

Jermain Chng, Irene Lim, Giles Tan, Gena Gentoza, Julius Pangjaya, Lee Sze Min, Pan Jingzhou, Zhou Zhenyu, James Hu, Shi Chun Yan

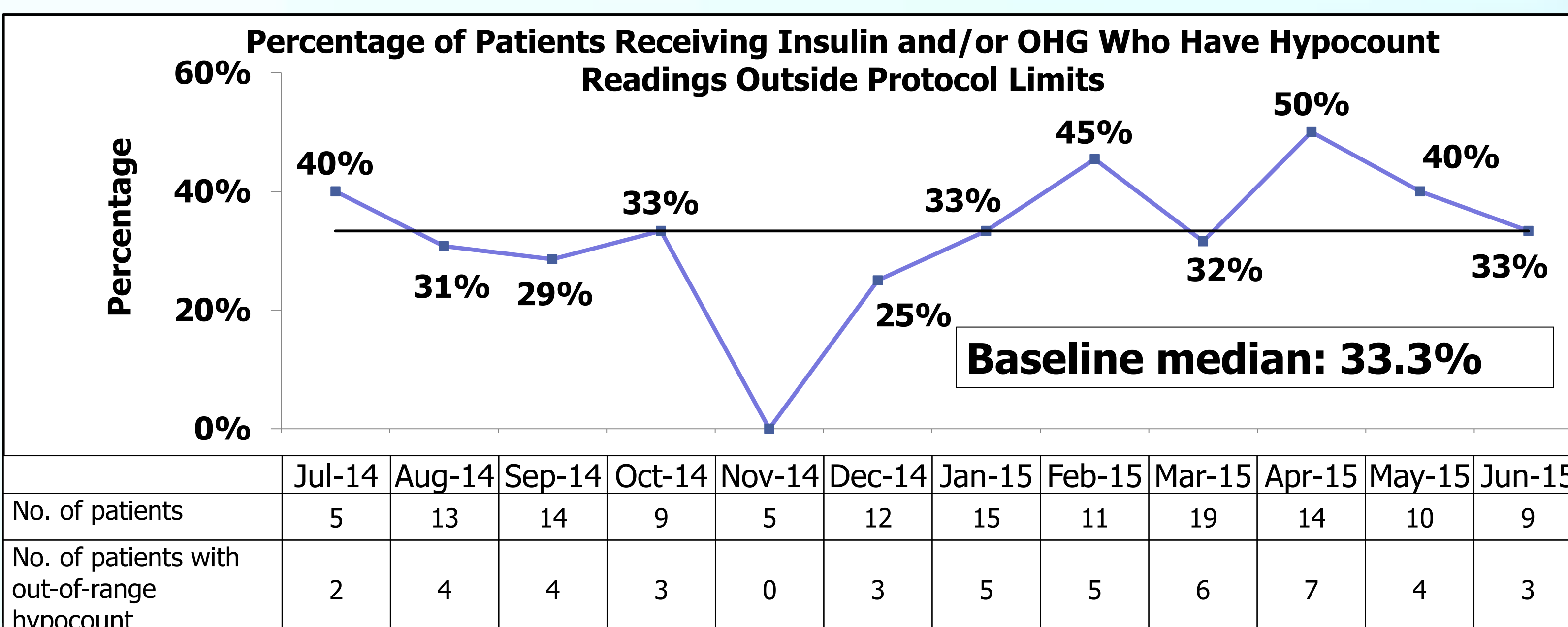
Mission Statement

To reduce the percentage of diabetic patients who have hypocount readings (blood glucose) going out of protocol limits (less than 4.0mmol/L and greater than 20mmol/L) by **30% within 2 years** (Feb 2015 to Feb 2017).

Team Members

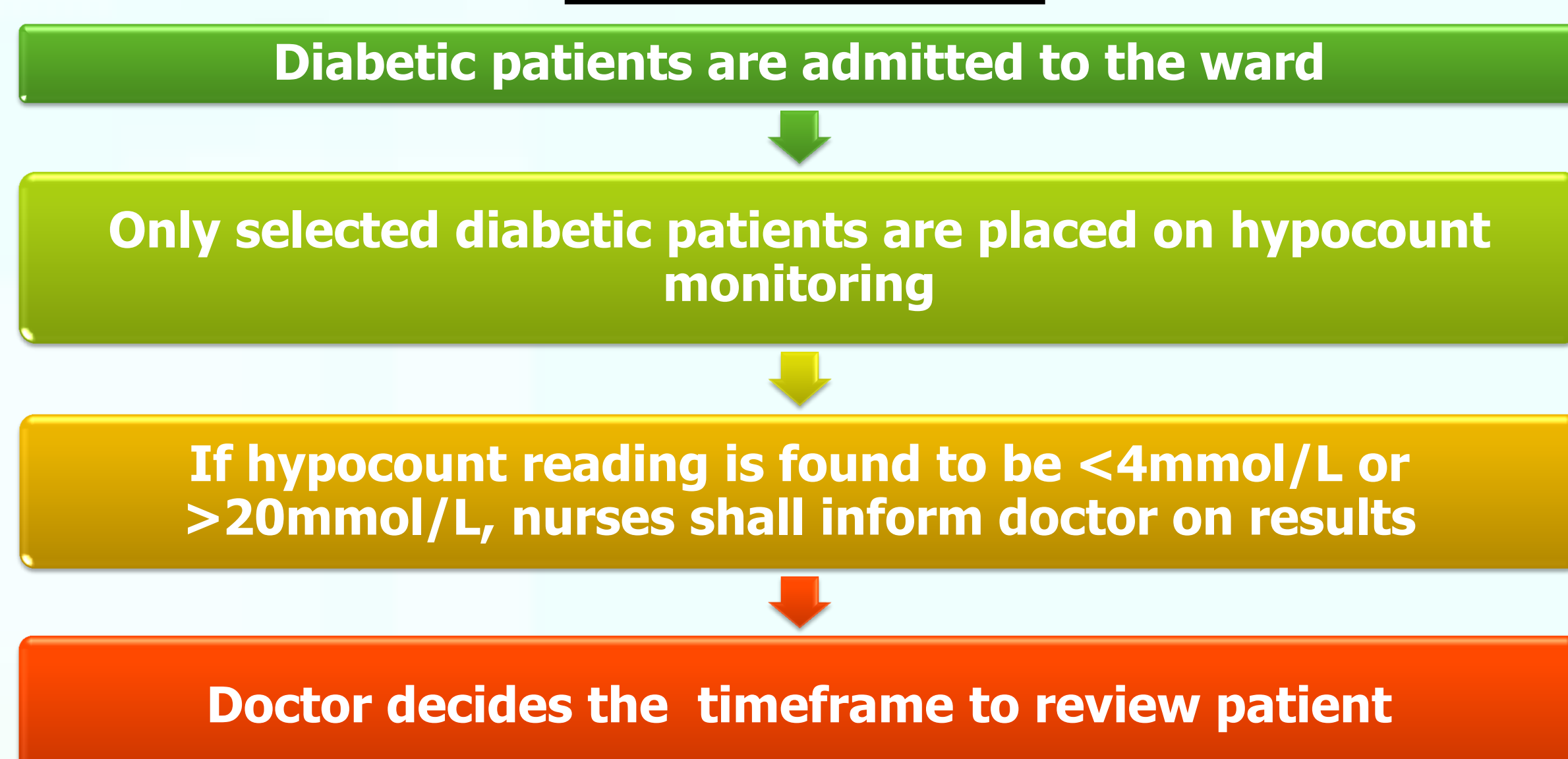
Name/Designation/Department	Role	Name/Designation/Department	Role
Irene Lim, AD, CGQ	Programme Manager	Pan Jingzhou, Pharmacist, Pharmacy	Team Member
Jermain Chng, Exec, CGQ	Programme Manager	Zhou Zhenyu, APN, DNA	Team Member
Dr Giles Tan, SC, Gen. Psych 1	Clinical Lead	James Hu Chuanlei, SSN, Diabetes Nurse	Team Member
Dr Gena Gentoza Gellangala, Res. Phy, Gen. Psych 2	Clinical Lead	Samantha Ong, CN	Team Sponsor
Shi Chun Yan, SSN, W80A	Team Member	Adj Asst Prof Alex Su, VCMB(CQ)	Team Sponsor
Julius Pangjaya, Snr Pharmacist, Pharmacy	Team Member	Dr Tina Fang, Director, CGQ	Advisor
Lee Sze Min, Snr Pharmacist, Pharmacy	Team Member	Bernard Wong, Mgr, NHG QRM	Advisor

Current Performance of a Process



Flow Chart of Process

Old Process Flow



Analysis

Gap Analysis

S/N	Current process	Best practices
G1	Management of diabetic patients who experience out-of-range blood glucose level is left to the care team's discretion.	A standardised procedure to manage patients with out-of-range blood glucose level.
G2	Routine diabetic care is not standardised, and diabetic patients are placed on blood glucose monitoring or have HbA1c checked depending on the care team's discretion.	Use evidence-based treatment in the prevention, diagnosis and management of diabetes ^{1,2} . These include monitoring of blood glucose and checking of HbA1c ¹ .
G3	Diabetic patients' blood glucose monitoring data is collected in the individual department and not collated centrally.	Blood sugar control is essential to reduce the risk of many medical complications ³ . Hence, blood glucose monitoring data should be tracked to examine trends over time and to implement improvements to care.
G4	Diabetic patients' meals and pre-meal diabetic medications are served far apart (e.g., > 1 hour), increasing their likelihood of experiencing out-of-range blood sugar level.	Literature showed that meals and diabetic medications should be as near as possible ⁴ .
G5	Patients are discharged without knowledge of diabetes management, such as the importance of adhering to medication regimes and management of hypoglycemia.	Patients/family members are educated on diabetes management and the importance of adhering to medication regimes in order to maintain healthy blood glucose levels.

Data Analysis: Reasons for Out-of-Range Blood Glucose Level

Reasons	%
S/N (Jun 2015 – Feb 2017)	
Medication-Related	33%
D1 Non-compliance before admission	17%
D2 Dose recently adjusted	13%
D3 Non-compliance in ward	3%
Diet	23%
D4 Poor oral intake / Insufficient food	13%
D5 Family brought outside food	10%
Medical Reasons	6%
D7 Unascertained	38%

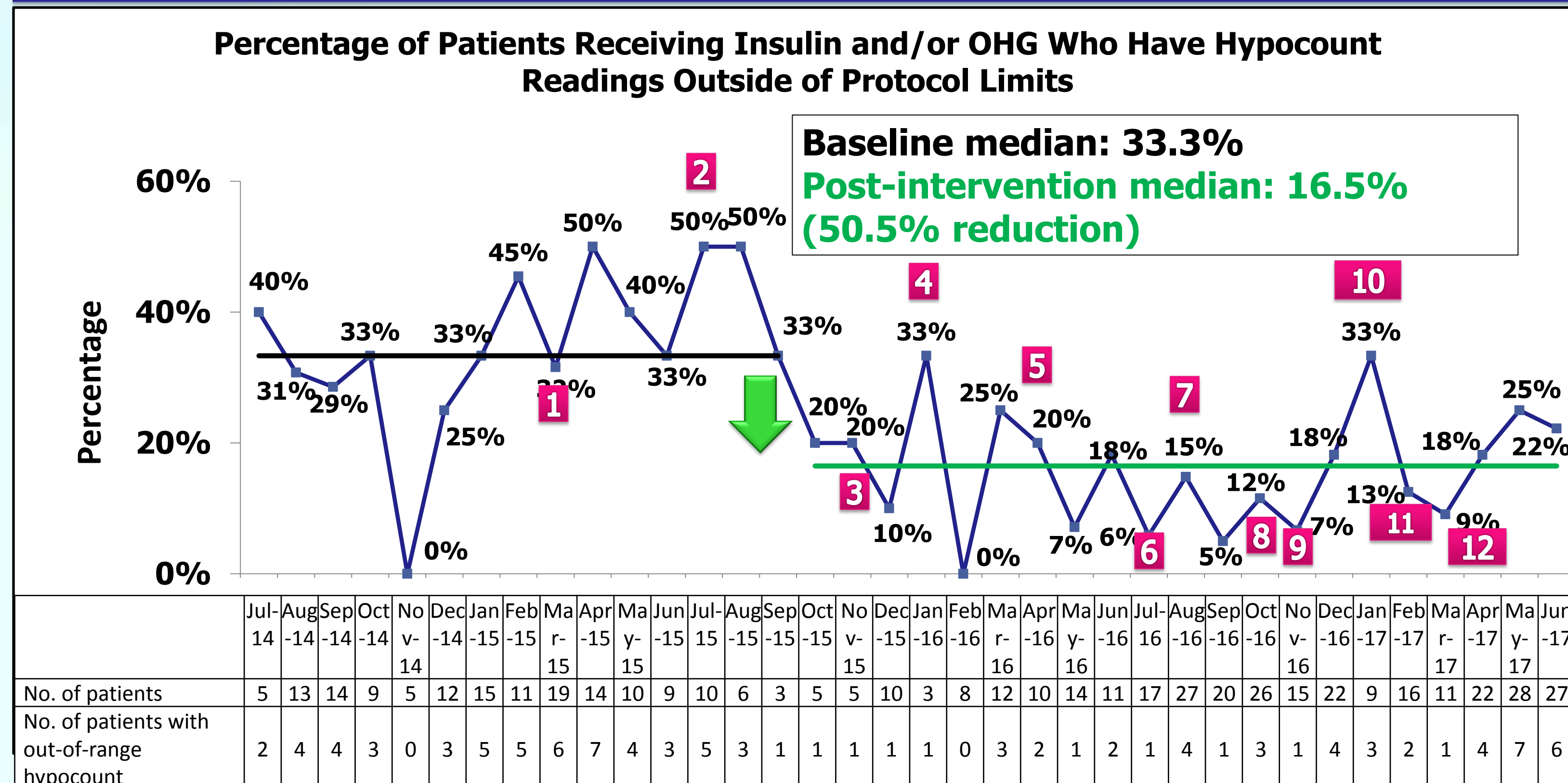
REFERENCES

- [1] Ministry of Health (Singapore) Diabetes Mellitus Clinical Practice Guidelines (2014)
- [2] Canadian Diabetes Association: In-hospital Management of Diabetes (2013)
- [3] The Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Study at 30 Years: Overview (2014)
- [4] Standards of Medical Care in Diabetes (2009), Diabetes Care, volume 32, Supplement 1

Implementation

Problem (S/N)	Interventions	Date
G1	1. Developed a Rescue Protocol which guides staff on how to manage patients with out-of-range hypocounts. 2. The protocol was incorporated into a hospital-wide policy on diabetes management.	Nov 2015 Mar 2017
G2, D5	1. Developed a Diabetes Care Plan for routine management of diabetic patients. The key elements of the care plan include: • Placement of newly-admitted diabetic patients on blood glucose monitoring • Measurement of HbA1c & renal panel/kidney function test • Providing pre-meal diabetic medications within 30 minutes of meals • Restricting outside food for inpatients and educating family on this. 2. The care plan was incorporated into a hospital-wide policy on diabetes management.	Nov 2015 Mar 2017
G3	1. Designed a form for collecting data, and forms are uploaded to shared folder monthly 2. Shared the analysis of blood glucose monitoring data with all wards on a monthly basis	Jul 2015 Apr 2017
G4	1. Standardised the timeframe for pre-meal diabetic medications to be given within 30 minutes of meals. This was placed into the Diabetes Care Plan 2. Tracked the percentage of patients with pre-meal diabetic meds and meals given within 30 mins of each other. Results was shared with the staff monthly 3. Created reminder sticker labels on the medication-serving device regarding the new timeframe	Jan 2016 Jan 2016 Oct 2016
G5, D1, D3	1. Used education brochures from polyclinics to educate patient on diabetes and foot care. 2. Developed education brochure on hypoglycaemia management for use in the ward and also given upon patient's discharge	Apr 2016 Apr 2016
D4	1. Changed diabetic diet from 1500kcal to 1800kcal (with dieticians advice)	Oct 2016

Results



- 1: Implementing new Rescue Protocol
- 2: New form to collect data for indicators; Placing of glucometer and data collection form on trolley when taking hypocount (Jul 2015)
- 3: Revised Rescue Protocol and new Diabetes Care Plan; Ward 33B piloted the protocols (Nov 2015)
- 4: Revised administration indicator (meals & meds within 30 mins) (Jan 2016)
- 5: Revised Routine Protocol and Diabetes educational brochure for patients (Apr 2016)
- 6: Merging of project form with existing hypocount monitoring form (Jul 2016)
- 7: Spread to block 3 acute wards; Junior Doctors' Meeting briefing (Aug 2016)
- 8: Reminder sticker label on med serving device and Diabetes Management poster; Changing of diabetic diet from 1500kcal to 1800kcal (Oct 2016)
- 9: Spread to block 3 long-stay wards (Nov 2016)
- 10: Spread to Wards 80B and 60AB (Jan 2017)
- 11: Roll-out to the hospital; Junior Doctors' Meeting briefing (Feb 2017)
- 12: Implementation of policy on Management of Patients with Diabetes (Mar 2017)

Audit of Wards for Compliance to Work Instruction (June 2017)

Assessment Criteria	% Pass
Hypokit contains correct items	74%
Hypokit placed at appropriate location	74%
Staff is aware of steps to take upon detection of a out-of-range hypocount	98%
Staff is confident in handling patients experiencing out-of-range hypocount	100%
Staff is aware of the critical lab results for blood glucose levels	63%
Staff knows what to do upon admission of a diabetic patient	89%

Project Impact

Item	Year 2015 (Pre-Intervention)	Year 2017 (Post-Intervention)	Change
No. of out-of-range hypocount episodes	456	183	↓ 60%
No. of patients sent to general hospital due to symptomatic hypo/hyperglycemia	16	6	↓ 63%
Cost Savings			
1) Treatment for out-of-range hypocount episodes	\$7,456	\$2,454	\$5,002
2) Transfers to general hospital	\$18,168	\$6,813	\$11,355
3) Cost arising from preventive measures	\$28,080	\$43,350	-\$15,270
TOTAL	\$53,704	\$52,617	\$1,087 (savings)

Problems Encountered

- Problem 1: Resignation of team members and lack of common availability of team members proved challenging to maintain project momentum.
 Problem 2: An audit revealed some wards still did not comply with our policy.
 Problem 3: Tedious collection of SHINE data.

Strategies to Sustain

1. Positive results from pilot ward was shared with new teams to gain their buy-in.
2. One staff from pilot ward was invited to our progress meeting.
3. While spreading, we conducted ward briefings and presentations to newly-spread wards. Our contacts were given out for staff to contact us for clarifications
4. Feedback sessions were held to gather feedback from wards. We also sent monthly data to wards so staff will know if the protocols are working.
5. We upped the visibility of the protocols by providing posters to wards, and stickers on nurses' iPads as reminders.
6. Management's support was sought through various platforms e.g. I&I committee.