

DAGDA score and pneumonia prevention program

(A journey from opinion to experience)

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HA convention 7/5/2018



7/2012 – 6/2013 results

	Survive	Died (30-days)	Mortality rate
Pneumonia group	48	24	33.3%
Non-pneumonia group	1609	61	3.65%

P-value: < 0.001

Preventive measures

- Education of staff
- Breathing exercises with incentive spirometer
- BD oral chlorhexidine swabs
- Ambulation with good pain control
- Bed elevation
- Program progress discussion
- Pneumonia bundle documentation
- Computerized pneumonia-prevention order

Long-term results of a post-op pneumonia prevention program for the inpatient surgical ward.

Hadiza S. JAMA Surg. 2014; 149 (9): 914-918

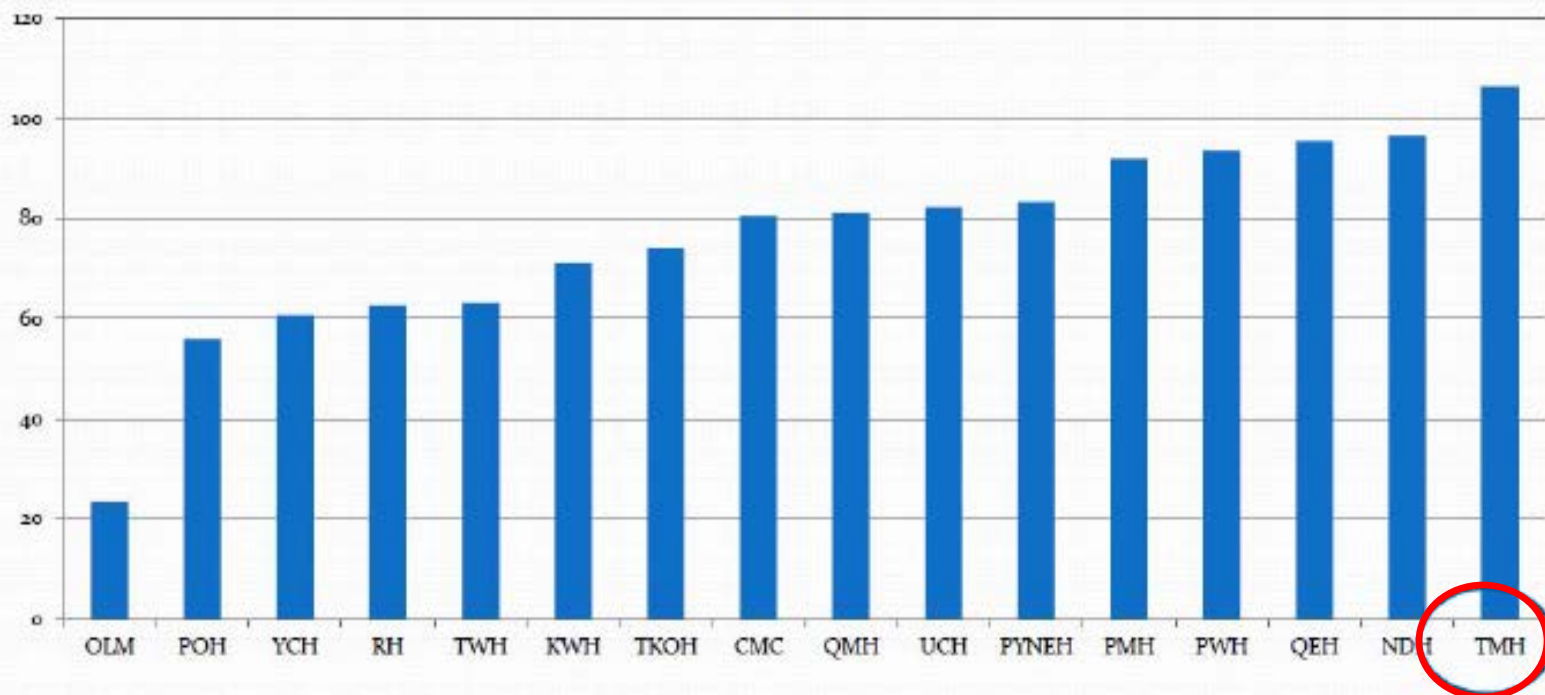
Postoperative pneumonia-prevention program for the inpatient surgical ward.

Wren S. J Am Coll Surg; 2010; 210 (4): 491-5

Preventive measures... applicable?

Acute bed occupancy rate

IP bed occupancy rate



Clinical questions

- Risk factors associated with post-operative pneumonia?
- Who are the high risk patients?

New Territories West



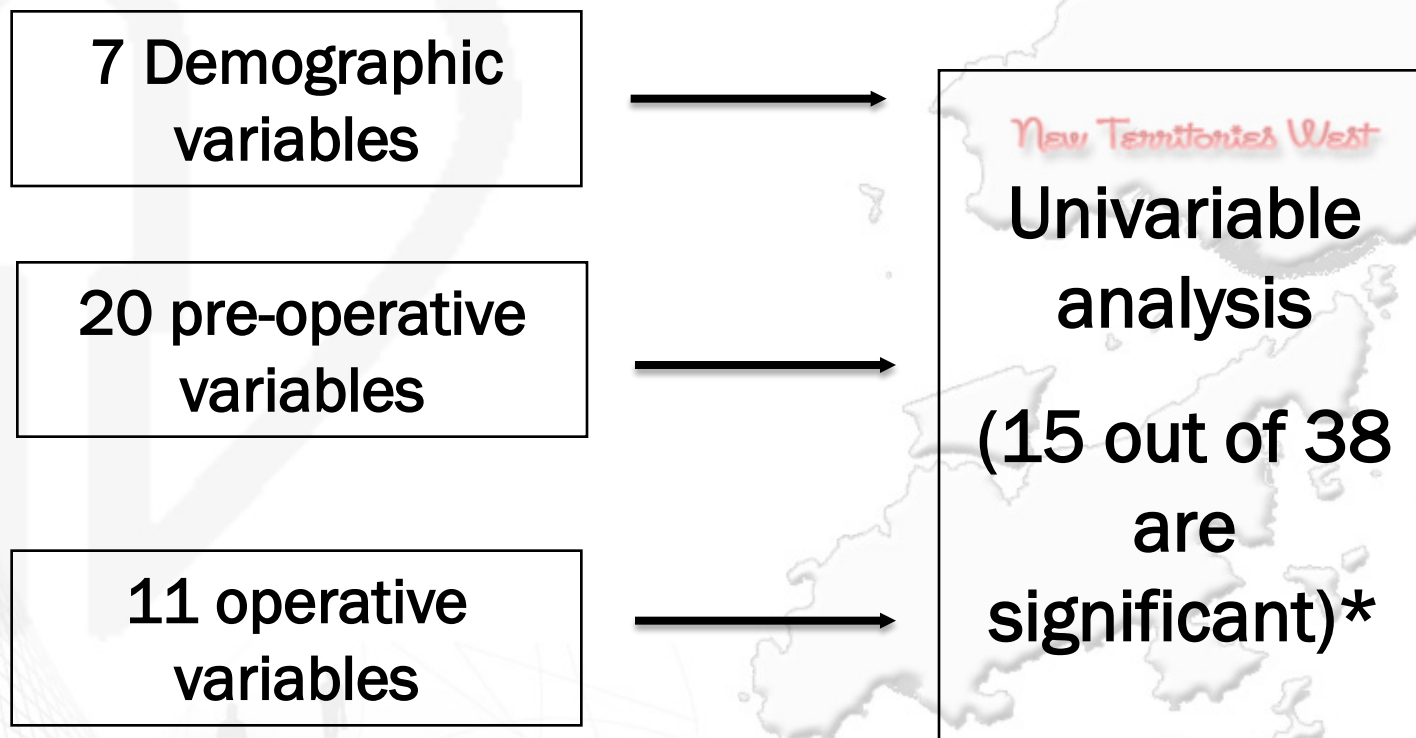
Analysis

(to identify significant risk factors associated with post-operative pneumonia)

- Using TMH SOMIP 7/2012 – 6/2013
- 1742 cases received major/ ultra-major operations
- Post-op pneumonia: 72 (4.1%)
- 38 variables
- Demographic related variables (7)
- Pre-operative related variables (20)
- Operative/ disease related variables (11)

Analysis

(to identify significant risk factors associated with post-operative pneumonia)



* P-value < 0.05 was considered significant

Analysis

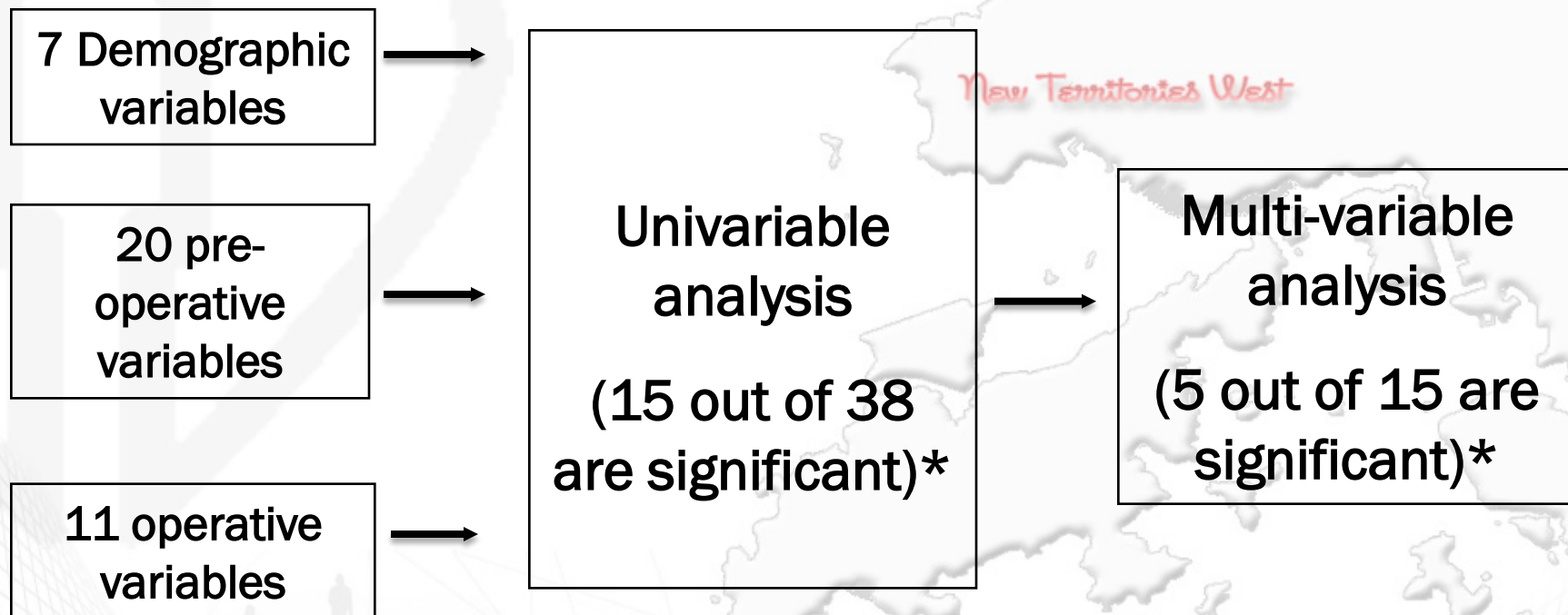
(to identify significant risk factors associated with post-operative pneumonia)

sex	Anti- psychotic agents	ASA score >=3	Renal failure need dialysis	Nature of operations	EOT > 24 hours after admission
age	Neurological status	ADL dependence	Disseminated CA	Cancer surgery	GA
smoking	hemiplegia	dyspnea	Diabetes mellitus	Major OT	OT time
alcohol	ascites	Cardiac disease	hypertension	Ultra-major OT	Blood loss > 100ml
Body weight	Acute renal failure	Severe COPD	Use of steroid	Elective/ emergency OT	MIS Contamination
height	Sepsis before OT	Neurological disease	immunosupp ressant		
BMI	Septic shock before OT	Neurological deficit			

red print: significant variables

Analysis

(to identify significant risk factors associated with post-operative pneumonia)



* P-value < 0.05 was considered significant

Multi-variable logistic regression

Risk factors	Uni-variable analysis (p-value)	Multi-variable logistic regression (p-value)
Cardiac disease	0.003*	0.241
Severe COPD	0.029*	0.128
Renal failure need dialysis	0.045*	0.965
ASA score ≥ 3	$< 0.001^*$	0.013*
ADL dependence	$< 0.001^*$	0.001*
dyspnea	$< 0.001^*$	0.006*
Neurological status	$< 0.001^*$	0.184
ascites	$< 0.001^*$	0.031*
Sepsis before OT	$< 0.001^*$	0.362
Nature of operations	$< 0.001^*$	0.074
Major OT	0.007*	0.792
Ultra-major OT	0.005*	0.78
Elective/ emergency OT	$< 0.001^*$	0.058
EOT > 24 hours after admission	$< 0.001^*$	0.774
GA	0.027*	0.028*

DAGDA score

<u>Risk factors</u>	<u>Multi-variable logistic regression (p-value)</u>	<u>B-value</u>	<u>Score</u>
<u>Dependence</u> (ADL)	0.001*	1.0	3
<u>Ascites</u>	0.031*	1.6	4
<u>GA</u>	0.028*	2.1	6
<u>Dyspnea</u> before OT	0.006*	0.8	3
<u>ASA score</u> ≥ 3	0.013*	0.6	2

DAGDA score: $f(\text{ASA} \geq 3) \times 2 + f(\text{dependence}) \times 3 + f(\text{pre-op dyspnea}) \times 3 + f(\text{ascites}) \times 4 + f(\text{GA}) \times 6$



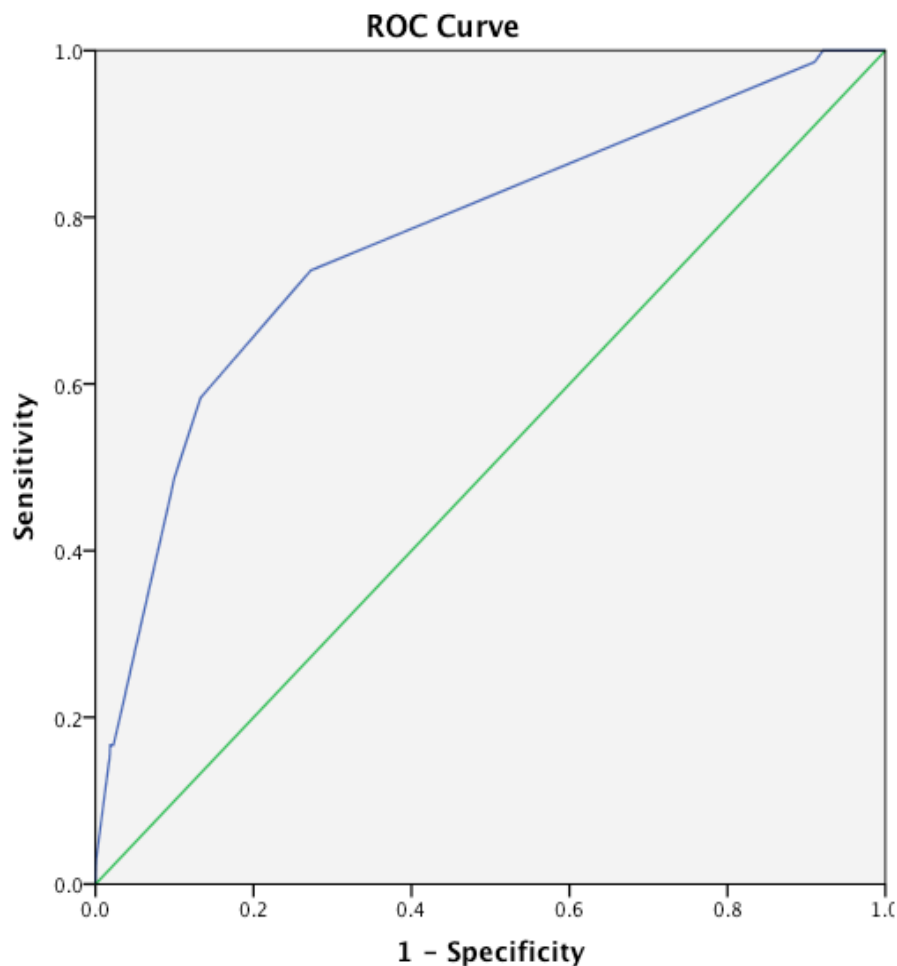
DAGDA score

DAGDA score cut-off	Sensitivity (per cent)	Specificity (per cent)
0	100	0
2	97.2	8.9
3	97.2	11.1
5	97.2	11.9
6	95.8	13.2
8*	73.6	73.4
9	58.3	87.1
10	48.6	90.3
11	47.2	90.6
12	16.7	97.8
13	16.7	98.1
14	15.3	98.2
15	28	99.9
18	14	100

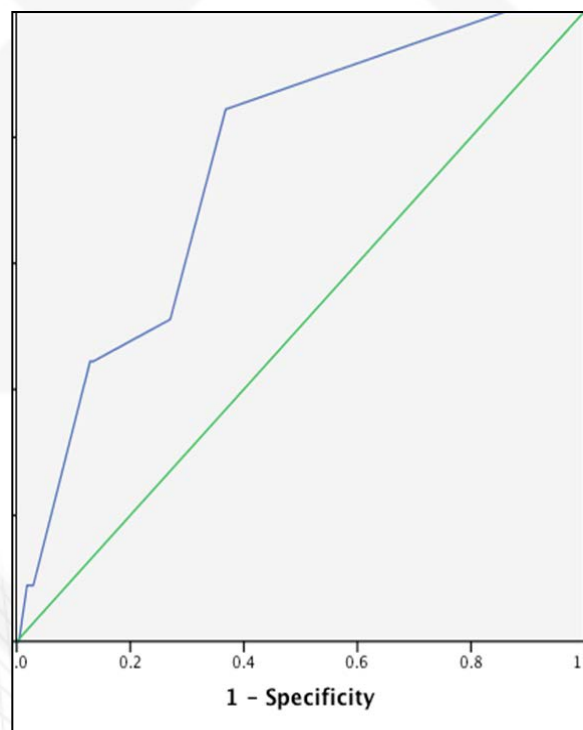
* Cut off point at 8 with sensitivity 73.6% and specificity 73.4%.

DAGDA score (2012-2013)

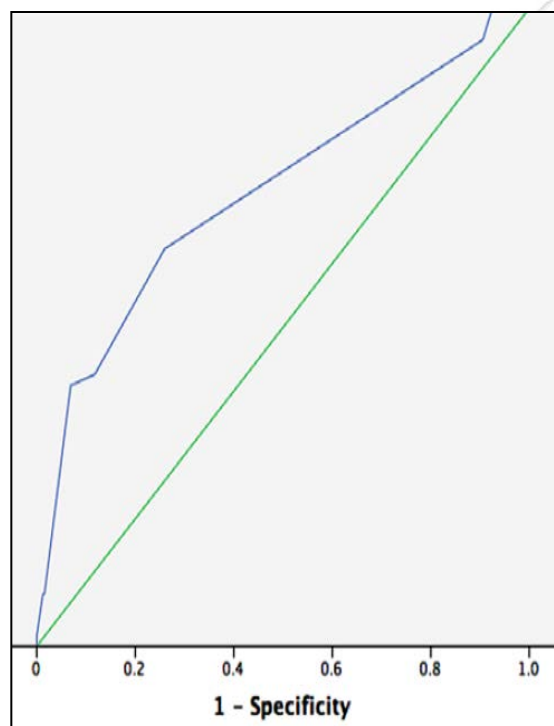
- Maximum DAGDA score: 18
- AUC: 0.78 (95% CI: 0.716 – 0.837)
- Cut-off point: 8 (sensitivity: 73.6%, specificity: 73.4%)



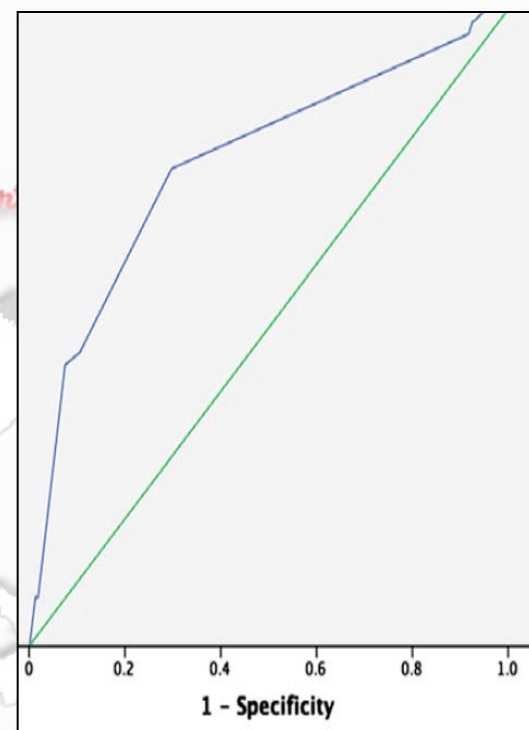
DAGDA score validation



2010-2011
1330 patients
AUC: 0.76



2013 – 2014
1671 patients
AUC: 0.7



2014 – 2015
1495 patients
AUC: 0.73

Predictive score (DAGDA score) for post-operative pneumonia
(major/ ultra-major operations, elective + emergency)

<u>Risk factors</u>	<u>Marks</u>
<u>D</u>ependence of activity of daily living (include partial/ total dependent)	<input type="checkbox"/> Yes ---→ 3 <input type="checkbox"/> No
<u>A</u>SA score ≥ 3	<input type="checkbox"/> Yes ---→ 2 <input type="checkbox"/> No
<u>G</u>eneral anaesthesia	<input type="checkbox"/> Yes ---→ 6 <input type="checkbox"/> No
<u>D</u>yspnoea before operation	<input type="checkbox"/> Yes ---→ 3 <input type="checkbox"/> No
<u>A</u>scites (minimal/ small/ trace amount/ $\leq 200\text{ml}$ are not qualified)	<input type="checkbox"/> Yes ---→ 4 <input type="checkbox"/> No
Total:	<input type="checkbox"/> ≥ 8 (go to preventive measures) <input type="checkbox"/> < 8

Preventive measures checklist

Start date:

DAGDA score:

Staff:

1. Warning sign

2. chest physio and breathing exercise

3. Alert case MO +/- frequent CXR

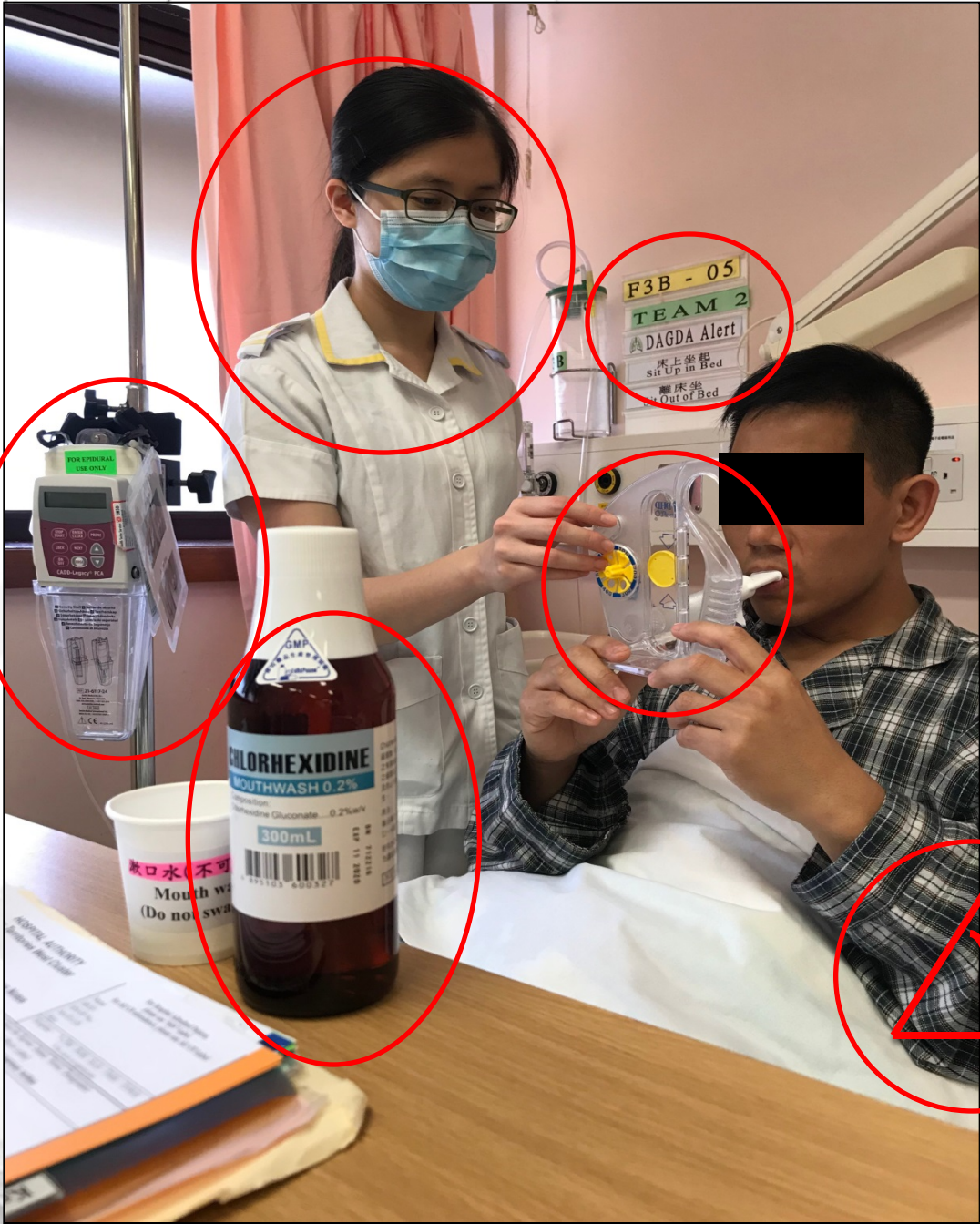
+/- bronchoscopy

+/- consult respiratory physicians

Ambulation with good pain control

4. Preventive nursing care

- head-of-bed elevation to at least 30 degrees and sit up at all meals
- twice daily oral hygiene with chlorhexidine swabs

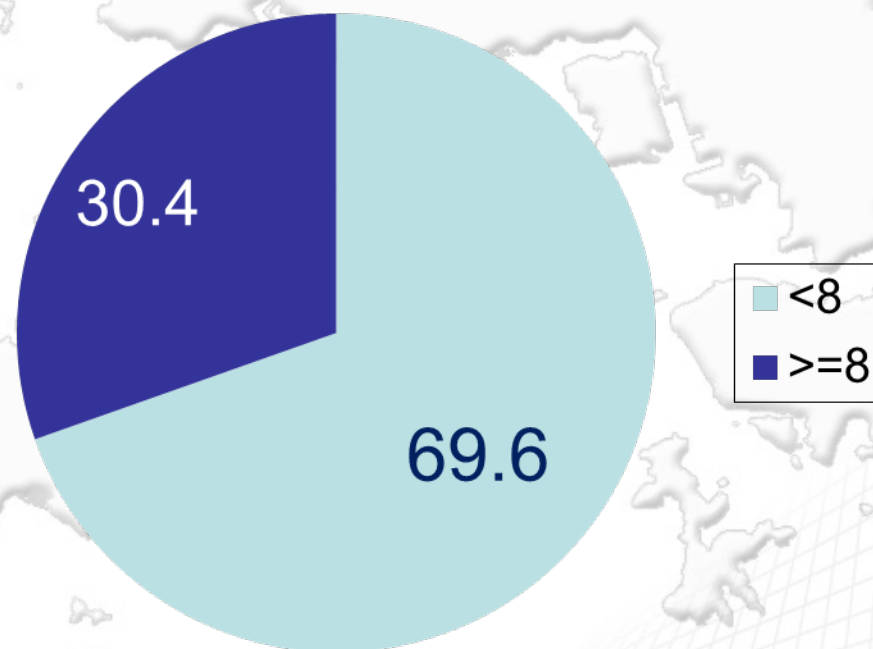


Results

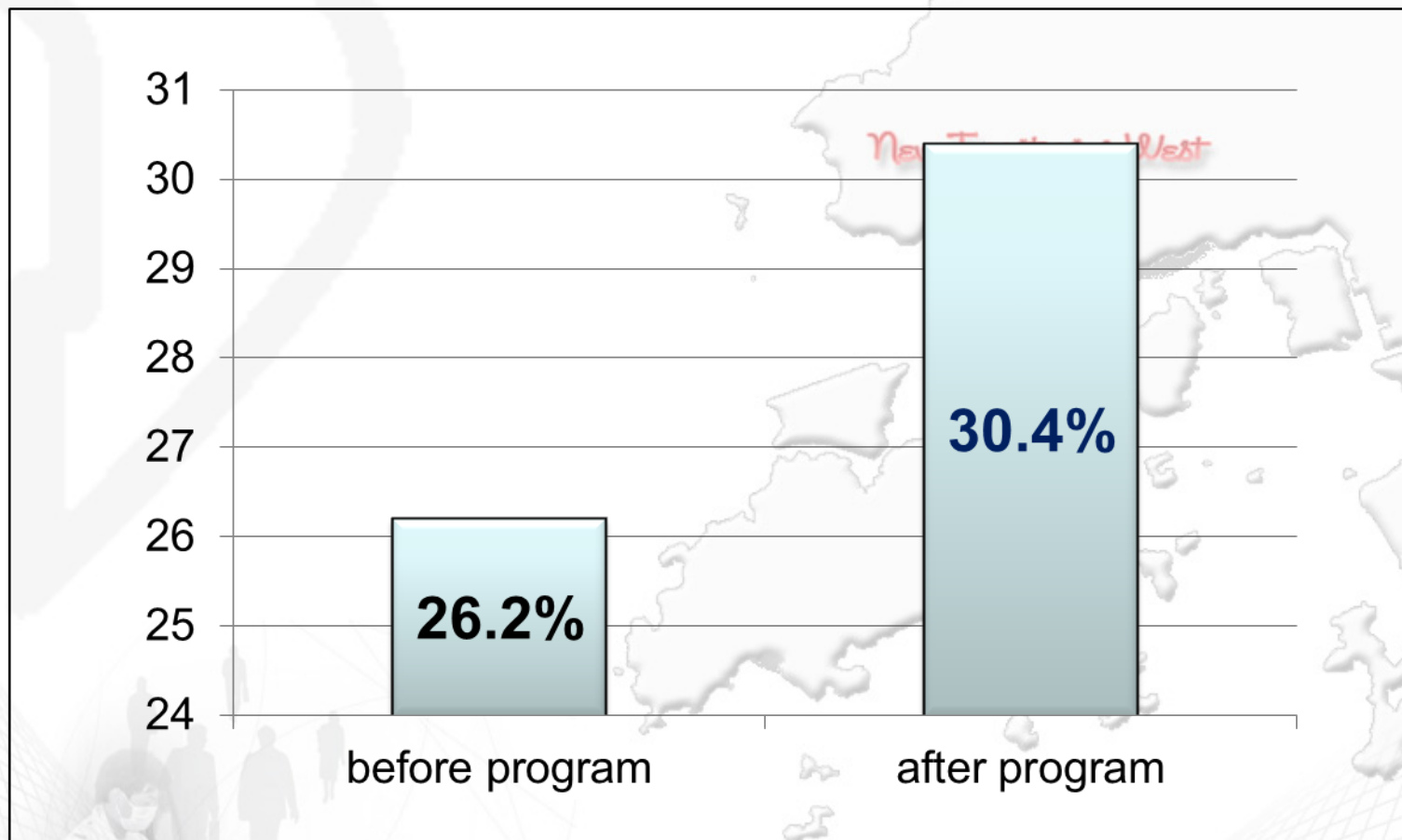
- **5/2016-11/2017**
- **435 cases**
- Major OT: 246 (53.8%)
- Ultra-major OT: 211 (46.2%)
- Elective: 218 (47.7%)
- Emergency: 239 (52.3%)

DAGDA score

New Territories West

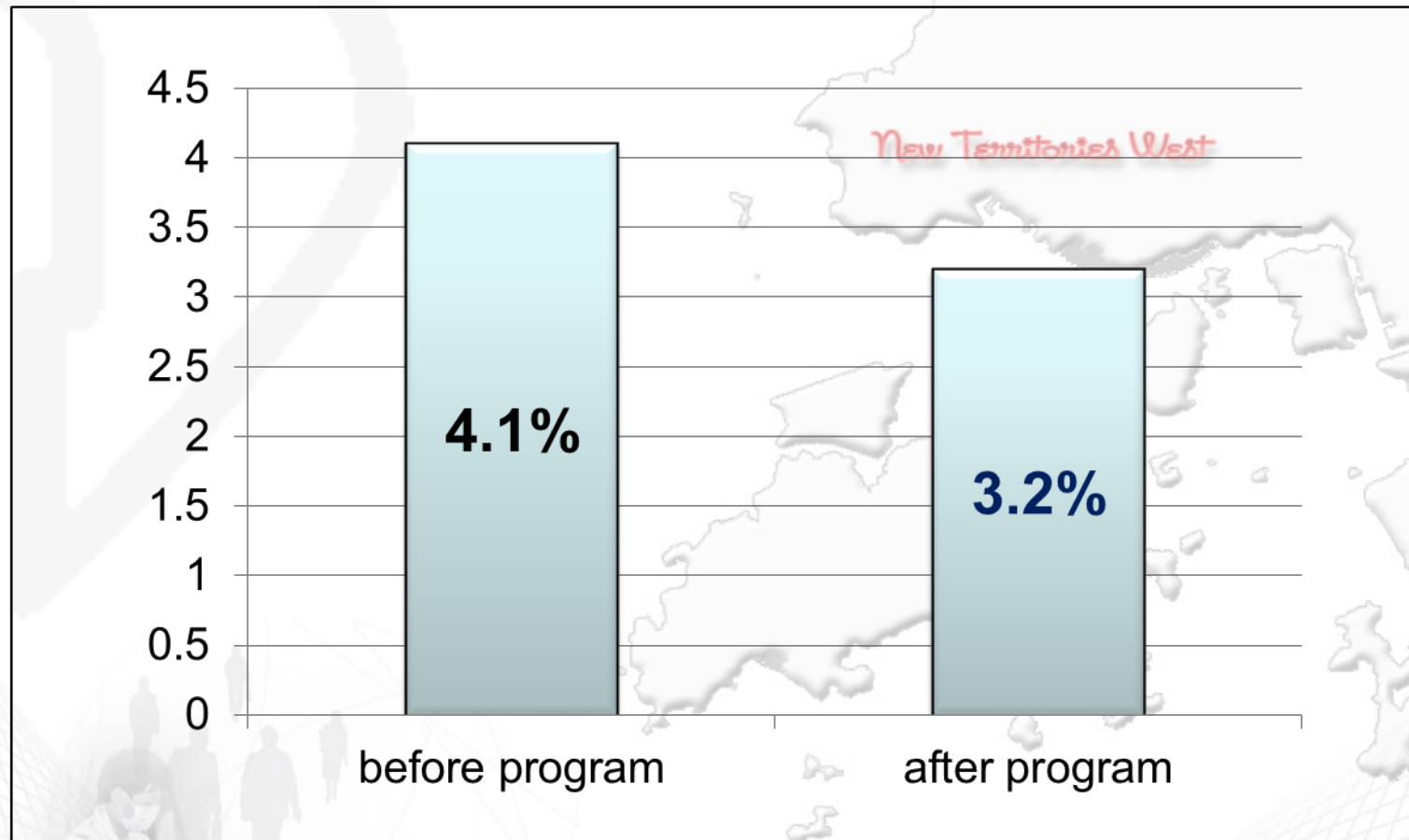


Results (% of patients with DAGDA score ≥ 8)



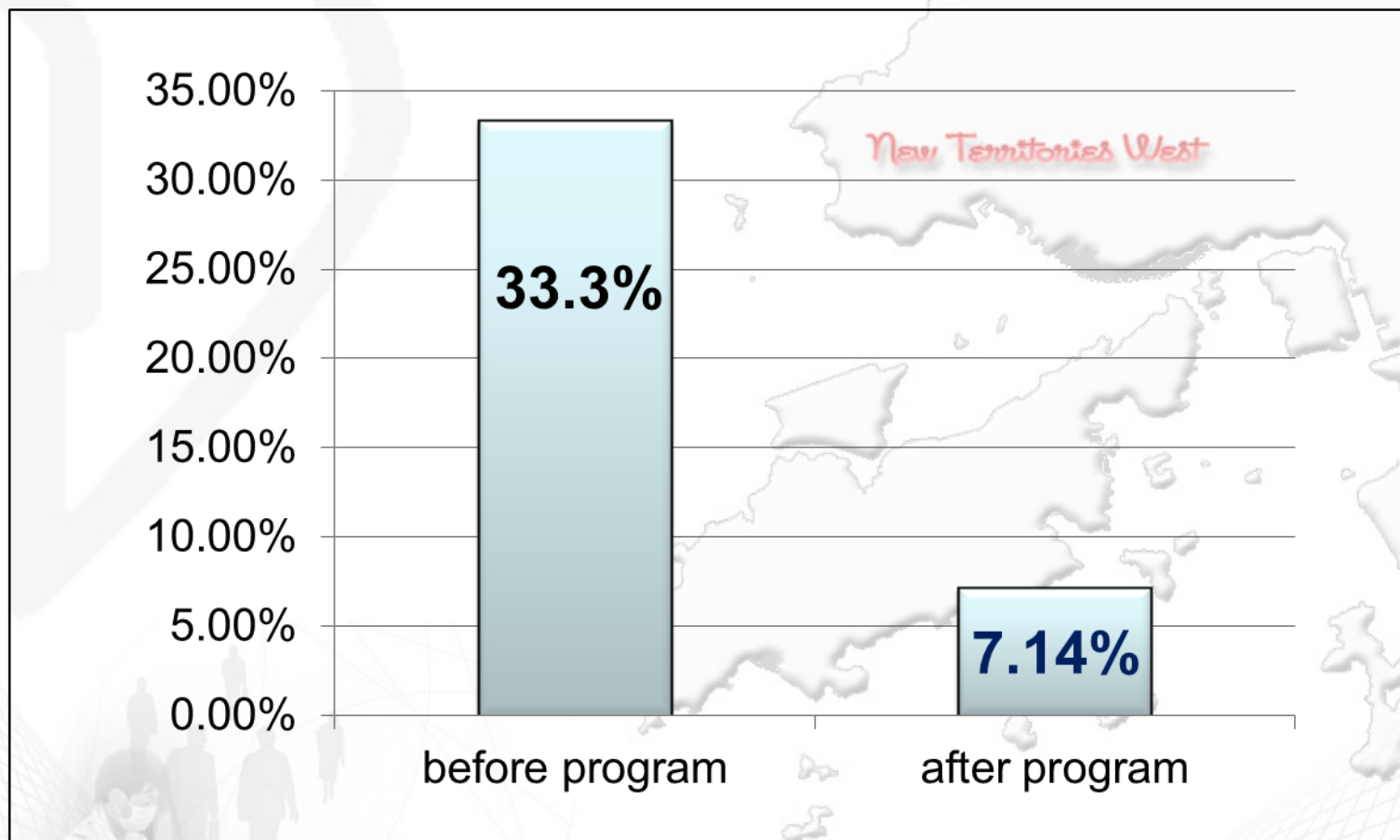
P-value: 0.073

Results (postoperative pneumonia rate)



P-value: 0.56

Results (pneumonia related mortality rate)



P-value: 0.048*

Scientific study

Year	Number of patients
2010 – 2011	1330
2012 – 2013	1742
2013 – 2014	1671
2014 – 2015	1496
5/2016 – 11/2017 (program)	435
Total	<u>6,674</u>

Economy



It's the economy, stupid.

(Bill Clinton)

izquotes.com



Life and death

pneum☠nia



Thank you



The DAGDA – the good God in Irish mythology (Wikipedia)

