



Use of quality indicators to assess diabetes care at the specialist outpatient clinics in Singapore

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Comprehensive Diabetes Care

- Diabetes mellitus is a chronic condition that requires continuing medical care and education to prevent acute complications and to reduce the risk of long-term complications.
- Among the long-term complications associated with diabetes mellitus are blindness, heart disease, stroke, kidney failure, amputation and nerve damage.
- Good control of diabetes can reduce the risk of complications of the disease.



Evidence and Practice

- Despite the availability of published guidelines and the evidence from clinical trials supporting their use, physician compliance with a number of diabetes management recommendations in a variety of health care delivery systems **falls short** of national standards.
- As a result, the quality of health care for patients with diabetes has been found to be **low** across multiple health systems.



Evidence and Practice

- In the United States, Saadine et al. reported a major gap between recommended diabetes care and the care that patients actually receive.
 - Adherence to quality standards **varied widely** and the rates of adherence to process measures of quality were **relatively low** compared with the targets established by the American Diabetes Association.



Evidence and Practice

- In 1999, Bernard et al. measured the performance of five 5 key indicators:
 - referral for dilated eye examinations
 - measurement of lipids
 - screening for proteinuria
 - performance of foot examinations
 - inquiries regarding self-monitoring of blood glucose
 - All fell short of recommendations when assessed by record review



Quality Indicators for Comprehensive Diabetes Care

- Indicators for good management of diabetes include:
 - **Structure** → the environment of care
 - **Process** → how things are organised and done
 - **Outcome** → the impact of health services on the patients



MOH CPG on Diabetes Mellitus

- The Singapore Ministry of Health (MOH) published the Clinical Practice Guidelines (CPG) on Diabetes Mellitus in 1999 and revised in 2006.
- It recommended a series of 9 process quality indicators for good management of diabetes mellitus.

MOH CPG on Diabetes Mellitus - Quality Indicators

Indicator	At-Risk	High-Risk
1. HbA1c	6-monthly	3-4 monthly
2. Eye assessment	Annual	As clinically indicated
3. Foot assessment	Annual	
4. Nephropathy assessment	Annual	
5. BP measurement	3-4 monthly	
6. Weight and BMI	3-4 monthly	
7. Lipid profile	Annual	
8. Cardiac assessment	As clinically indicated	
9. Self-management education	Annual	

At-Risk : Stable, meeting targets of control as agreed by patient and his physician

High-Risk: Unstable control, fail to meet targets in the past 12 months; diabetic who is pregnant; patient with established diabetic complications; patient with psychosocial problems that complicate management



National Audit of Diabetes Care

- In 2002, MOH conducted the first National Diabetes Care Audit in 6 public acute-care hospitals and 17 polyclinics in the 2 public sector healthcare groups based on the CPG
 - Both groups had good structural programmes, protocols and linkages across the continuum of care at both the hospital and primary care (polyclinic) levels.



National Audit of Diabetes Care

- Monitoring of process and outcomes such as glycated haemoglobin (HbA1c), blood pressure (BP) and weight were conducted conscientiously.
- There remained gaps in the screening and early detection for major early macro- and micro-vascular complications such as dyslipidaemia, cardiovascular, renal, eye and foot complications.

Assess Quality of Diabetes Care

- Use quality indicators to
 - establish the standards of clinical practice for the management of diabetes mellitus @ SOCs
 - study variability of care delivery
 - identify areas for quality improvement



DIABETES

- ● ● | Measuring the Quality of Care of Diabetic Patients at the Specialist Outpatient Clinics in Public Hospitals in Singapore

- A retrospective review
- Using patient medical records
- Period of study: December 2004 to October 2005.



Methodology

Study Population

- Patients with diabetes mellitus were randomly chosen from a list of patients who attended these 6 groups of SOCs
 - Cardiology
 - General Medicine
 - Geriatrics
 - Others
 - Neurology
 - Rheumatology
 - Respiratory Medicine





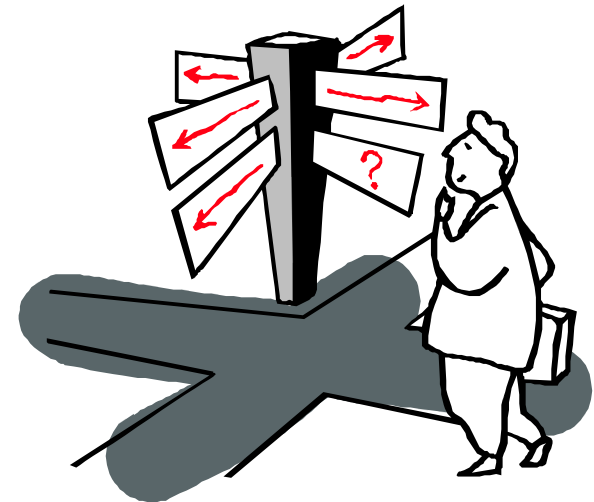
Methodology

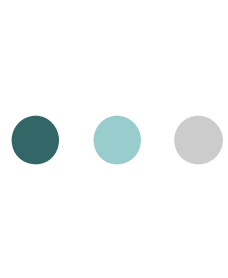
Study Population

- Patients must be on treatment for at least 15 months during Oct 2003 to Apr 2005
- Prescribed anti-diabetic medication from these clinics
- Last recorded visit was denoted as the 15th month visit.

Methodology

- Study parameters included **process and outcome indicators** based on the 1999 Singapore Ministry of Health (MOH) Diabetes clinical practice guidelines (CPG)





Methodology

- Care Process indicators

No.	Indicator	Time	No.	Indicator	Time
1	HbA1c	6 months	6	Serum Creatinine	15 months
2	Weight / BMI	4 months	7	Eye assessment	15 months
3	BP	6 months	8	Foot assessment	15 months
4	Urine Microalbumin*	15 months	9	Patient education	15 months
5	Lipid profile	15 months			

* (albustix, urinary protein or microalbumin)



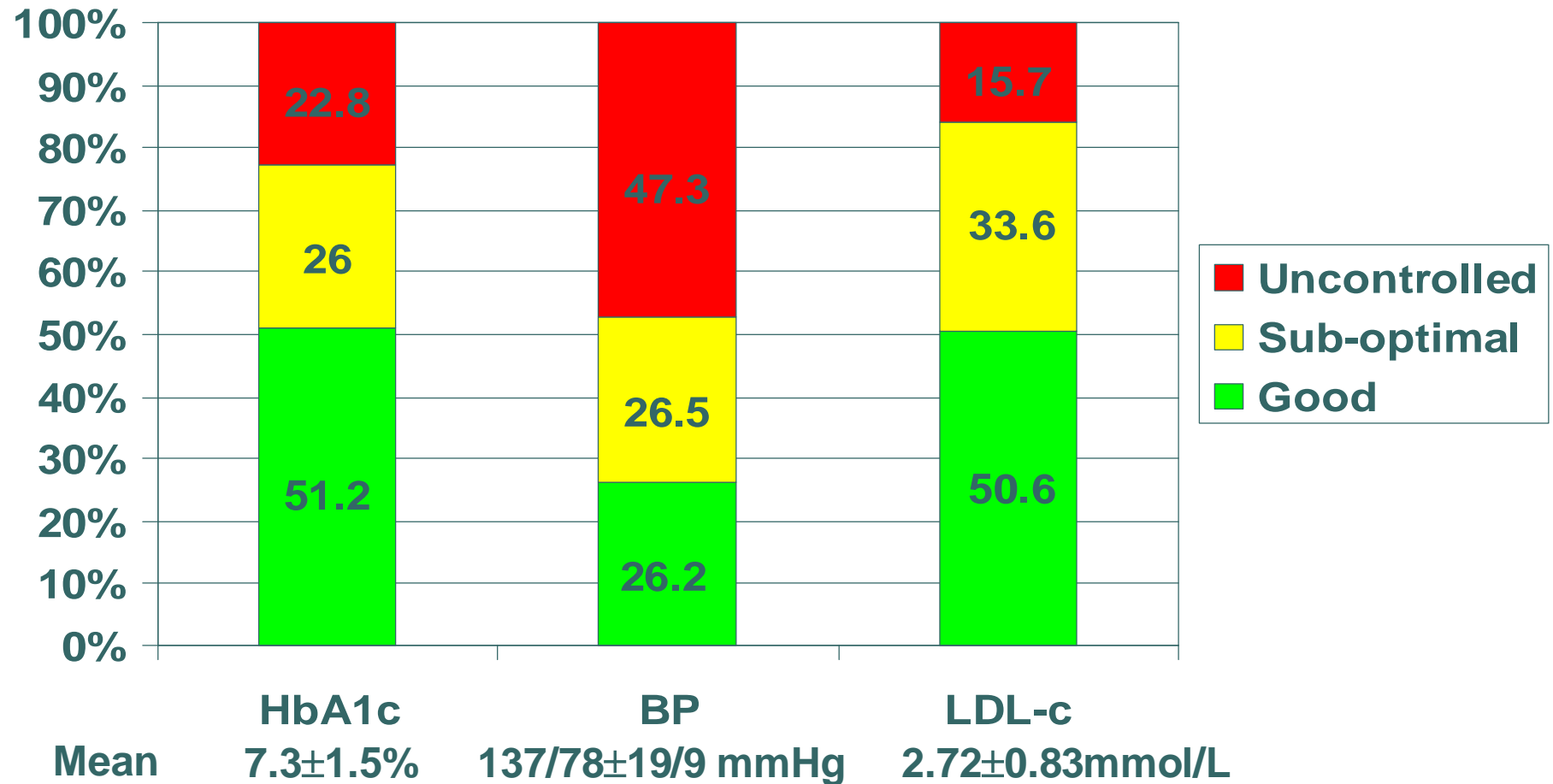
Results

- A total of 575 cases were sampled from ten SOC's across three hospitals

Gender	Male	39.8%
Age	<45	4.5%
	45-64	39.7%
	65+	55.9%
Ethnicity	Chinese	74.1%
	Malay	10.3%
	Indian	14.4%
	Others	1.2%

Results

Overall Glycaemic, Blood Pressure and Cholesterol Control



Outcomes of Diabetes Care by Hospital

No.	Clinical parameter		Hosp A (n=120)	Hosp B (n=180)	Hosp C (n=275)	All (n=575)	p-value
1	HbA1c (%)	N	118	176	259	553	ns
		Mean	7.4 ± 1.4	7.4 ± 1.4	7.2 ± 1.6	7.3 ± 1.5	
2	Blood Pressure	N	120	178	275	573	ns
	SBP (mmHg)	Mean	136.2 ± 18.7	136.3 ± 19.6	138.1 ± 19.6	137.1 ± 19.4	
	DBP (mmHg)	Mean	77.0 ± 9.7	77.0 ± 9.4	78.3 ± 8.3	77.6 ± 9.0	
3	Fasting LDL-c (mmol/L)	N	94	160	216	470	ns
		Mean	2.74 ± 0.93	2.74 ± 0.80	2.70 ± 0.86	2.72 ± 0.85	

22 subjects did not have a HbA1c record

2 subjects did not have blood pressure record

105 subjects did not have LDL-c record

Outcomes of Diabetes Care by Specialty

No.	Clinical parameter		Cardiology (n=120)	Gen Med (n=171)	Geriatrics (n=115)	Others (n=169)	p-value
1	HbA1c (%)	N	110	167	114	162	
		Mean	7.5 ± 1.4	7.5 ± 1.6	6.9 ± 1.3	7.3 ± 1.6	0.016
2	Blood Pressure	N	119	171	115	168	
		Mean	134.5 ± 18.0	140.0 ± 22.9	138.1 ± 17.7	135.4 ± 17.0	ns
	DBP (mmHg)	Mean	77.2 ± 9.2	78.6 ± 9.5	75.0 ± 8.4	78.8 ± 8.3	
3	Fasting LDL-c (mmol/L)	N	111	155	79	125	
		Mean	2.56 ± 0.83	2.88 ± 0.92	2.60 ± 0.94	2.75 ± 0.68	0.011

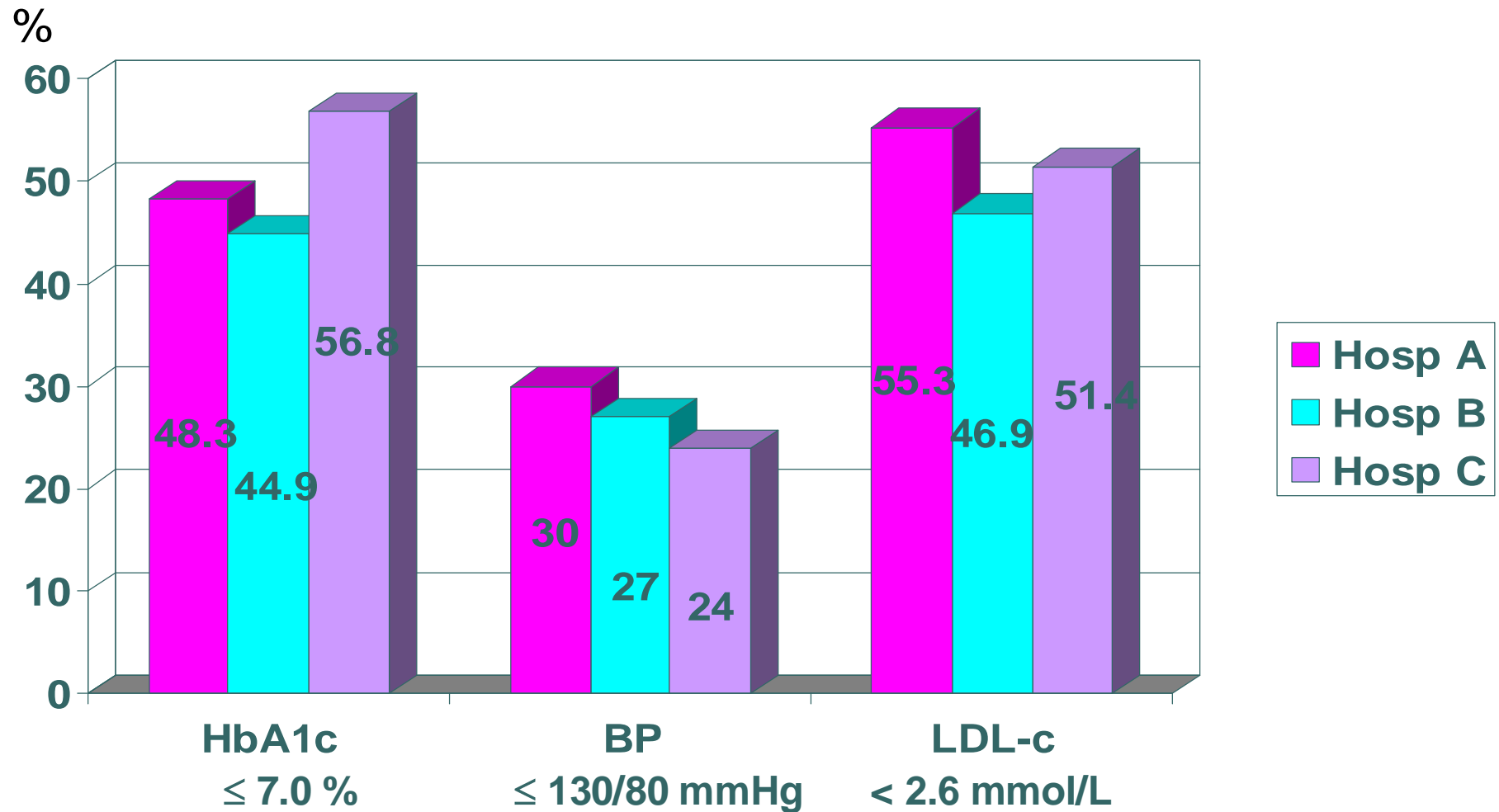
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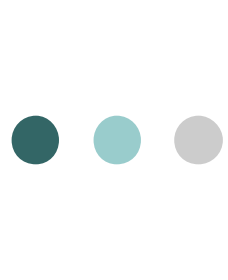
Results

Optimal Glycaemic, Blood Pressure and Cholesterol Control by Hospital



Care Processes by Hospital

No.	Audit parameter, patients with	Frequency (months)	Hosp A	Hosp B	Hosp C	All (n=570)	p-value
			%	%	%	%	
1	HbA1c test	6	95.8	85.6	75.6	83.0	<0.001
2	Weight / BMI measurement	4	55.0	17.8	22.5	27.8	<0.001
3	BP measurement	4	100	97.8	98.2	98.4	ns
4	Urine albumin test	15	65.0	41.1	37.8	44.5	<0.001
5	Lipid profile	15	75.8	85.6	71.6	76.9	0.001
6	Serum creatinine test	15	95.0	78.3	90.2	87.5	<0.001
7	Eye assessment	15	56.7	53.9	23.3	39.8	<0.001
8	Foot assessment	15	14.2	38.3	6.5	18.1	<0.001
9	Patient education	once	30.8	52.2	29.1	36.7	<0.001
Average Score (9 parameters), %			65.4	61.2	50.5	57.0	<0.001
Number of parameters \geq 50%			7	6	4	4	
Number of parameters \geq 75%			4	4	3	4	



Results

- The aggregate score for nine process parameters ranged from
 - 50.5% to 65.4% across the hospitals
 - 47.8% to 70.0% across the specialties
- Large inter- and intra-hospital variance for eye, foot examination and weight measurement.



Benchmark

- Using the *Healthcare Effectiveness Data and Information Set (HEDIS)* indicators for comprehensive diabetes care by the National Committee for Quality Assurance (NCQA) in USA.
- The HEDIS is a tool used by more than 90 percent of America's health plans to measure performance on important dimensions of care and service.



Methods

- Quarterly review of all patients with diabetes mellitus aged 16+ years
- On follow-up at the SOCs of 3 acute hospitals in NHG
- Between January 2006 and December 2007
- Data was obtained from the Chronic Disease Management System (CDMS)



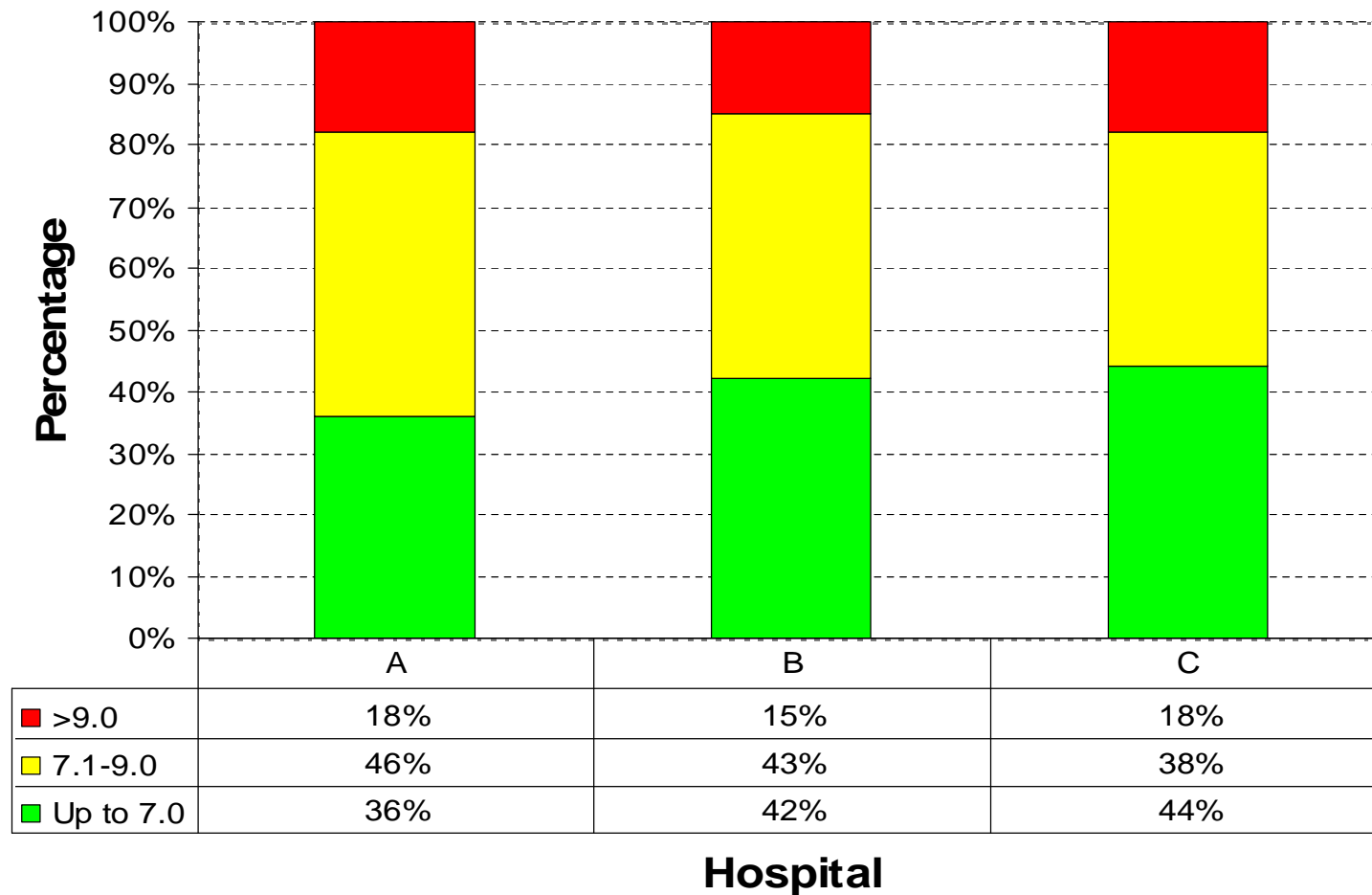
Methods

- 4 “Process” indicators
 - HbA1c test
 - LDL-c test
 - Nephropathy test
 - Eye examination
- 2 “Intermediate outcome” indicators
 - Poor HbA1c ($> 9\%$) control
 - Optimal LDL-c (< 2.6 mmol/L) control



Glycaemic control

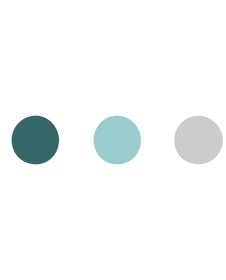
Distrubution of HbA1c





Summary of Results

- Gradual increase in
 - LDL-c test rate from 73%-85% to 86%-89%
 - Nephropathy test from 34%-71% to 52%-74%
- Fewer patients with poor HbA1c control, decrease from 17%-24% to 16%-18%
- More patients with optimal LDL-c control, increase from 47%-56% to 50%-62%



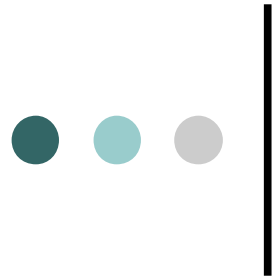
Conclusion

- Rates of all 4 process and 2 intermediate outcome indicators were comparable with the HEDIS benchmarks in 2005.
- There is variation across the hospitals for the rates of key process indicators for quality diabetes care and these can be further improved.



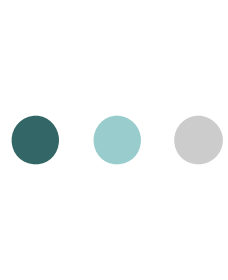
Conclusion

- Healthcare providers can be overwhelmed by the complexity of issues associated with the during management of patients with diabetes mellitus and often fail to adequately address both diabetes-related and non-diabetes-related healthcare screening.
- Appropriate management of patients with diabetes mellitus requires that a number of healthcare screenings be performed on a regular basis.



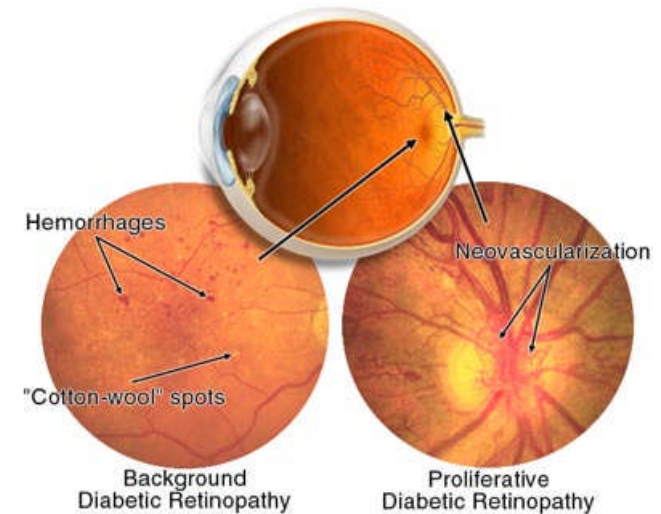
Conclusion

- The healthcare system can be re-engineered to facilitate all physicians, regardless of their sub-specialty, to provide holistic and patient-centred care.



Conclusion

- Specific efforts will be invested to increase the rates of **retina** and **foot screening** through capacity building and reinforcement among clinicians.
- Set targets for continuous quality improvement of diabetes care and reduce the variance in care provision through regular reviews.



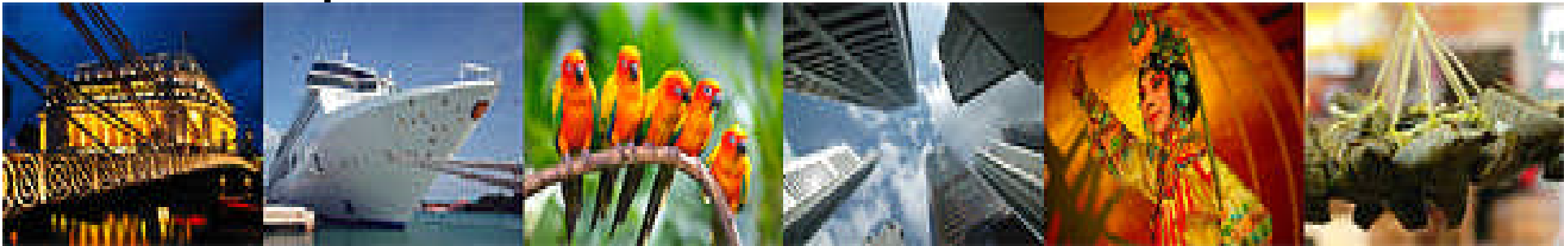
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