

Mission Statement

To reduce incidence of first episode of hypoglycemia in patients treated with oral hypoglycemic agents (OHGAs) / insulin admitted to orthopaedic ward 12D by 50% over 6 months

Definitions

(1) Hypoglycemia - Refers to a capillary blood glucose (CBG) of less than 4 mmol/L

(2) Patients with the following criteria are excluded:

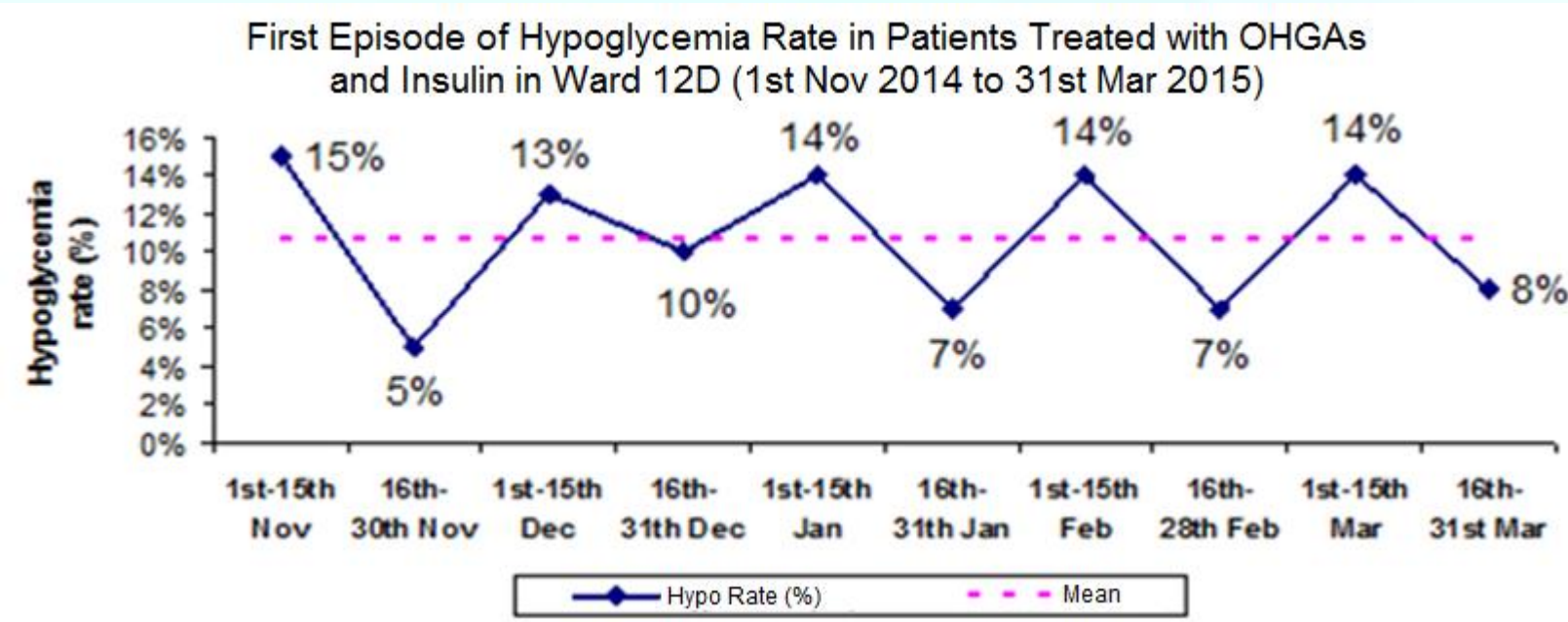
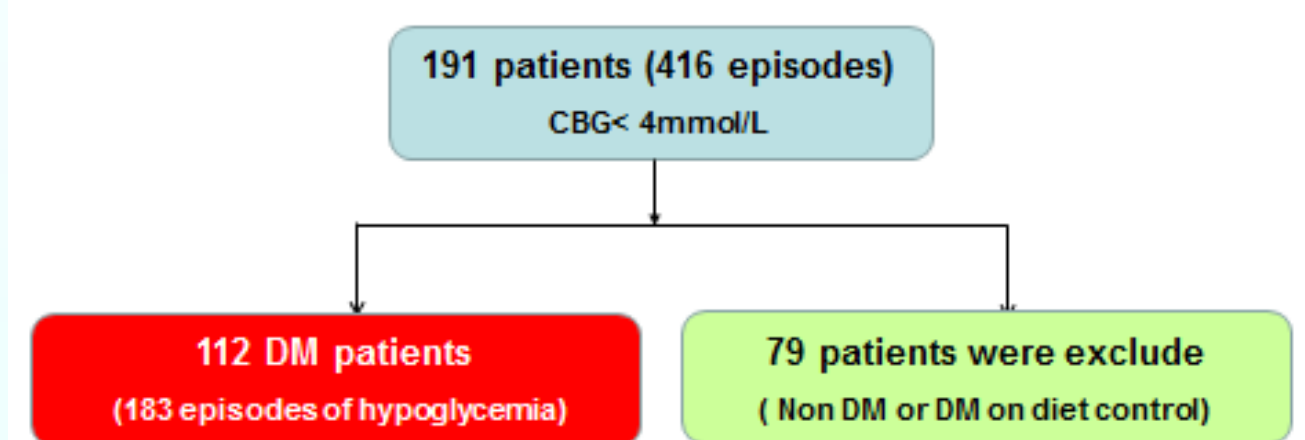
- Non-diabetes patients
- Diabetes Mellitus (DM) patients on diet control
- Patients admitted for hypoglycemia

Team Members

Name	Designation	Department	Role
Lian Xia	Advanced Practice Nurse	Nursing Service	Leader
Michelle Jong	Senior Consultant	Endocrinology	Member
Muhammad Farhan	Associated Consultant	Orthopaedic Surgery	Member
Wayne Yap	Resident	Orthopaedic Surgery	Member
Lam Chin Chin	Diabetes Nurse Educator	Nursing Service	Member
Lim Shu Fang	Senior Pharmacist	Pharmacy	Member
Chern Yann	Dietitian	Nutrition & Dietetics	Member
Koh Poh Sim	Senior Staff Nurse	Ward 12D	Member
Arumugam Saraswathi	F&B supervisor	Kitchen	Member
Ho Si Rong	Assistant Manager	Operations Medicine	Member
Kellie Tedjo	Executive	Operations Medicine	Member
Daniel Chew	Senior Consultant	Endocrinology	Sponsor
George Julie	Senior Consultant	General Medicine	Mentor

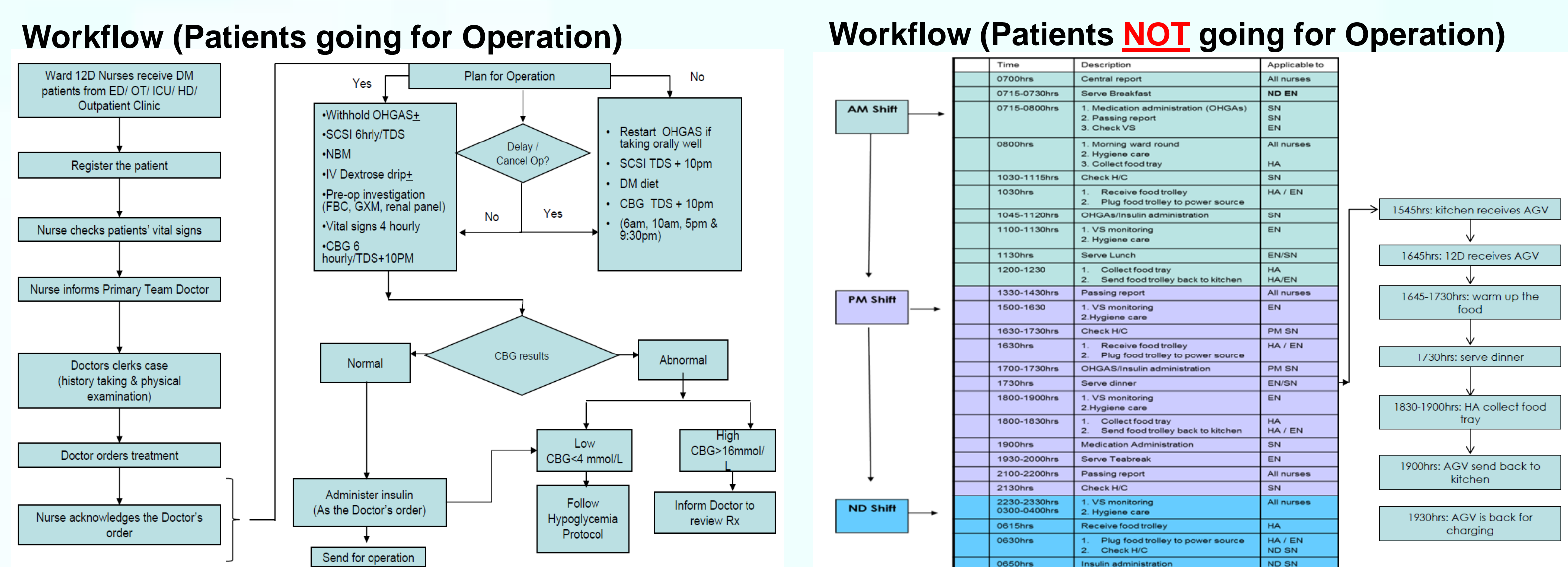
Evidence for a Problem worth solving

- Two weeks hospital wide inpatient ward audit from 3rd-17th Nov, 2014.
- Data was retrieved from Cobas IT system & case notes.

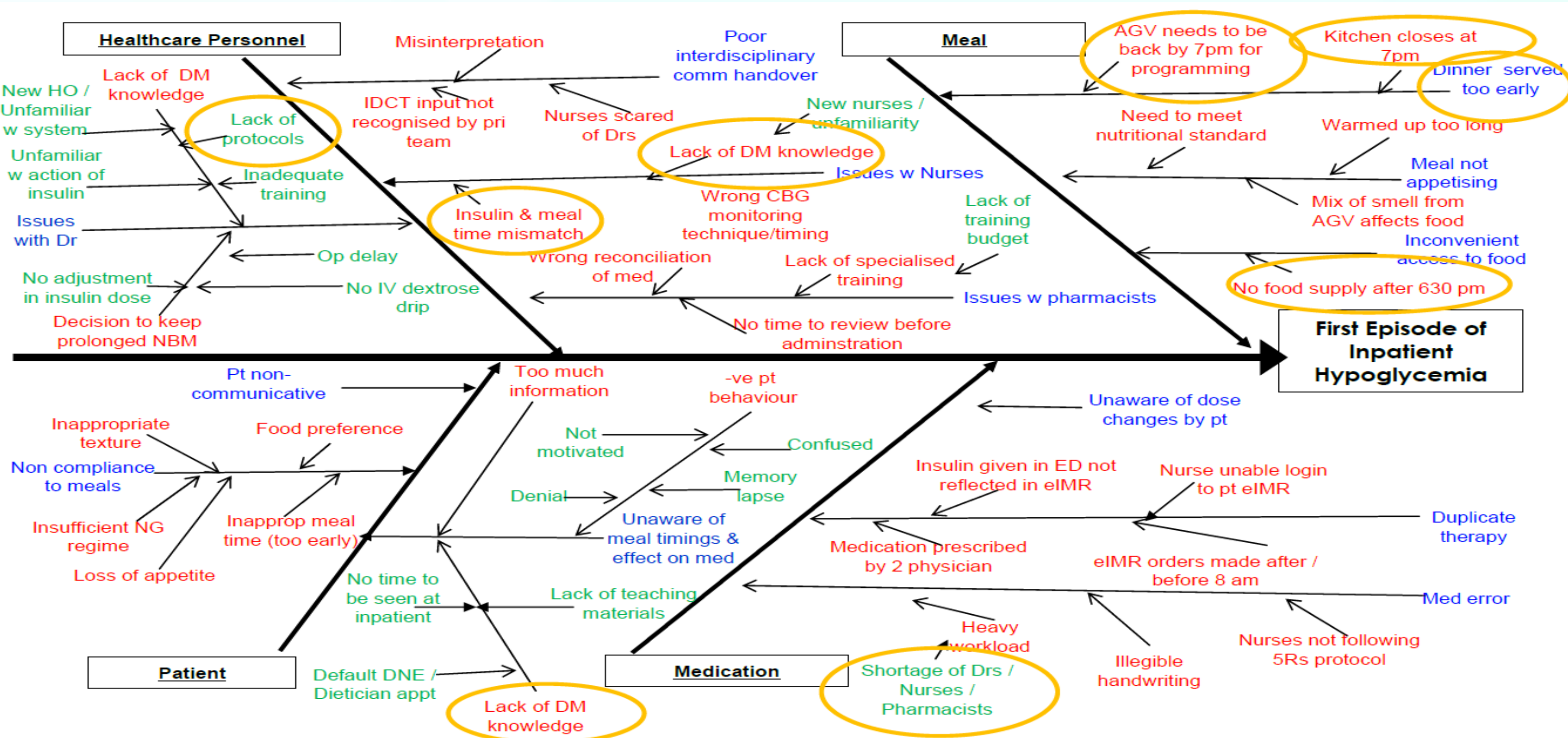


- Hypoglycemia in the hospital has been shown to have adverse consequences.
- In a study by Turchin et al. (2009) hypoglycemia during a single hospital day increased the length of stay by 1 day, and hypoglycemia recorded on two separate days increased the length of stay by over 2 days.
- Exposure to hypoglycemia increased the 1-year mortality rate proportionally to the number of days that hypoglycemia was observed by Wexler (2007).

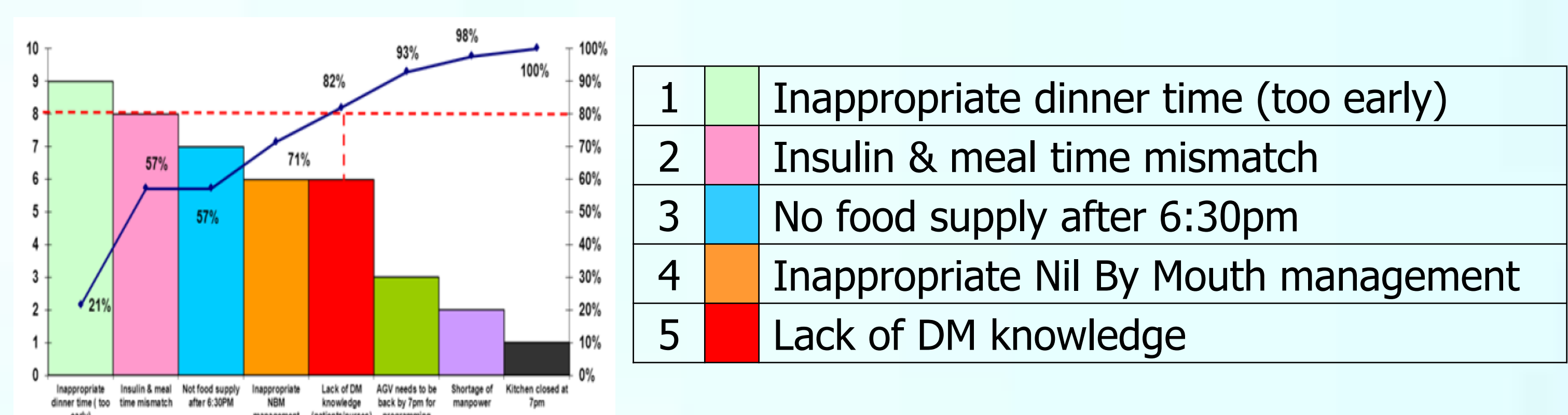
Flow Chart of Process



Cause and Effect Diagram



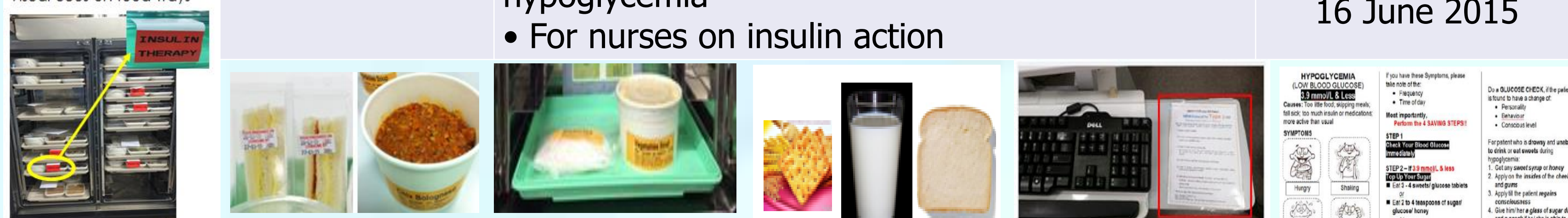
Pareto Chart



Implementation

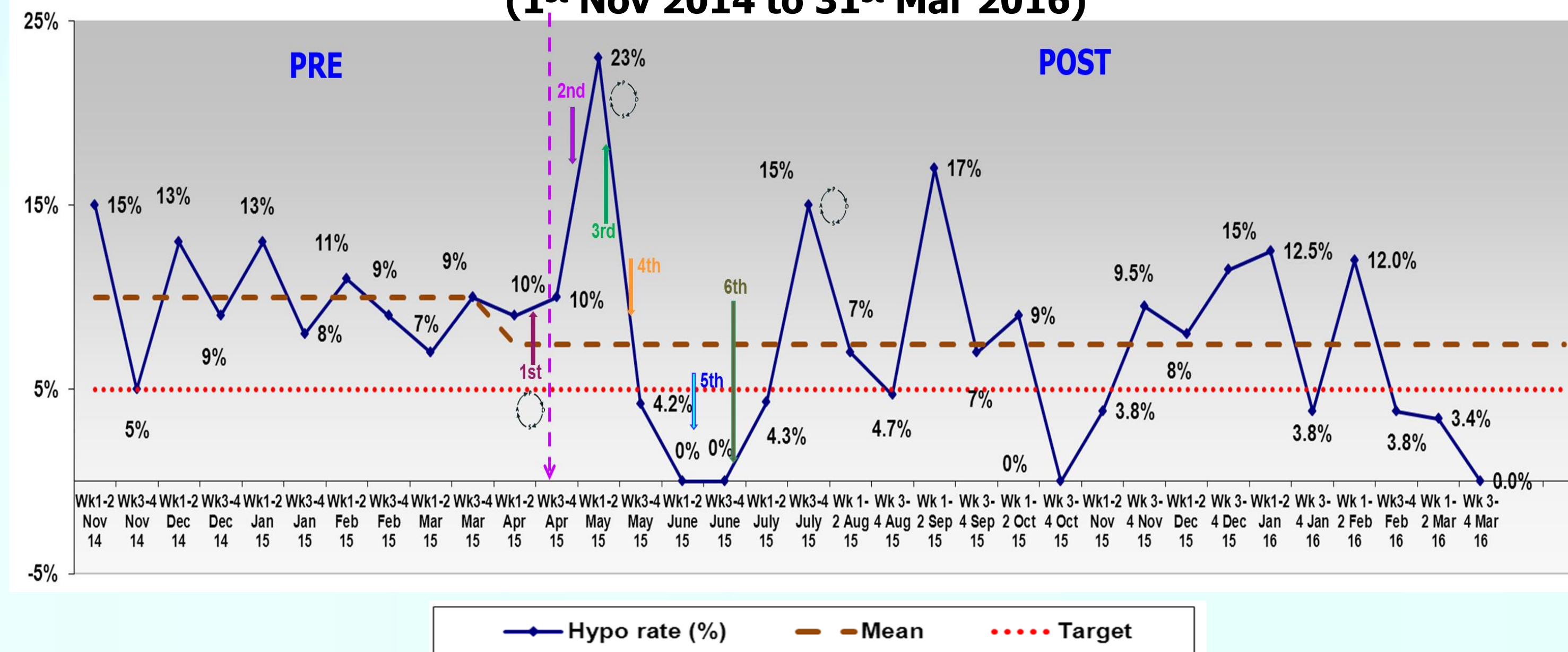
Cause / Problem	Intervention / PDSA	Date of Implementation
Inappropriate dinner time (too early)	1. Delay dinner time from 5:30pm to 6:30pm	6 April 2015
Insulin & meal time mismatch	2a. Insulin labelling on food trays 2b. Readjust insulin administration with breakfast timing	20 April 2015 22 June 2015
No food supply after 6:30pm	3. Provide food for late admission	11 May 2015
No Snack for bedtime CBG < 6mmol/L	4. Bedtime Snacks	27 May 2015
Inappropriate Nil By Mouth (NBM) management	5. Initiate Nil By Mouth (NBM) protocol	12 June 2015
Lack of Knowledge	6. Education • For patients on signs & symptoms of hypoglycemia • For nurses on insulin action	24 May 2015 16 June 2015

Visual cues on food trays



Results

Hypoglycemia Rate in Patients Treated with OHGAs & Insulin in Ward 12D (1st Nov 2014 to 31st Mar 2016)



The percentage of patients with a first episode of hypoglycemia dropped significantly from baseline **11.9%** (n=276) to **7.9%** (n=581). The incidence of recurrent episodes of hypoglycemia also declined from **4.7%** to **3.3%**.

Cost Savings

1. Reducing one episode of hypoglycemia will reduce one day of hospital stay

For Patient	
↓ Length of hospital stay	Bed: \$42 / day / per patient Treatment: \$24 / day / per patient
↓ No. of CBG Monitoring	\$7 per CBG monitoring / per patient
Glucose Powder	\$2.6 / packet
Total saved per day	\$75.6 / day

For Organization	
↓ Length of hospital stay	\$1251 / day
↓ Nurse's Manpower	\$8 / 15 mins
↓ Doctor's Manpower	\$16 / 20 mins
Total saved per day	\$1275 / day

2. Decrease risk of hypoglycemia complications (e.g. Seizure, Cardiac arrhythmia & Sudden death)

Problems Encountered

- New nurses / doctors were not familiar with new workflow & protocol
- Frequent clinical rotations for physicians
- Low compliance rate among the physicians
- Challenge of data collection & analysis
- Difficulty in organizing team meetings due to different shift duty

Strategies to Sustain

- To create a sustainable education & learning environment for new doctors / nurses
- Circulate the audit results among departments regularly
- Increase awareness among healthcare providers
- Continue monitoring the progress of the project & compliance rate across departments
- Create expert improvement & measurement support groups

Lessons Learnt

- Engage patient & caregivers in preventing hypoglycemia
- Develop open channels of communication across all team members and at all levels of staff
- Engage all the right stakeholders and gain support from senior management
- Keep everyone informed of the process and the data behind the decisions
- Take time to celebrate achievements, no matter how small