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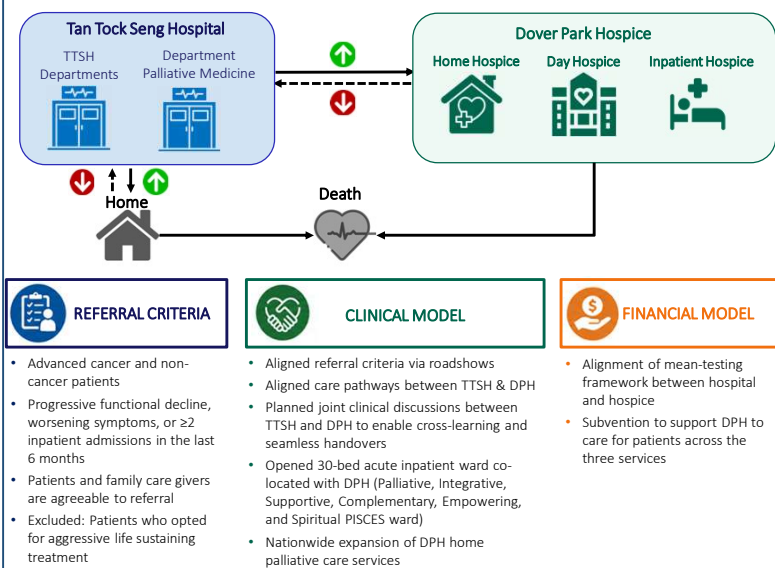
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1 BACKGROUND

Population ageing, rising chronic disease burden, and increasingly complex healthcare needs are increasing the demand for **coordinated palliative care** in Singapore. Yet, only 40% of decedents received palliative care at the end-of-life between 2017-2020. Access remains predominantly **cancer-focused, with later referrals for patients with non-cancer conditions**. Further challenges include **non-systematic referral criteria, fragmented care planning, financing barriers, and limited home-care capacity**.¹⁻⁶ To address this gap, the Tan Tock Seng Hospital (TTSH) and Dover Park Hospice (DPH) piloted the Integrated Palliative Care Programme (IPCP) that aims to provide seamless palliative care across hospital and hospice setting.

3 METHOD

Aim of IPCP: To ensure seamless transitions across hospital and hospice settings based on patients' evolving needs and to provide good palliative care in terms of patient outcomes, care, and cost.



2 OBJECTIVE

Evaluate the healthcare costs and care outcomes associated IPCP decedents compared to historical decedents who were seen by TTSH Palliative Medicine department and referred to non-DPH institutions (Control A) or DPH (Control B).

STUDY POPULATION

Historical decedents (1 st Oct 2022 to 30 th Nov 2023)		IPCP decedents (1 st Jan to Dec 2024)
Control A: non-DPH decedents (n=417)	Control B: DPH decedents (n=541)	IPCP decedents (n=726)
• TTSH Palliative Medicine Department patients who were referred to non-DPH institutions providing palliative care	• TTSH Palliative Medicine Department patients who were referred to DPH	• All patients admitted to TTSH and DPH • Patients referred to DPH from other institutions were excluded

PRIMARY OUTCOMES

• The **cost consequence analysis** focused on the **final month of life**, where IPCP effects were concentrated.

Outcomes	Definitions	A	B	IPCP
Consequence	Symptom control: Edmonton Symptom Assessment Score (ESAS) pain · dyspnea · delirium	–	✓	✓
	Place of death	✓	✓	✓
Cost	Acute hospital utilisation incurred within NHG Health Regional Health System: Inpatient (IP) admissions, Emergency Department (ED) visits, outpatient and average length of stay (ALOS) in the last 1, 3, 6, and 12 months of life	✓	✓	✓
	Acute hospital expenditure incurred within NHG Health Regional Health System: Inpatient (IP) admissions, Emergency Department (ED) visits, and outpatient (OP) in the last 1, 3, 6, and 12 months of life Consumer Price Index 2022 adjusted	✓	✓	✓

STATISTICAL ANALYSIS

- Costs and consequences presented **separately without aggregation into a single outcome**
- χ² tests** for categorical outcomes; **One-way ANOVA** for continuous outcomes
- Pairwise comparisons: **IPCP vs Control A** and **IPCP vs Control B**
- Final-month CCA reports **absolute mean or percentage-point differences**

4 RESULTS

The median time from first palliative referral to death for IPCP decedents: 41.5 days (IQR: 17 to 87 days). Compared to Controls A and B, IPCP decedent were older and had more non-cancer diagnosis

Compared with Control A, IPCP decedents had \$2,964 lower NHG gross costs, but \$1,080 higher ILTC costs. At the same time, IP, ED and OP utilisation and ALOS were lower, while out-of-hospital and home deaths were substantially higher. No significant differences were seen when compared to Control B

Table A: Profile of Control A, Control B, and IPCP decedents

Baseline characteristics	Control A Non-DPH decedents (n=417)		Control B DPH decedents (n=541)		IPCP decedents (n=726)	P all groups
Demographics	Mean	SD	Mean	SD	Mean	SD
Age (years)	76.1	12.8	76.2	11.8	78.8	12.0
Charlson Comorbidity Index	8.0	4.0	8.3	3.6	8.0	4.0
Gender	n	%	n	%	n	%
Male	215	51.6	300	55.5	377	51.9
Ethnicity	n	%	n	%	n	%
Chinese	354	84.9	465	86.0	639	88.0
Malay	25	6.0	34	6.3	40	5.5
Indian	17	4.1	23	4.3	23	3.2
Others	21	5.0	19	3.5	24	3.3
Housing type	n	%	n	%	n	%
1-2 room	39	9.4	57	10.5	58	8.0
3-5 room	255	61.1	386	71.4	505	69.6
Others (landed, HUDC, etc.)	123	29.5	98	18.1	163	22.4
Diagnosis	n	%	n	%	n	%
Cancer	262	62.8	388	71.7	475	65.4
Non-cancer	155	37.2	153	28.3	251	34.6
Advanced heart failure	32	7.7	40	7.4	38	5.2
End-stage renal failure	31	7.4	35	6.5	39	5.4
End-stage lung disease	43	10.3	33	6.1	42	5.8
Advanced dementia	60	14.4	58	10.7	126	17.4
Severe liver disease	7	1.7	8	1.5	9	1.2
Parkinson's disease	8	1.9	6	1.1	25	3.4
Other	34	8.2	24	4.4	29	4.0

Table B: Cost consequence analysis in the last month of life

Cost Consequence Analysis	Control A Non-DPH decedents (n=417)	Control B DPH decedents (n=541)	IPCP decedents (n=726)	Δ IPCP-Control A		Δ IPCP-Control B	
Gross healthcare costs	Mean	Mean	Mean	Mean difference	P	Mean difference	P
NHG gross cost	\$16,735	\$13,109	\$13,771	-\$2,964	0.02	+\$662	0.52
DPH gross cost	\$1,743	\$2,401	\$2,823	+\$1,080	<0.001	+\$422	0.12
Total gross cost	\$18,478	\$15,510	\$16,594	-\$1,884	0.15	+\$1,084	0.31
Symptom control	%	%	%	% difference	P	% difference	P
Pain controlled	-	97%	97%	-	-	0%	0.9
Dyspnea controlled	-	94%	93%	-	-	-1%	0.50
Delirium controlled	-	92%	97%	-	-	+5%	0.06
Place of death	%	%	%	% difference	P	% difference	P
Out-of-hospital deaths	45%	72%	79%	+34%	<0.001	+7%	0.08
Home deaths	22%	33%	39%	+17%	<0.001	+6%	0.08
Healthcare utilisation	Mean	Mean	Mean	Mean difference	P	Mean difference	P
NHG IP utilisation	0.96	0.80	0.82	-0.14	<0.001	+0.02	0.72
NHG ED utilisation	0.65	0.48	0.48	-0.17	<0.001	0.00	0.93
NHG OP utilisation	1.02	0.78	0.67	-0.35	<0.001	-0.11	0.29
NHG ALOS	16.59	14.34	12.83	-3.76	<0.001	-1.51	0.13

5 CONCLUSION

IPCP delivered greater value in the final month of life by shifting care from acute hospitals to hospice, reducing acute healthcare utilisation and expenditure while enabling more patients to die at home or outside hospital with maintained high-quality symptom control indicating better alignment of resources with patient-centred outcomes.

6 REFERENCES

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