

Treatment Variation and Outcome in T1-T2, N0 Glottic Cancer

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Objectives

- To describe the spectrum of treatment in a population of patients with T1-T2 glottic cancer
- To assess the association between radiation treatment parameters, patient characteristics, and local control rates
- To compare local control rates among the Ontario cancer centres
- To compare treatment patterns between centres where local control rates vary

Study Population

- Carcinomas of the glottis, diagnosed in Ontario from 1982-1995
- Sample size: 491 T1N0 and 213 T2N0
- Sampling designed to represent patients from each cancer centre in the province, with some oversampling for small centres

Study Context

- Ontario is the largest province in Canada, 11.9 million, 38% of the population
- Nine cancer centres deliver all of the radiotherapy for the province and register 98% of glottic cancer patients
- Part of a larger study in laryngeal cancer with a total sample size of 1546

Data Sources

- Ontario Cancer Registry
- Province-wide chart review
- Radiotherapy treatment records abstracted by a radiation therapist

Study Variables

Patient Characteristics

Age

Sex

Socioeconomic status

Urban/Rural

Treatment Variables

Modality

RT

parameters

Time-related

Quality indicators

Outcomes

Overall survival

Cause-specific survival

Local control

Patient Characteristics

	n	T1	T2
Mean age (SD)		64.0 (9.8)	63.5 (10.2)
Sex (% male)		88.8	88.7
SES			
1 st quintile (low)		29.3	35.7
2		20.9	22.2
3		19.8	23.2
4		18.4	12.6
5 th quintile (high)		11.6	6.3
Rural residence*		18.4	21.3

* General population: 16.7%

Initial Treatment

(%)

	T1	T2
Radiotherapy	93.5	92.5
Local excision	3.7	0.5
Partial laryngectomy	1.6	0.5
Total laryngectomy	0	4.2
No treatment	1.2	2.4

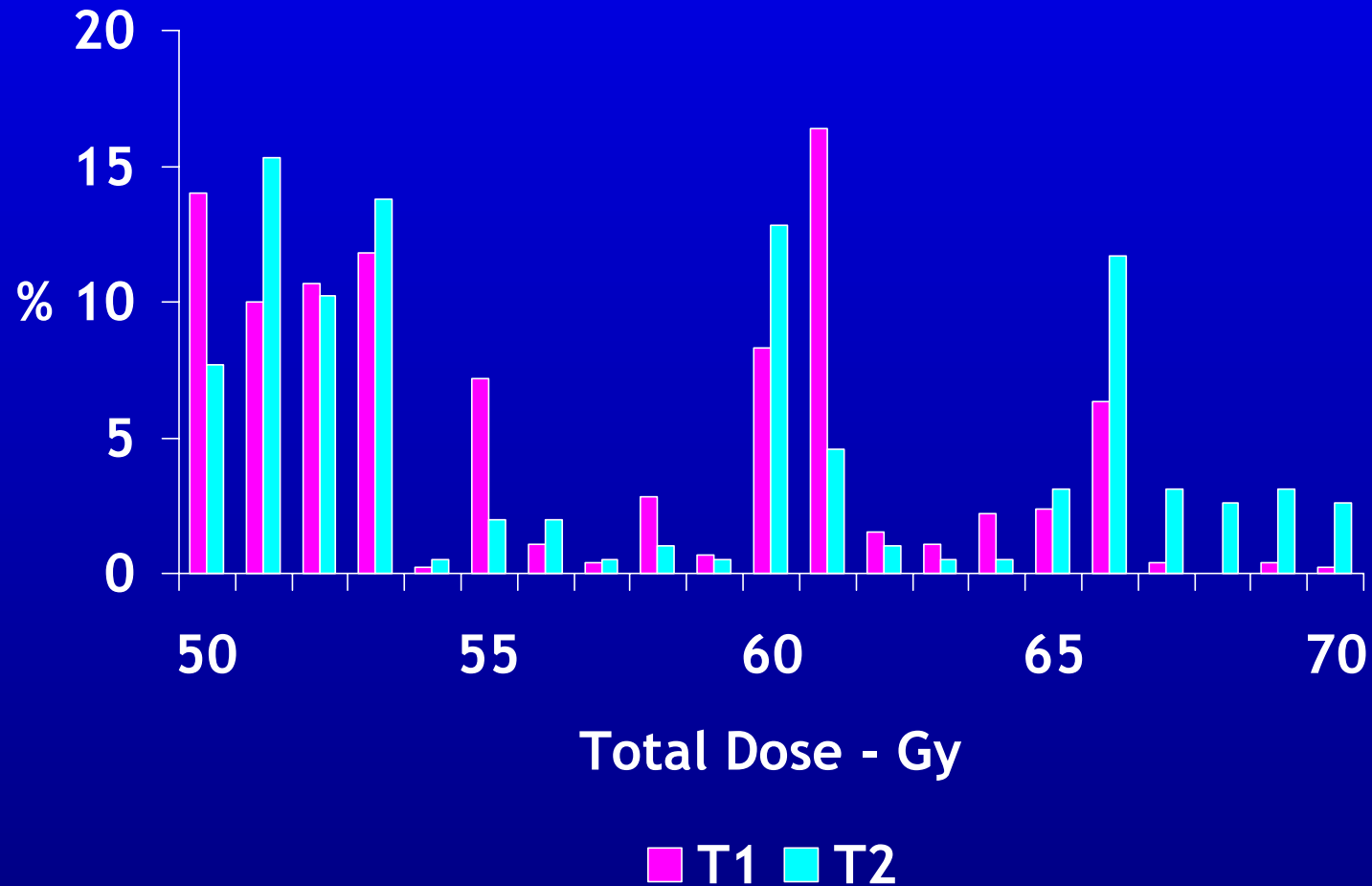
Outcome Results - All Patients

5-year Actuarial Rates

(95% Confidence Limits)

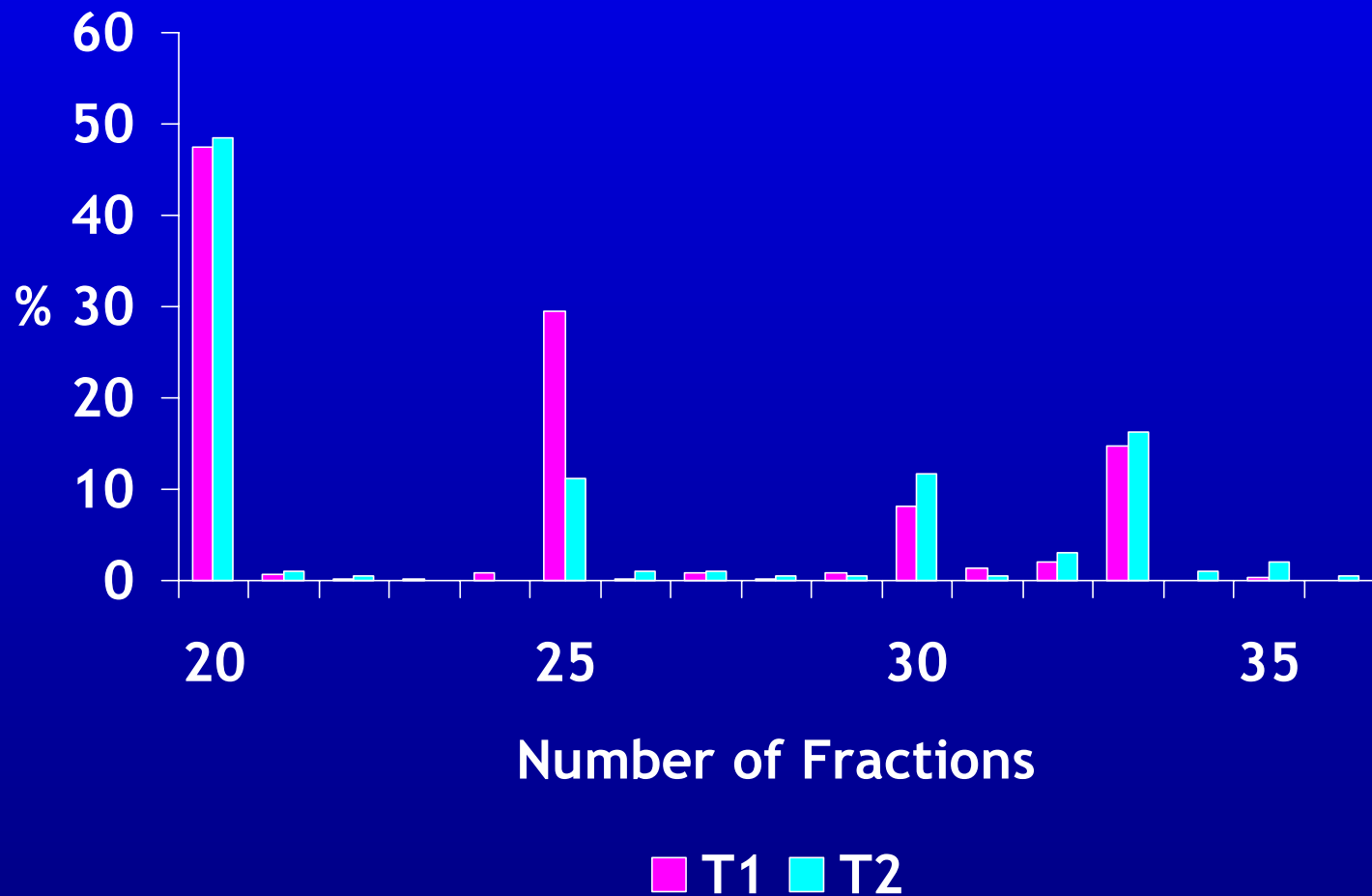
	T1	T2
Overall survival	77% (73%, 81%)	69% (63%, 76%)
Cause-specific survival	93% (91%, 96%)	81% (76%, 87%)
Local control	82% (78%, 86%)	63% (56%, 70%)

Total Radiation Dose (Gy)



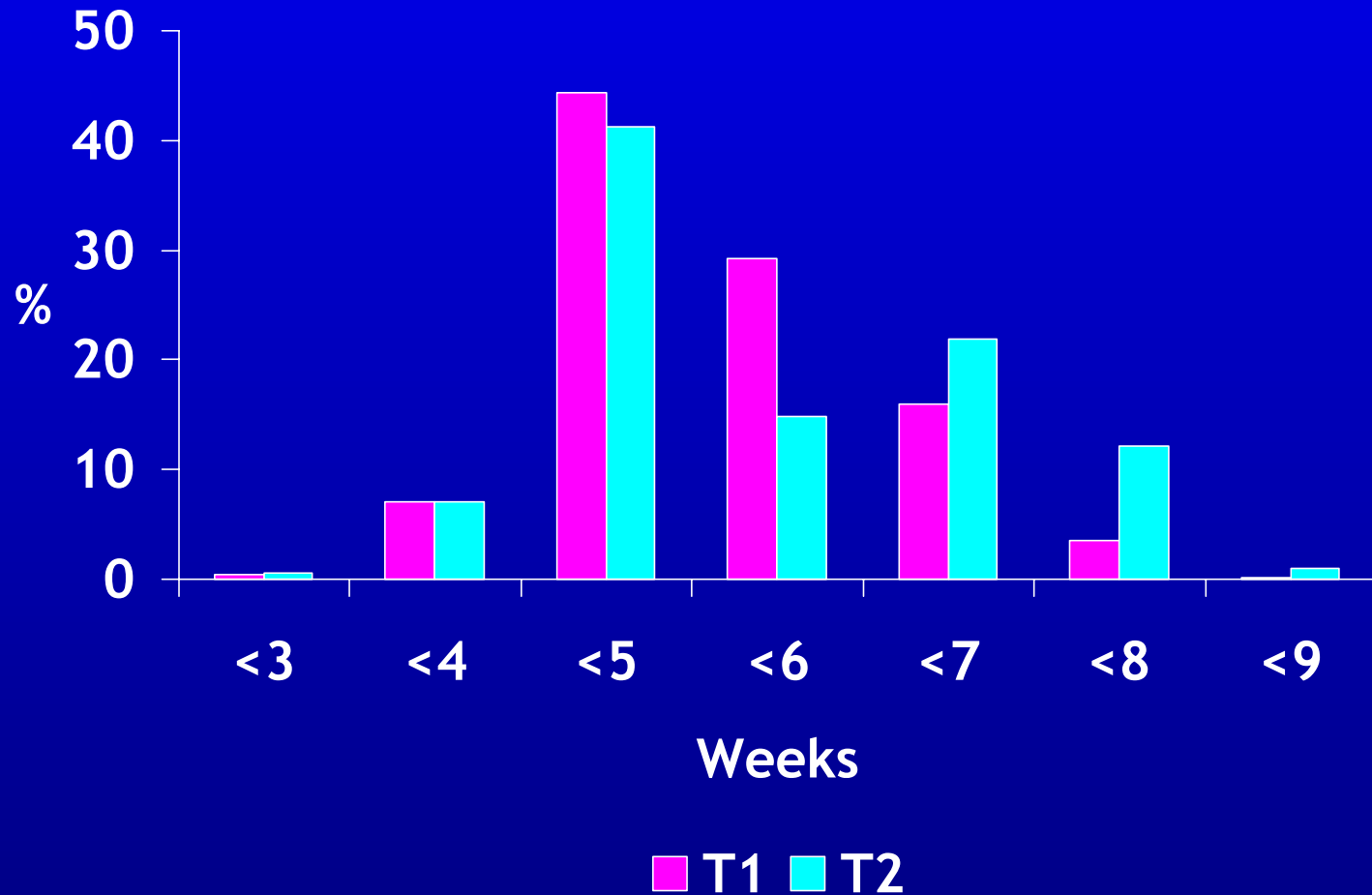
7 T1 and 2 T2 treated with <50 Gy

Number of Radiation Fractions



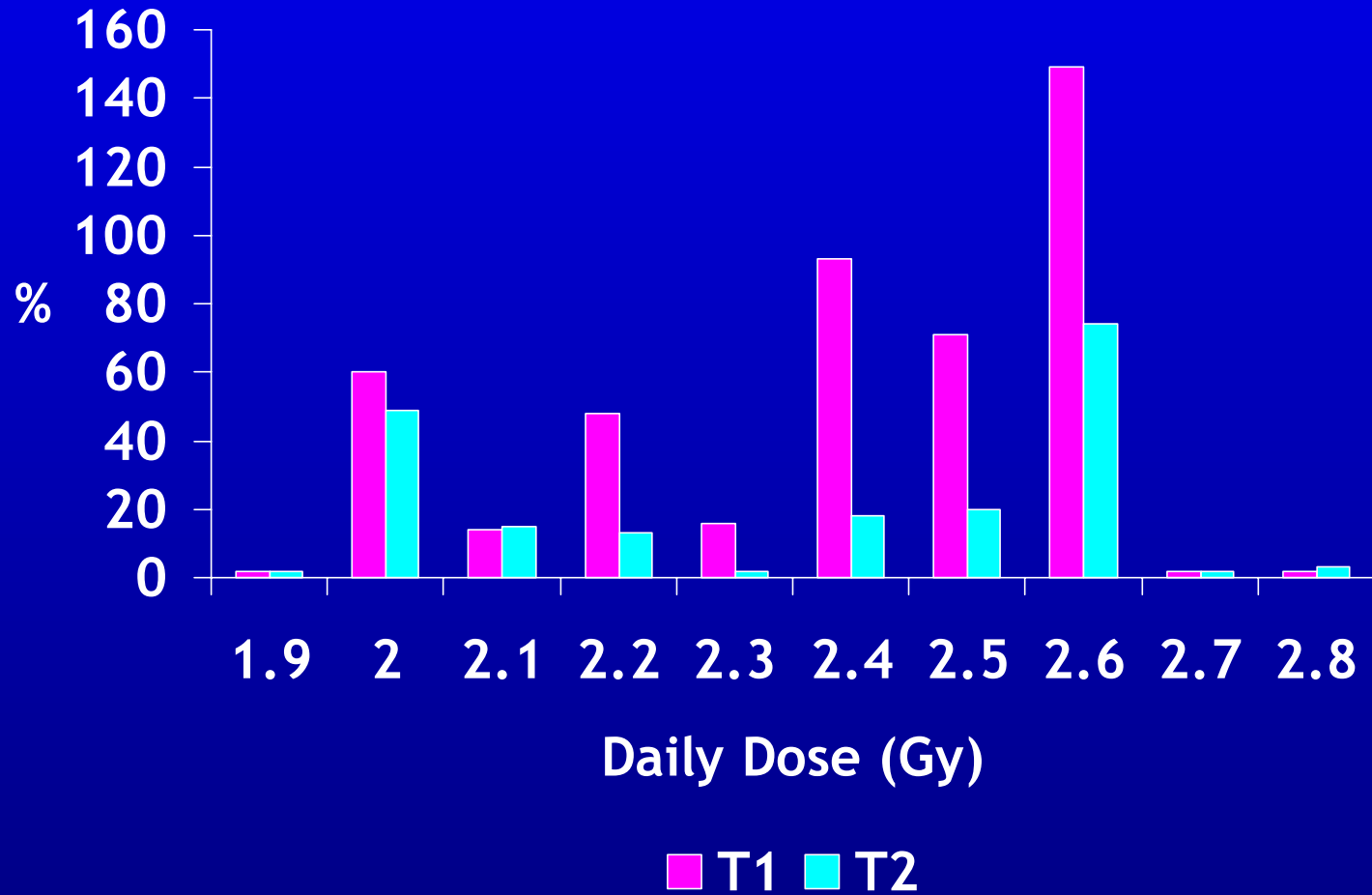
4 T1 and 1 T2 treated with <20 fractions

Total Treatment Time



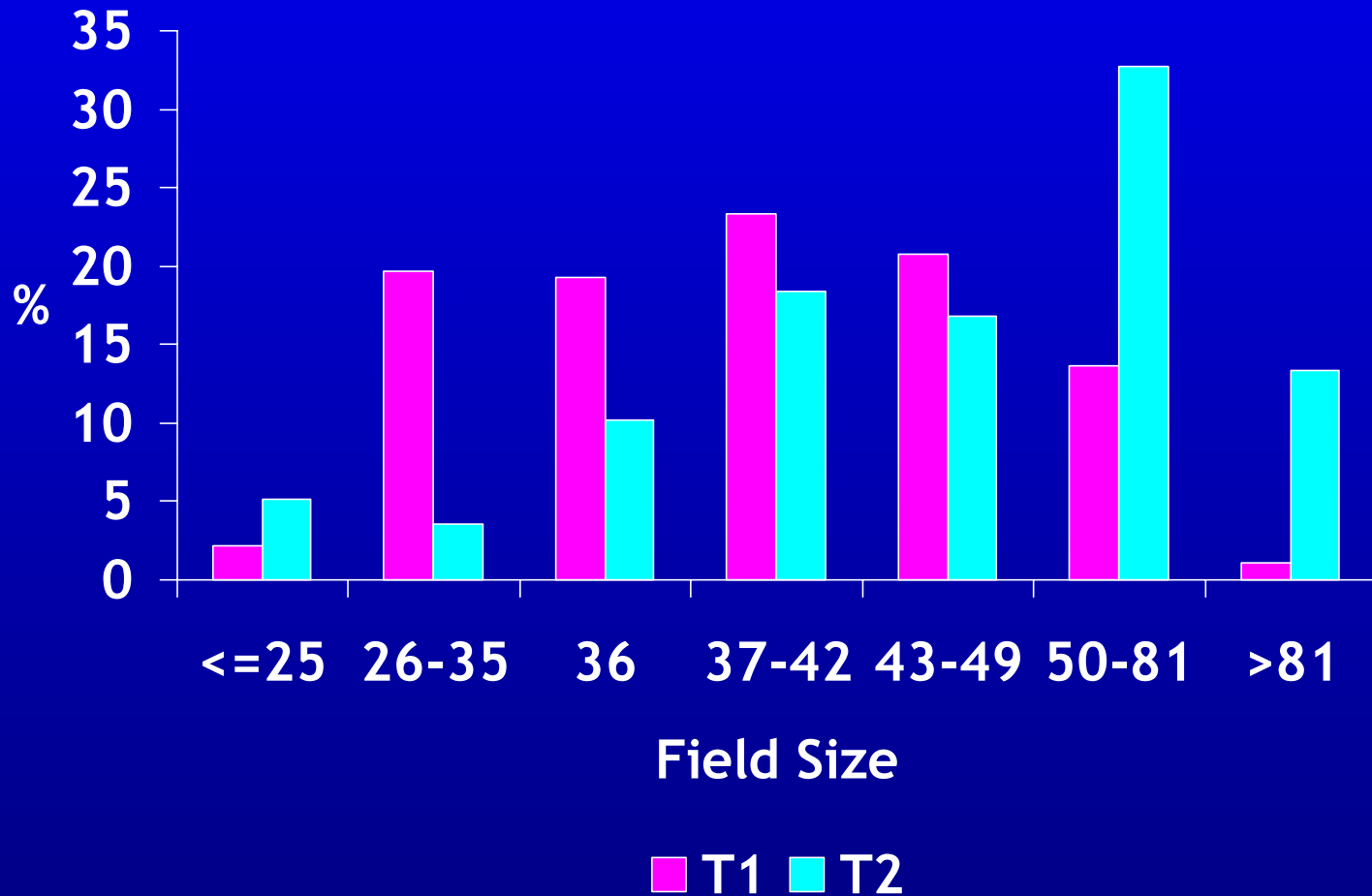
2 T2 treated in >9 weeks

Daily Dose (Gy)



1 T1 treated with 3.7 Gy

Field Size (cm²)



Field Reductions: T1 7.0%, T2 29.1%

Technique, Beam Energy

(%)

	T1	T2
Technique		
POP	77.6	75.5
Angle-down	4.6	17.9
Ant. wedge	16.7	4.6
Other	1.1	2.0
Beam Energy		
Co60	87.5	73.0
6MV	7.0	17.4
4MV	5.3	7.7
Other	0.2	2.0

Quality Indicators

	T1	T2
Wait time to treatment		
<=3 weeks	17.9	15.3
3<6 weeks	50.0	48.0
>6 weeks	32.1	36.7
Treatment interrupts		
0	27.2	24.5
1	43.0	39.8
2	15.4	14.3
3	8.6	8.7
4+	5.9	12.8
Late treatment breaks		
yes/no	13.6%	27.1%

Local Control - T1

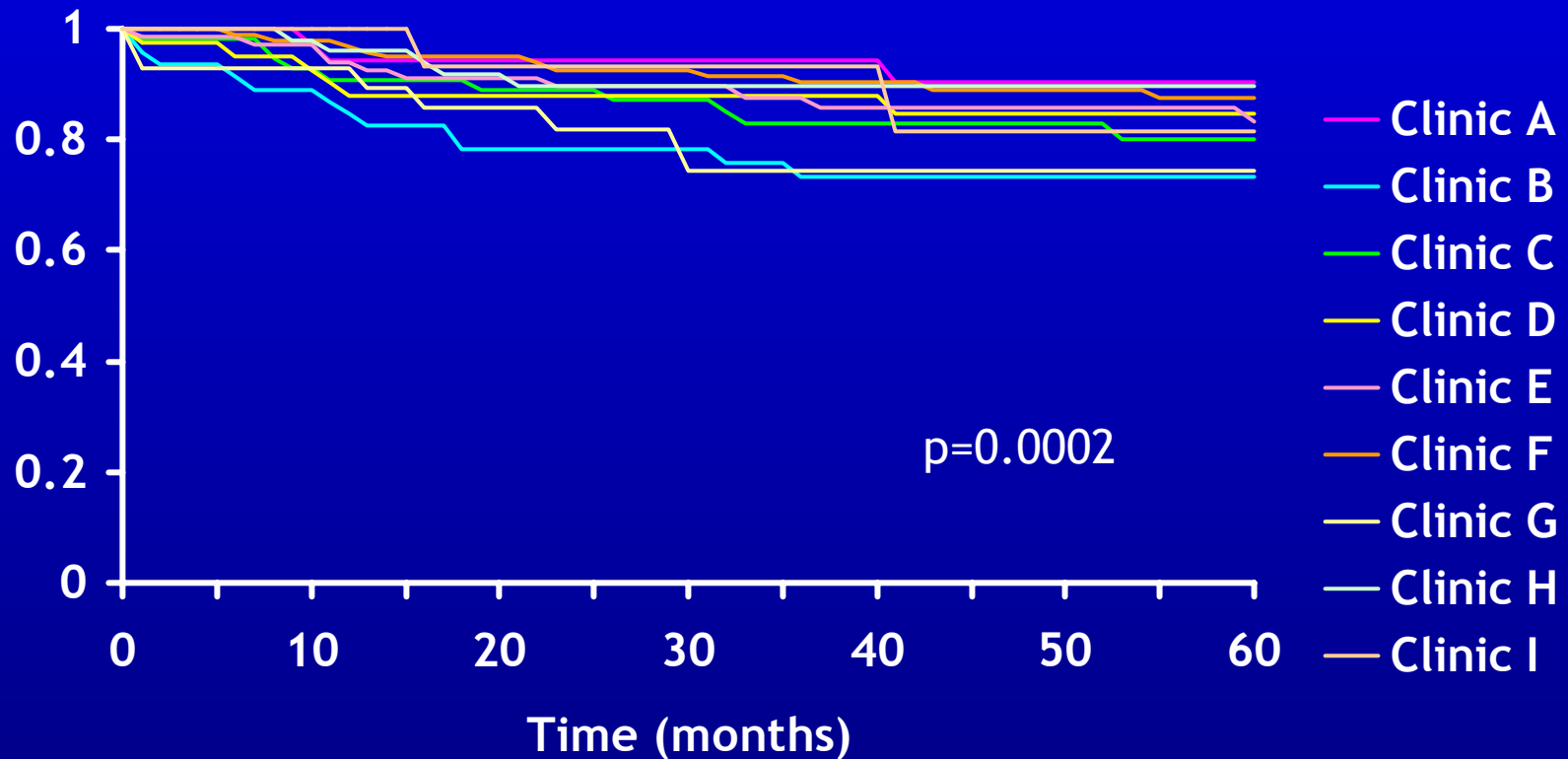
	Risk Ratio	(95% CI)
Age		
<=49	3.21	1.49, 6.90
-59	1.56	0.83, 2.92
-69	1.00	-
-79	1.17	0.59, 2.34
>=80	2.03	0.69, 5.98
Treatment Interrupts		
0	1.00	-
1	1.08	0.58, 2.01
2	0.73	0.28, 1.85
3	2.06	0.94, 4.55
4+	2.43	1.00, 5.91

Local Control - T2

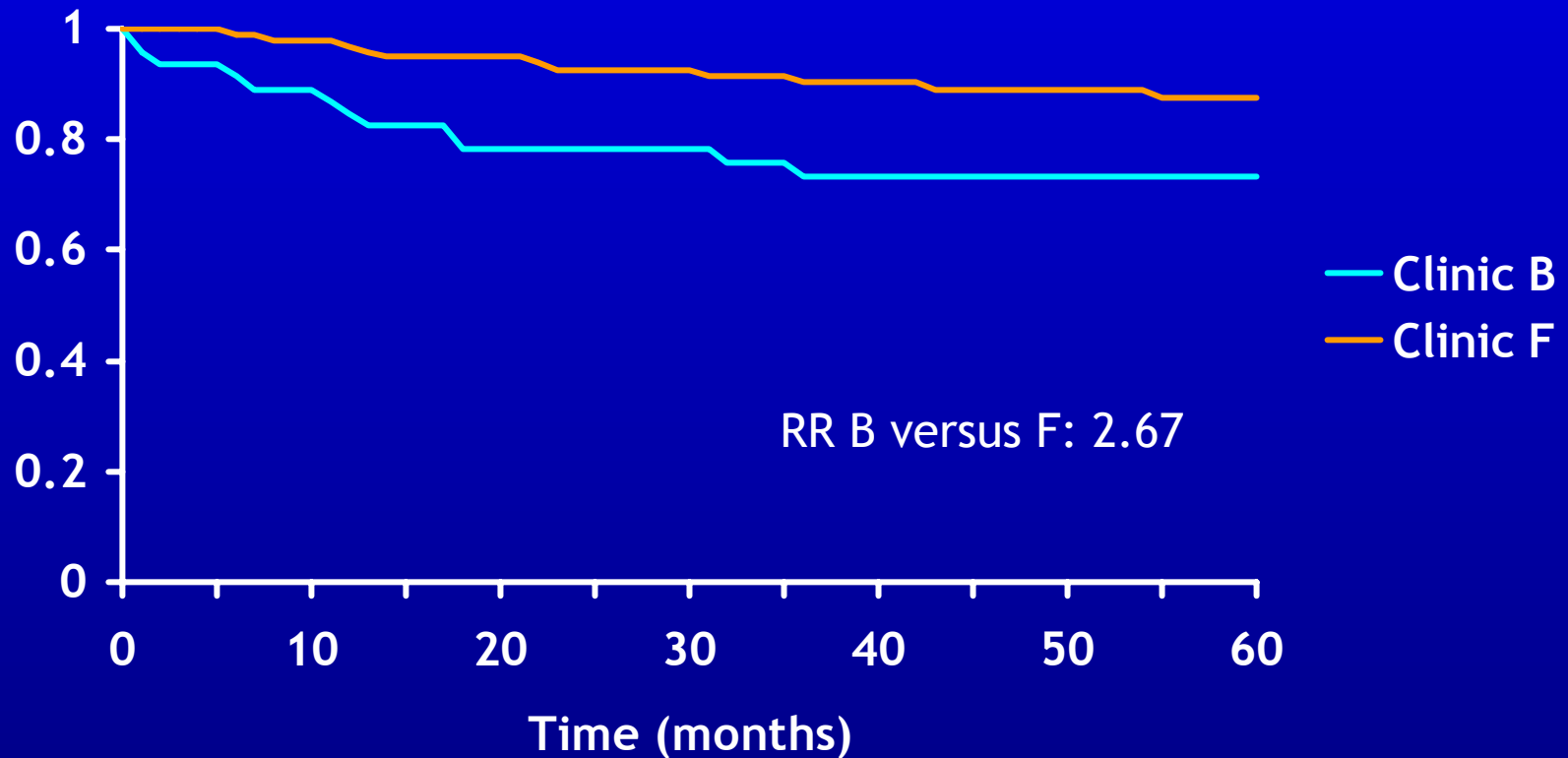
Multivariate Risk Ratios

Age		Beam energy	
<=49	1.05	Co60	1.00
-59	2.61	6MV	1.26
-69	1.00	4MV	2.75
-79	3.32	other	10.40
>=80	2.42		
Technique		Field	
POP	1.00	reduction	2.33
Angle down	1.40		
Other	0.14	Late break	2.19

Local Control by Clinic - T1

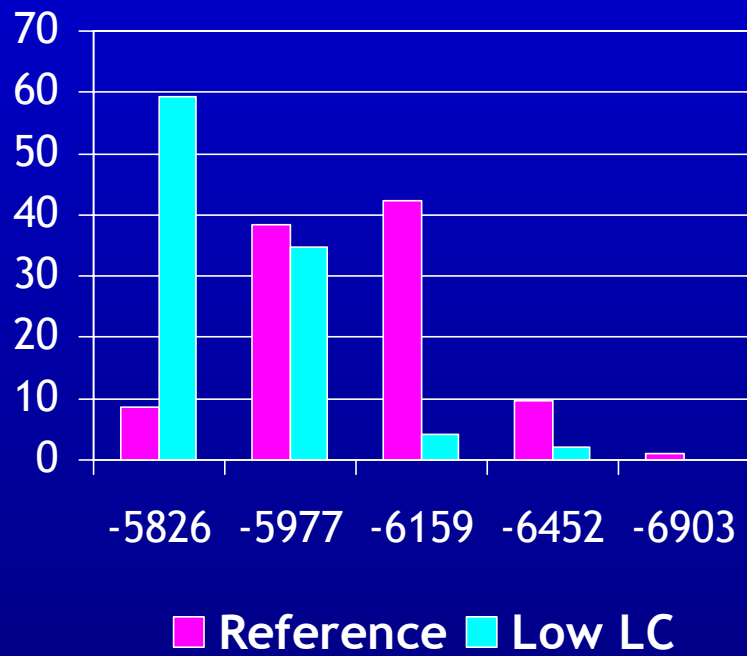


Local Control by Clinic - T1



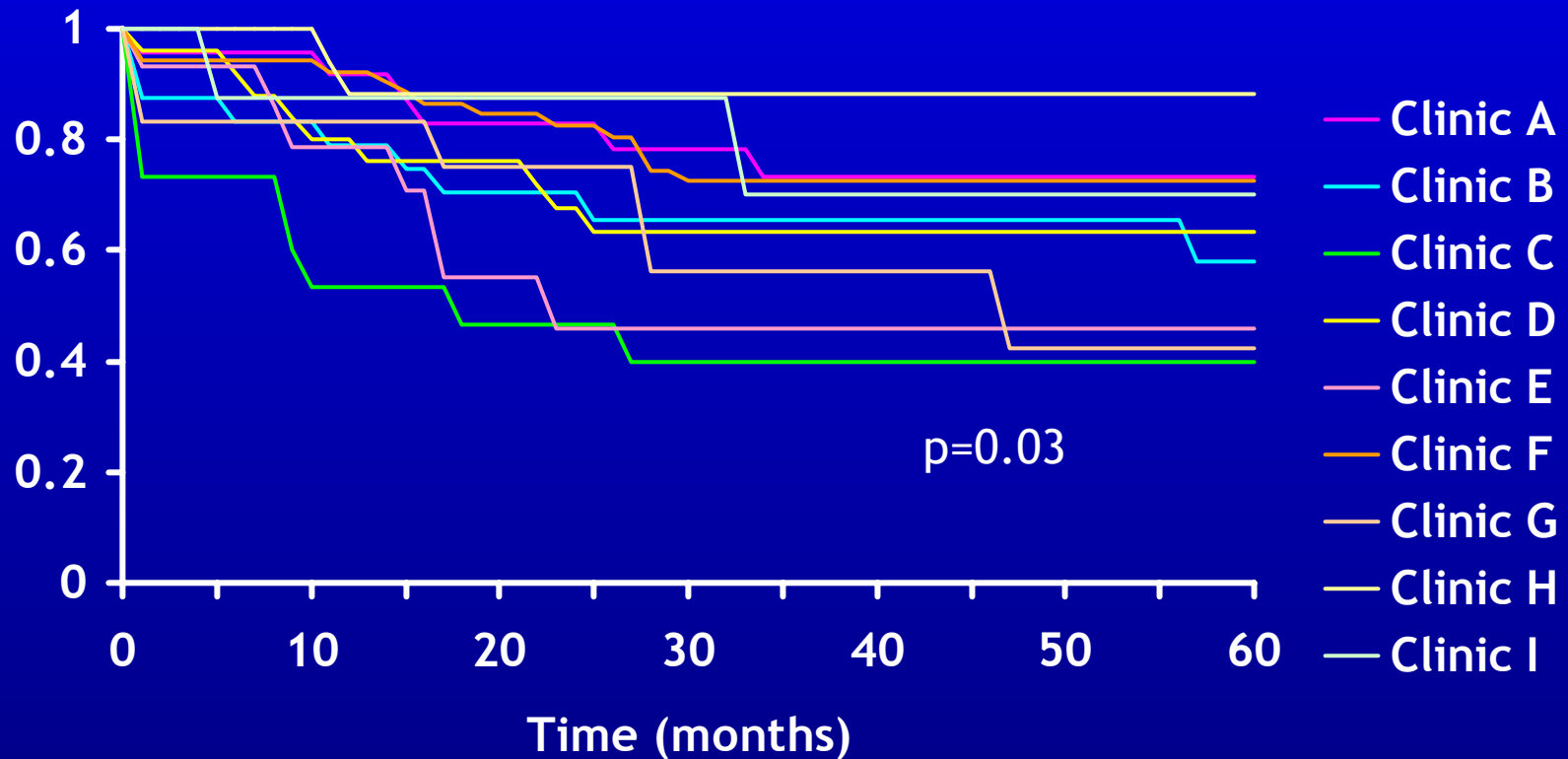
Local Control by Centre - T1

BED by Centre

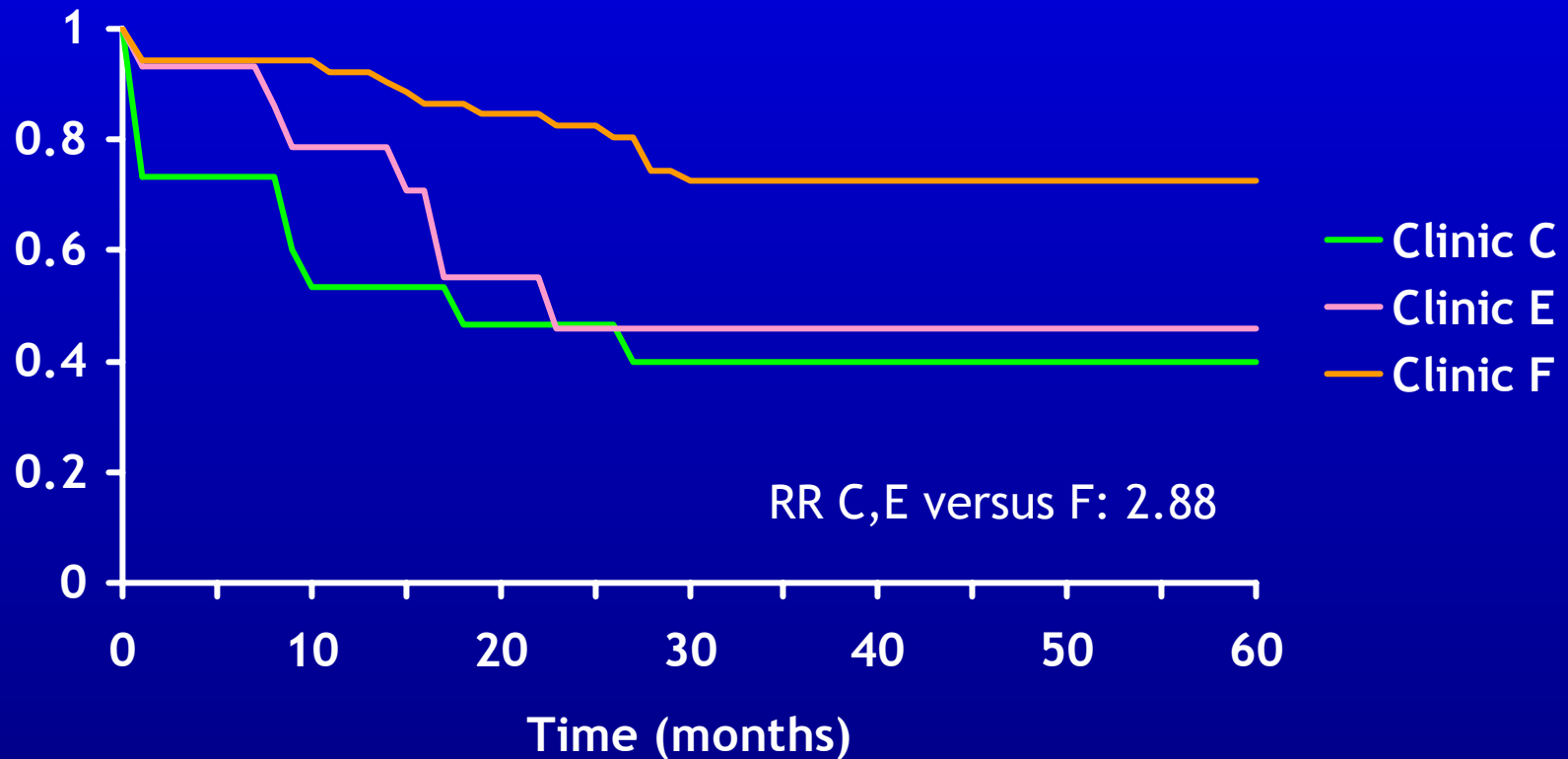


- BED cGy₁₅ explained some of the centre effect:
 - RR of 2.67 reduced to 2.09 (ns)

Local Control by Clinic - T2



Local Control by Clinic - T2



Local Control by Centre - T2

	Reference	Low Local Ctrl
Total Treat Time		
<=28	45.3	0.0
29-35	50.9	6.5
36-42	1.9	29.0
>42	1.9	64.5
Late breaks	5.7	41.9
Field reductions	7.6	45.2

Local Control by Centre - T2

	Risk Ratio*
Univariate	2.88
Total Treat Time added	1.49
Late Treatment Break added	2.34
Field Reduction added	1.92

* Risk of local failure in low local control centres compared to the reference

Conclusions

- In Ontario, treatment varies for T1-T2 glottic cancer in ways that affect the local failure rates
- Understanding treatment variation and its impact allows us to identify aspects of practice that need attention

Conclusions

- Cancer registries provide an invaluable resource to the evaluation of the care of cancer patients by:
 - identifying population-based disease cohorts
 - providing initial information about treatment and survival
- Further enhancement of cancer registries with disease stage, treatment and outcome information will improve our ability to describe the care and outcome of people with cancer