow for continued management of patients under the care of primary care physicians
- To reduce time and costs for patients by up to 20%

Methodology



398 SingHealth Polyclinics (SHP) patients showed up for Spirometry test between Apr 2020 to Sep 2023



Compared time and cost savings for patients



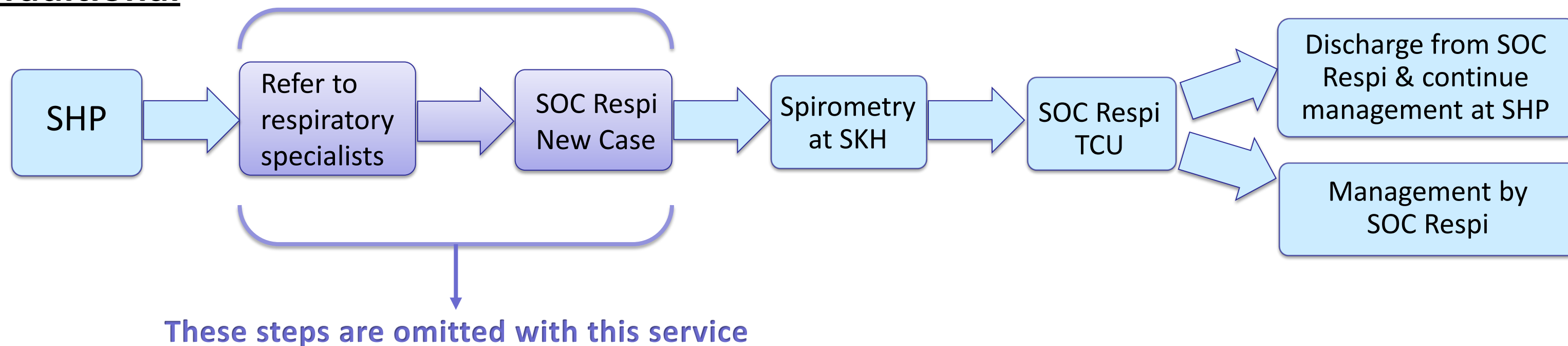
Analyzed spirometry results and the number of referrals and non-referrals to respiratory specialists



Collected feedback surveys from 164 patients to understand patients' sentiments

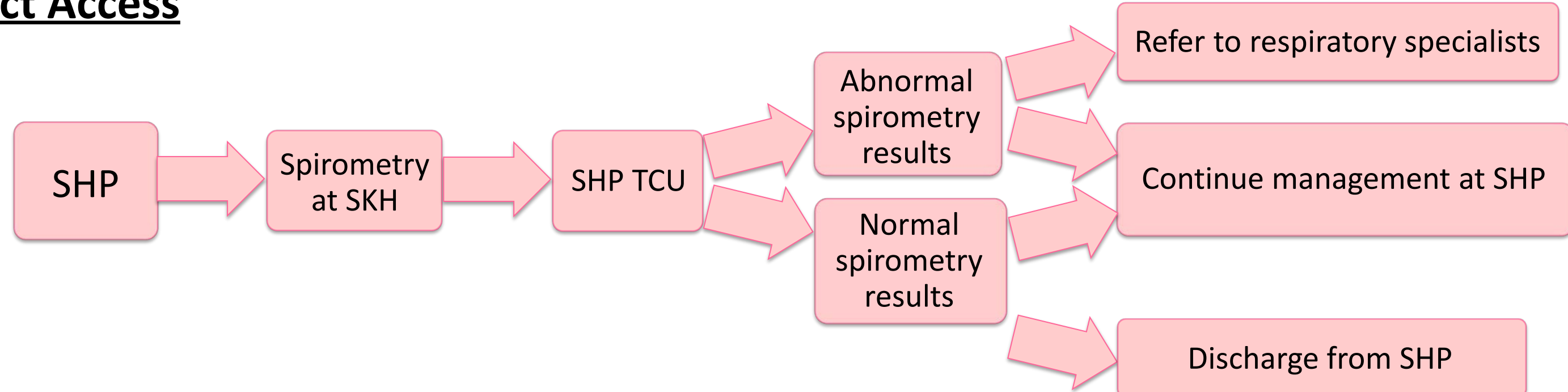
Patient Journey

Traditional



These steps are omitted with this service

Direct Access



Results

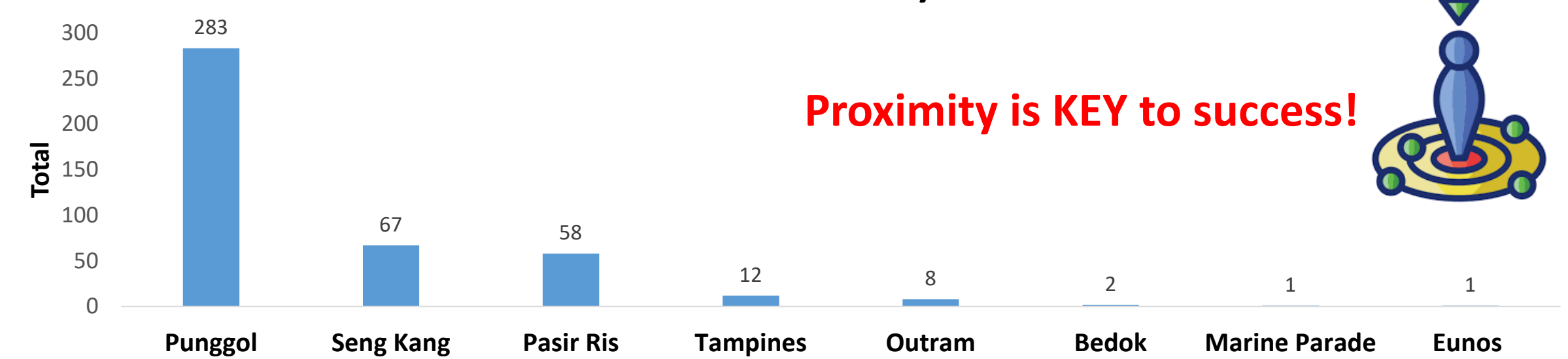
Patient Demographics (n = 398)

Gender	Total (%)
F	53
M	47

Race	Total (%)
Chinese	58
Malay	25
Indian	10
Other Races	7

Clinical Diagnosis at Point of Referral	Total (%)
Asthma	75
COPD	9
Asthma and/or COPD	4
SOB	2
Chronic cough	5
Others	4
No diagnosis	1

Referral Source of Polyclinics

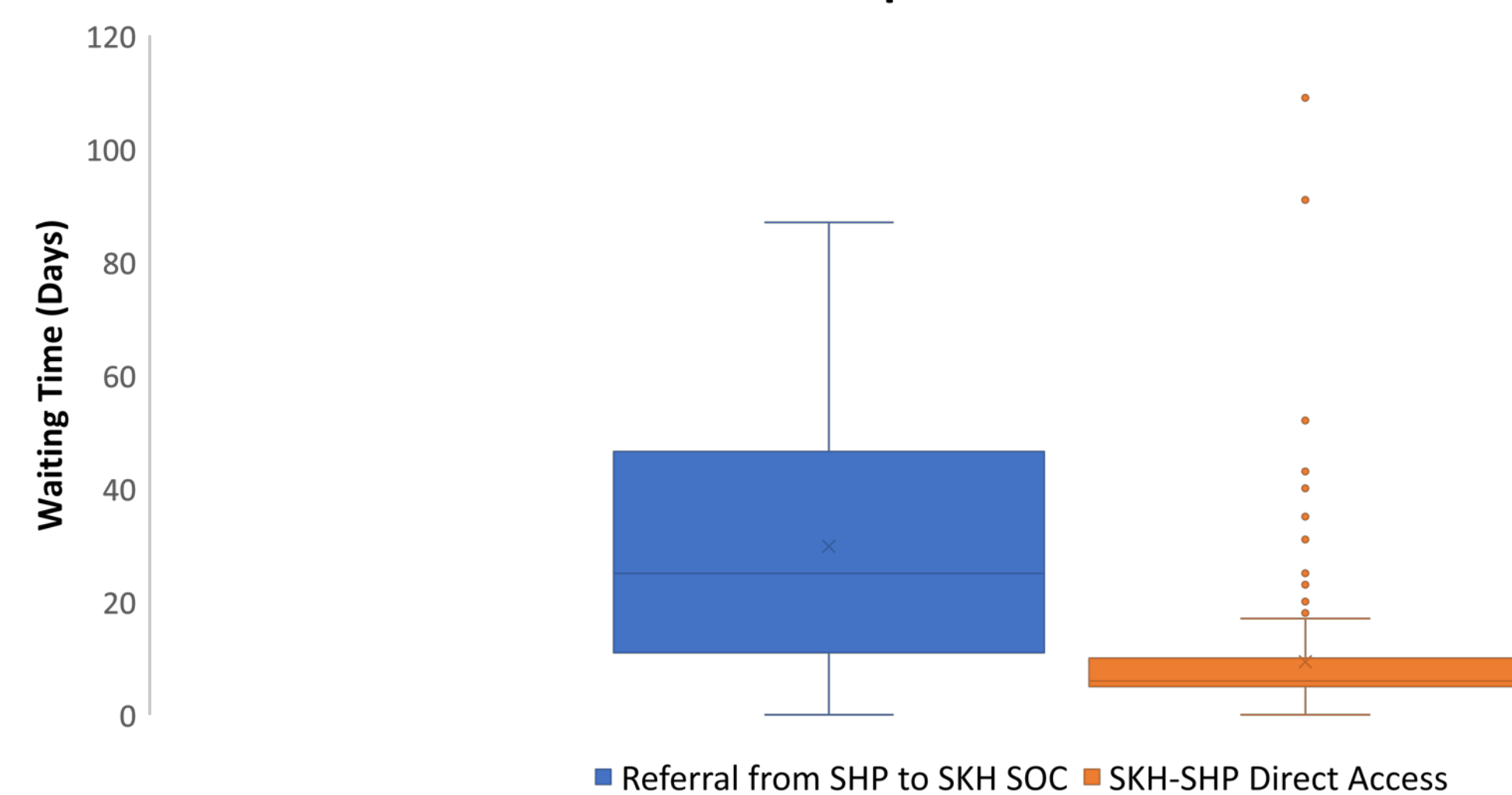


Proximity is KEY to success!



Time Savings

Box Plot Comparison between Services

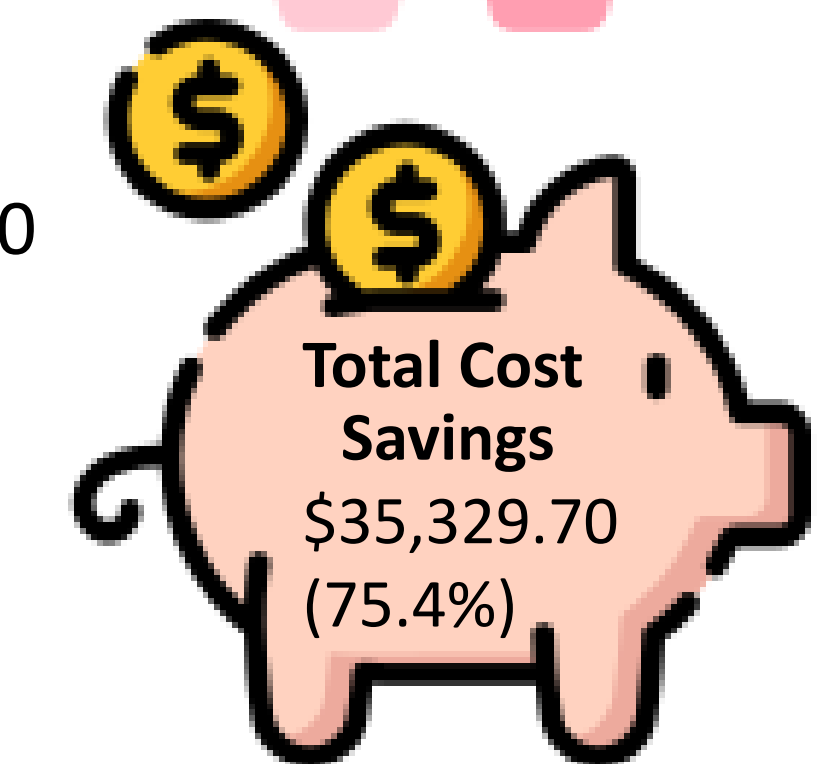


Traditional:
Mean = 29.8, Standard deviation = 21.5
Direct Access:
Mean = 9.4, Standard deviation = 11
P-value from t-test is less than expected value of 0.5. Significant difference do exist!



Cost Savings

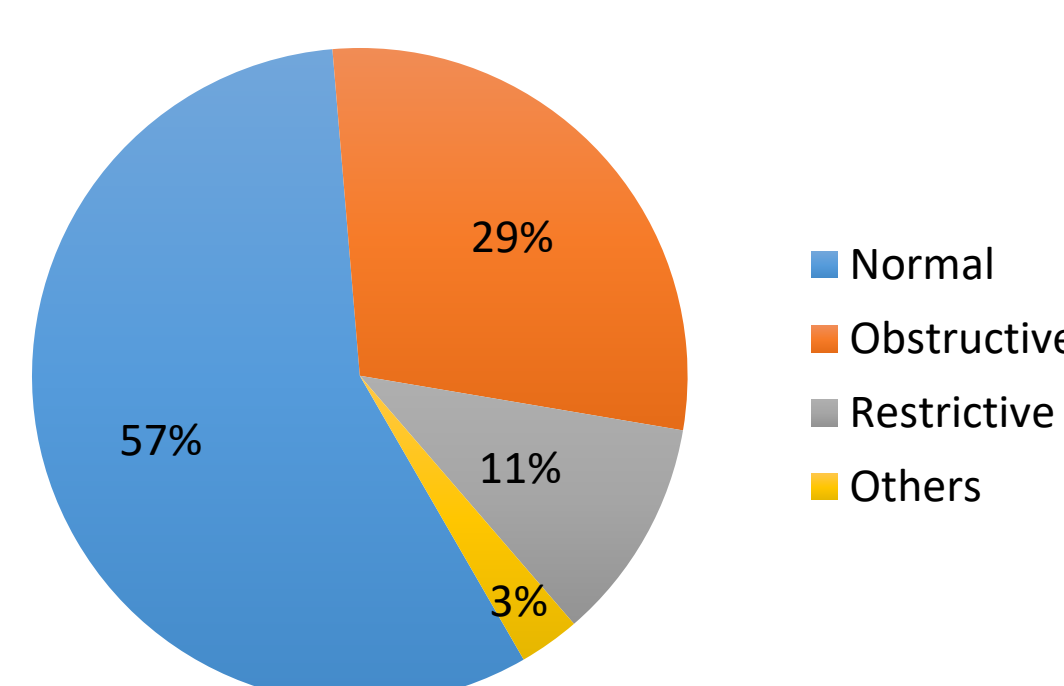
Cost savings per patient = Consultation Fees (\$119.30) + Transport Fees (\$3.80) = \$123.10



Referrals for Specialist Care

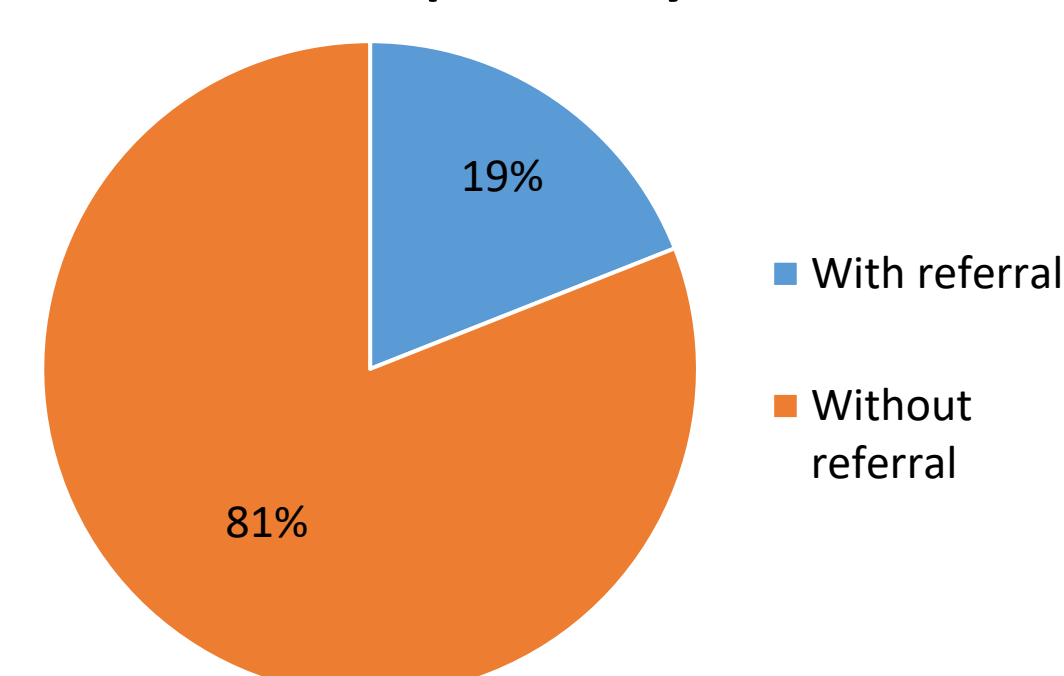
Referrals to Respiratory Specialists	Total
Yes	109
No	287
Unreported Spirometry Results at SHP TCU	2

Overall Spirometry Results

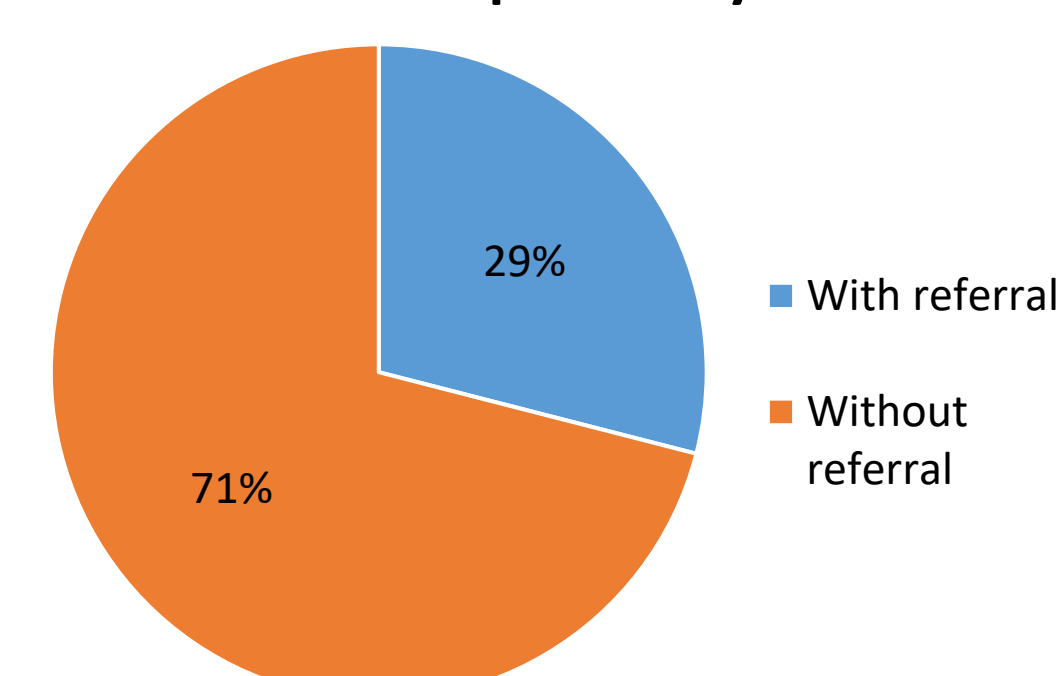


- For those with abnormal obstruction results, only 29% were referred for specialist care suggesting that primary care physicians are comfortable with managing patient with obstructions pattern (indicative of asthma and COPD).
- For those with abnormal restrictive results, majority (71%) were referred for specialist evaluation. This is likely due to the need for further testing such as Lung Volume Study to confirm the restrictive defects.

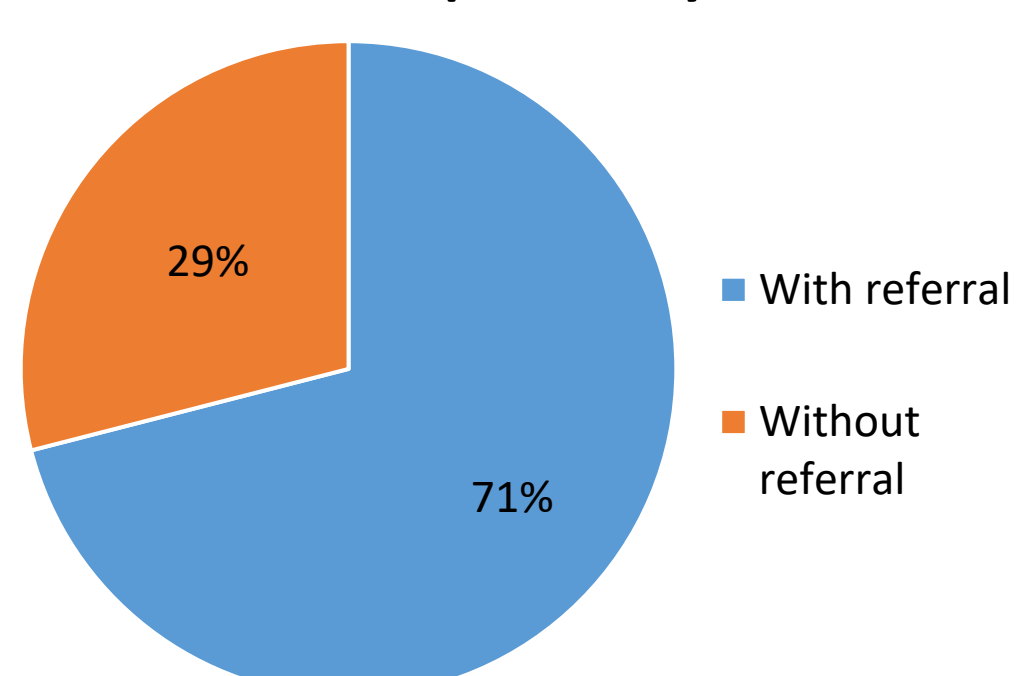
Normal Spirometry Results



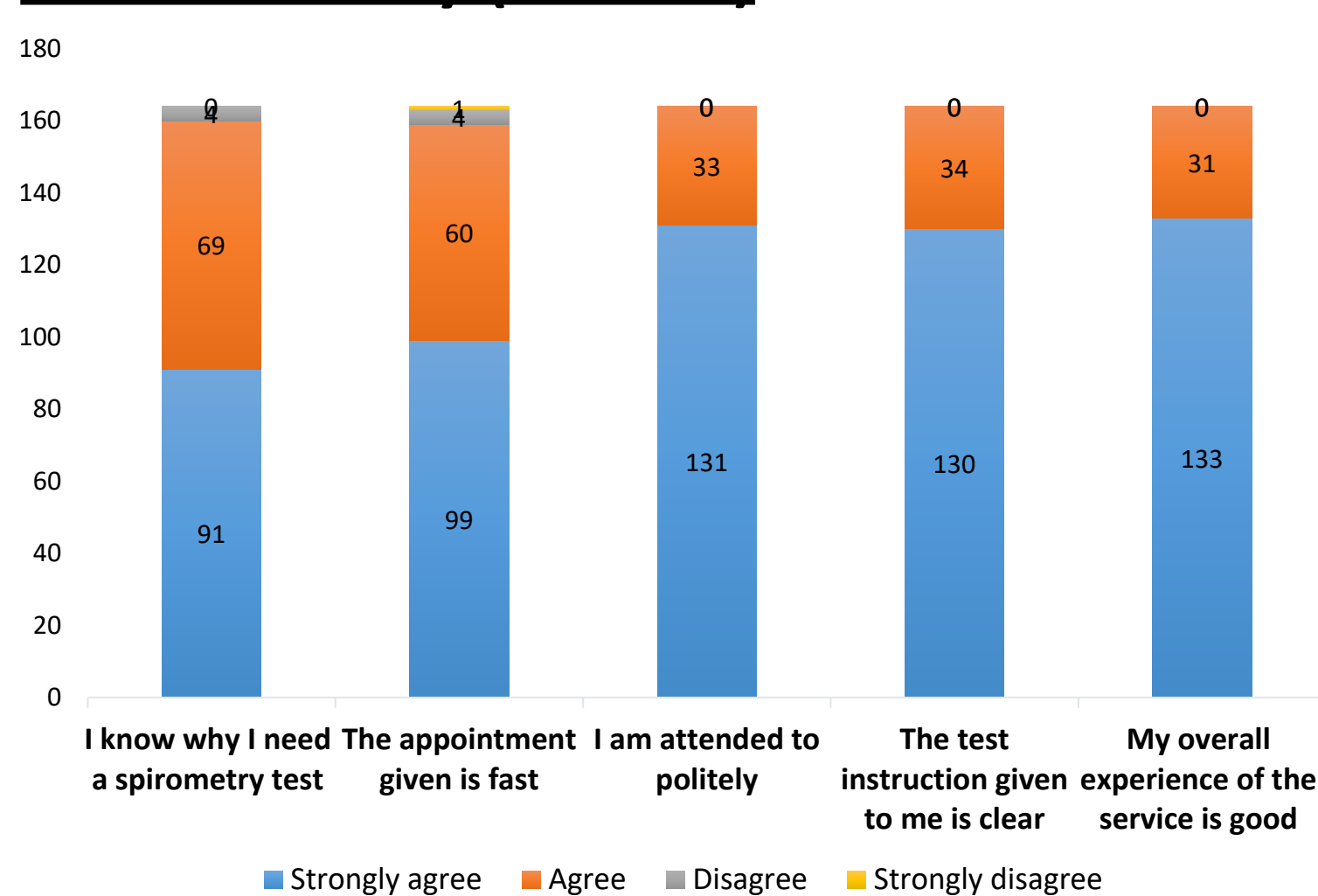
Obstructive Spirometry Results



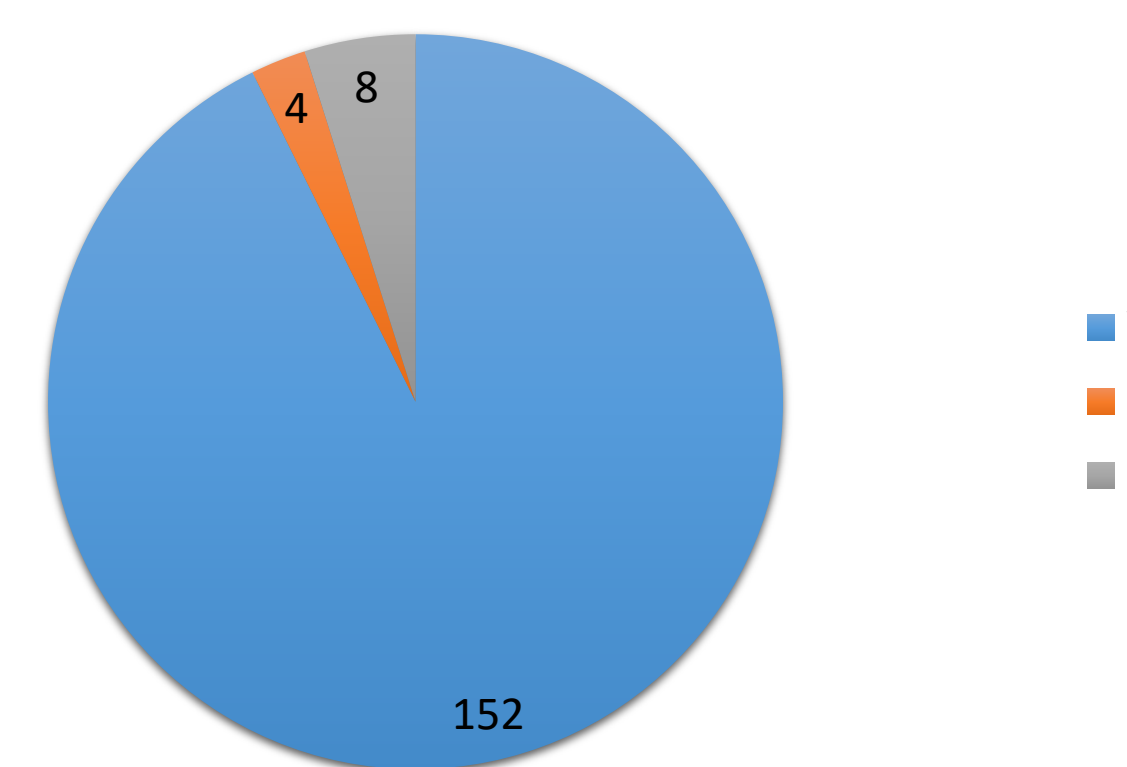
Restrictive Spirometry Results



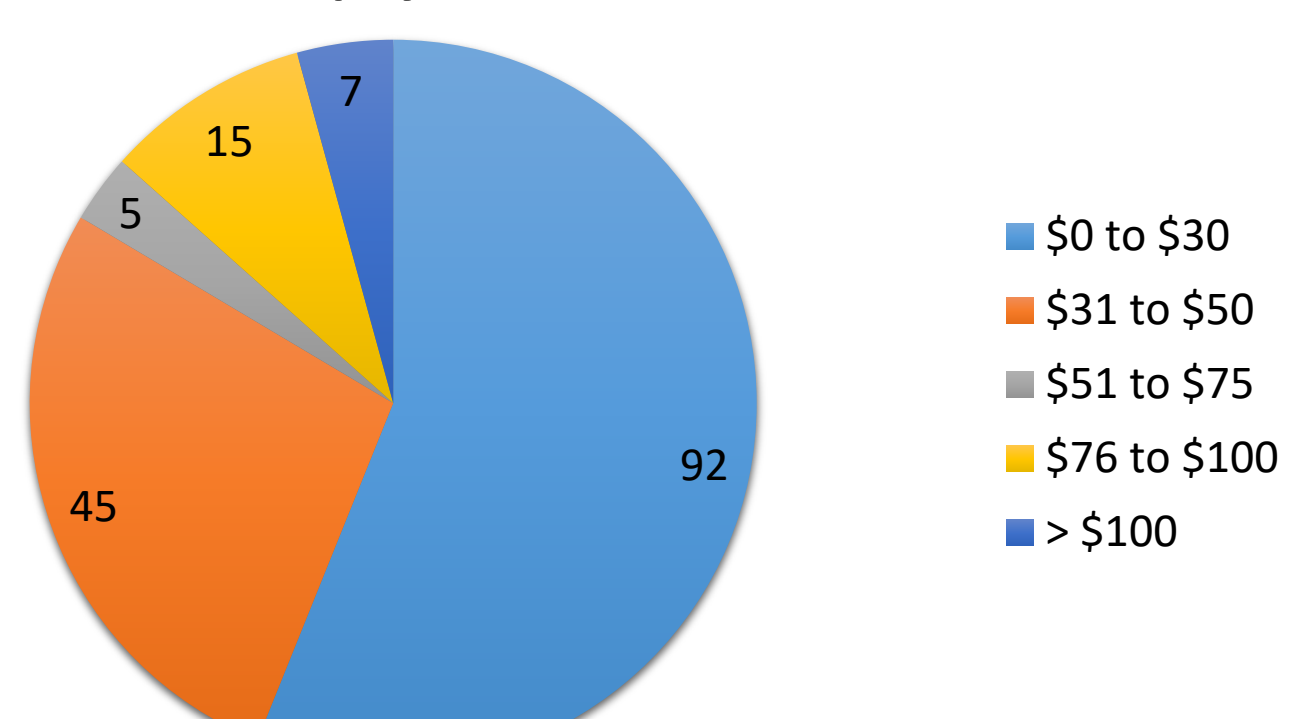
Patient Survey (n = 164)



Do you think test has benefited you



What would be a reasonable cost you are willing to pay for this test?



Thoughts on reasons behind benefits of spirometry:



Being informed of their health condition is important to patients.

Conclusion

Direct access spirometry service between SKH and SHP has helped patients save time and costs and provided strong support to SHP doctors in their ongoing management of primary care patients. Patient feedback consistently reflects high satisfaction regarding the promptness of spirometry appointments, courteous staff, and overall pleasant visitation encounters. From a health eco-system perspective, this model has effectively optimised patient allocation to primary care providers, enhancing primary care services and alleviating wait times for patients requiring specialist consultations.