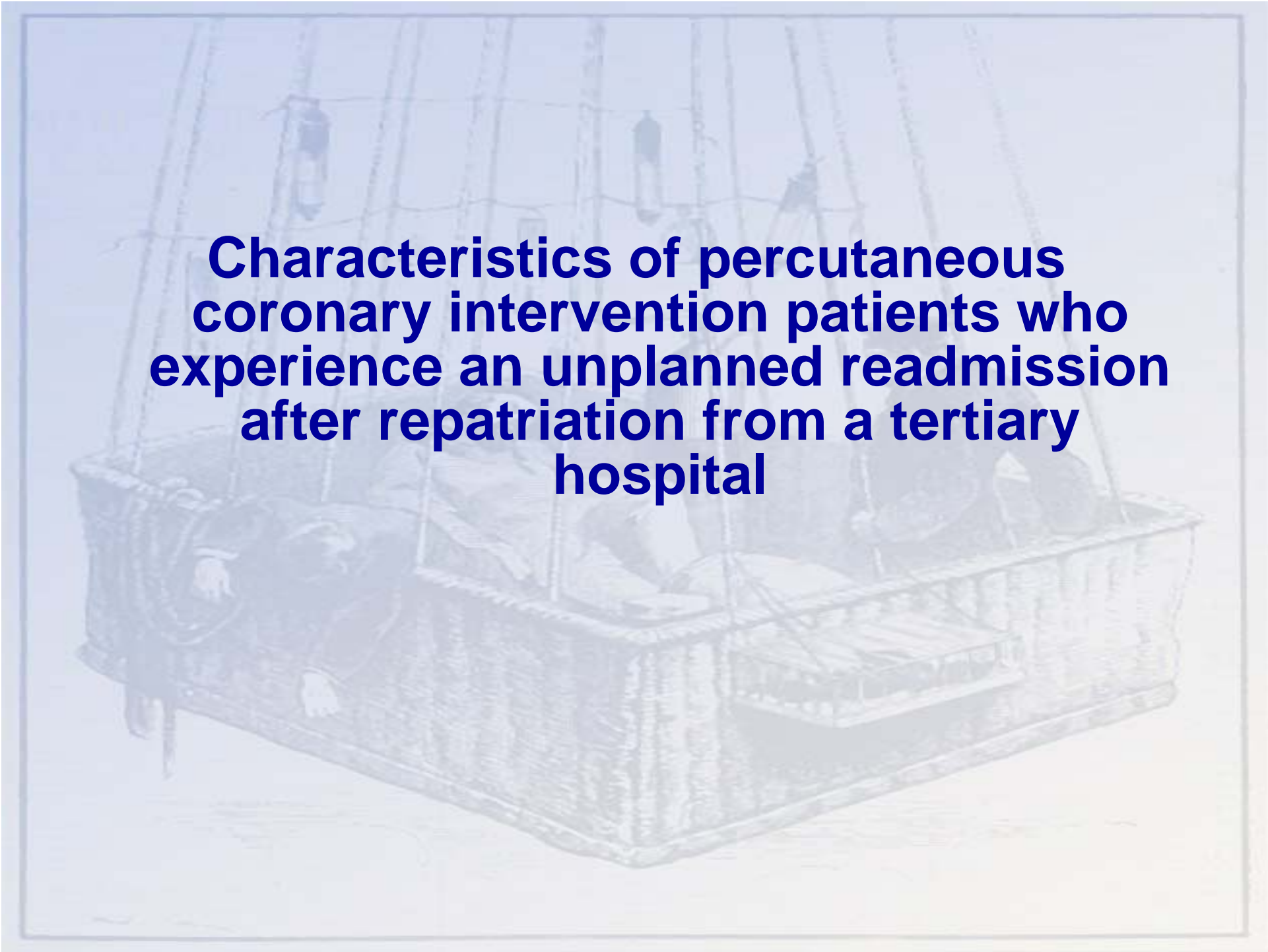


A detailed black and white illustration of a hot air balloon basket. Inside the basket, a patient is lying down, appearing to be in a medical emergency. A medical professional is positioned at the back of the basket, attending to the patient. Various pieces of medical equipment, including a large cylindrical tank (likely oxygen), a tray with instruments, and several hanging lamps, are visible within the basket. The basket is suspended by ropes and is shown in flight against a plain background.

**Percutaneous Coronary Intervention, Repatriation and Unplanned Readmissions**

**Peter J. Kennedy RN MN PGCert HSc. (AeroRT) NZCFN**



**Characteristics of percutaneous coronary intervention patients who experience an unplanned readmission after repatriation from a tertiary hospital**

# Dataset criteria

- Study period 1 Jan 2000 – 31 Dec 2008
- Patients undergoing Coronary Angiography, CABG, PCI or other cardiac procedure at Wellington Hospital
- 1<sup>st</sup> admission to any hospital within 3 days of index event discharge

# Repatriation Transport



- Patients from Hawke's Bay may return to home by
  - Air Ambulance (Pressurized or Unpressurized)
  - Scheduled Airline Service
  - Land Transport

# Data Extract



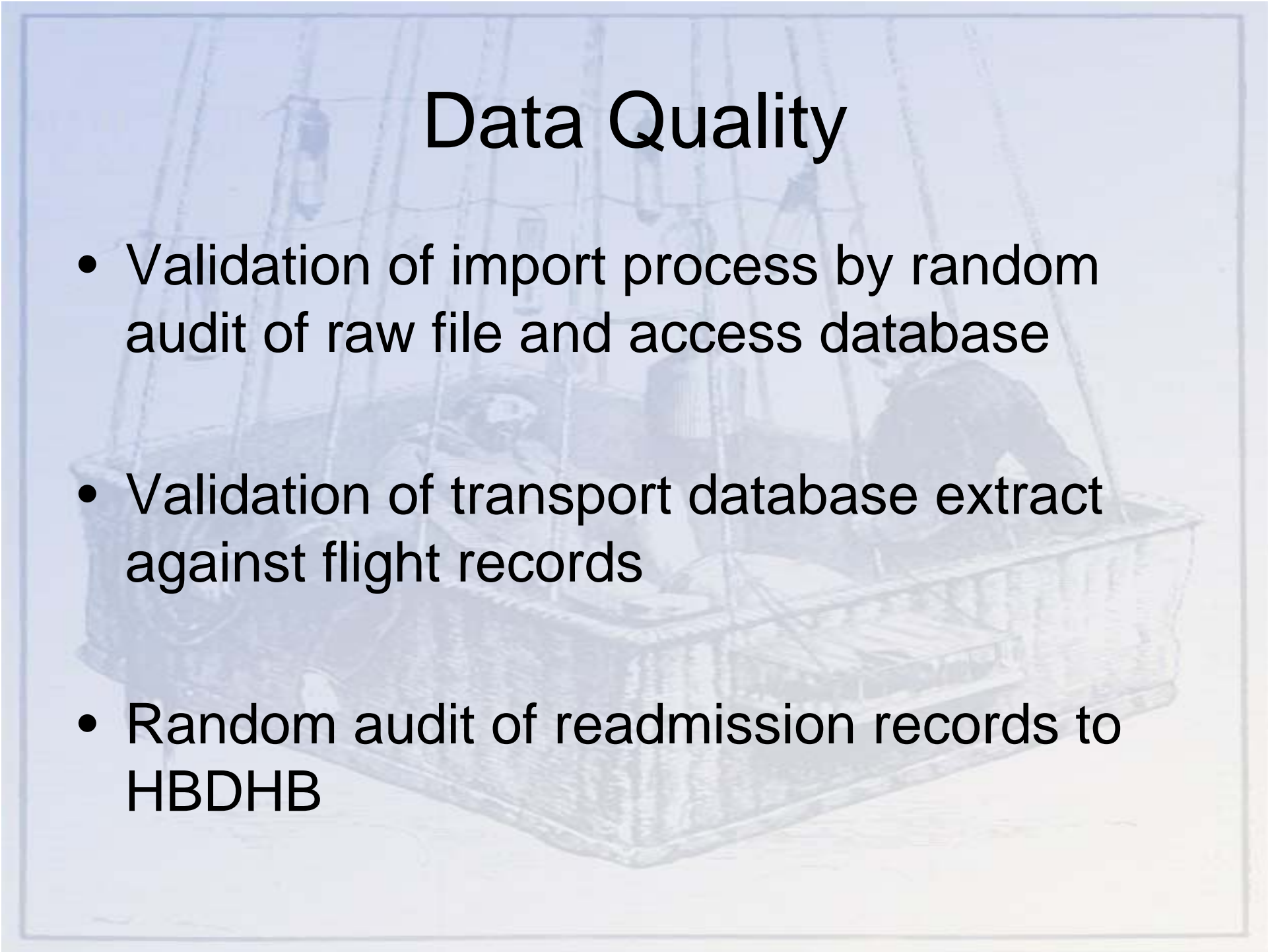
- 137,762 rows of data from the index event ICD codes table were allocated to the index admissions file records from NMDS
- 2474 transport records from HBDHB Patient Transport Database

# Dataset Preparation



- Logical mapping of data
  - primary diagnosis to one of 12 diagnostic groups
  - principal procedure to prioritized binary answer
  - co morbidities to binary answers
  - readmission reason to planned / unplanned for Hawke's Bay patients

# Data Quality



- Validation of import process by random audit of raw file and access database
- Validation of transport database extract against flight records
- Random audit of readmission records to HBDHB

# Data Analysis

- Analysis using SPSS 15
- Demographic analysis on 1<sup>st</sup> index event only to avoid pseudo-replication errors
- Frequency distributions, cross tabulations and binary logistic regression used to analyze data
- 94.5% of admissions 1<sup>st</sup> or 2<sup>nd</sup> index events





“There is nothing like looking, if you want to find something.

You certainly usually find something, if you look, but it is not always quite the something you were after.”

J.R.R Tolkien (1892 – 1973)

# Results

- Total Patients 16,850
- Total Index Admissions 18,577
- Total Readmissions 3,329 (17.9%)
- Hawke's Bay Patients 2289 (13.5%)
- Hawke's Bay Admissions 2474
- Hawke's Bay Readmissions 556 (22.5%)

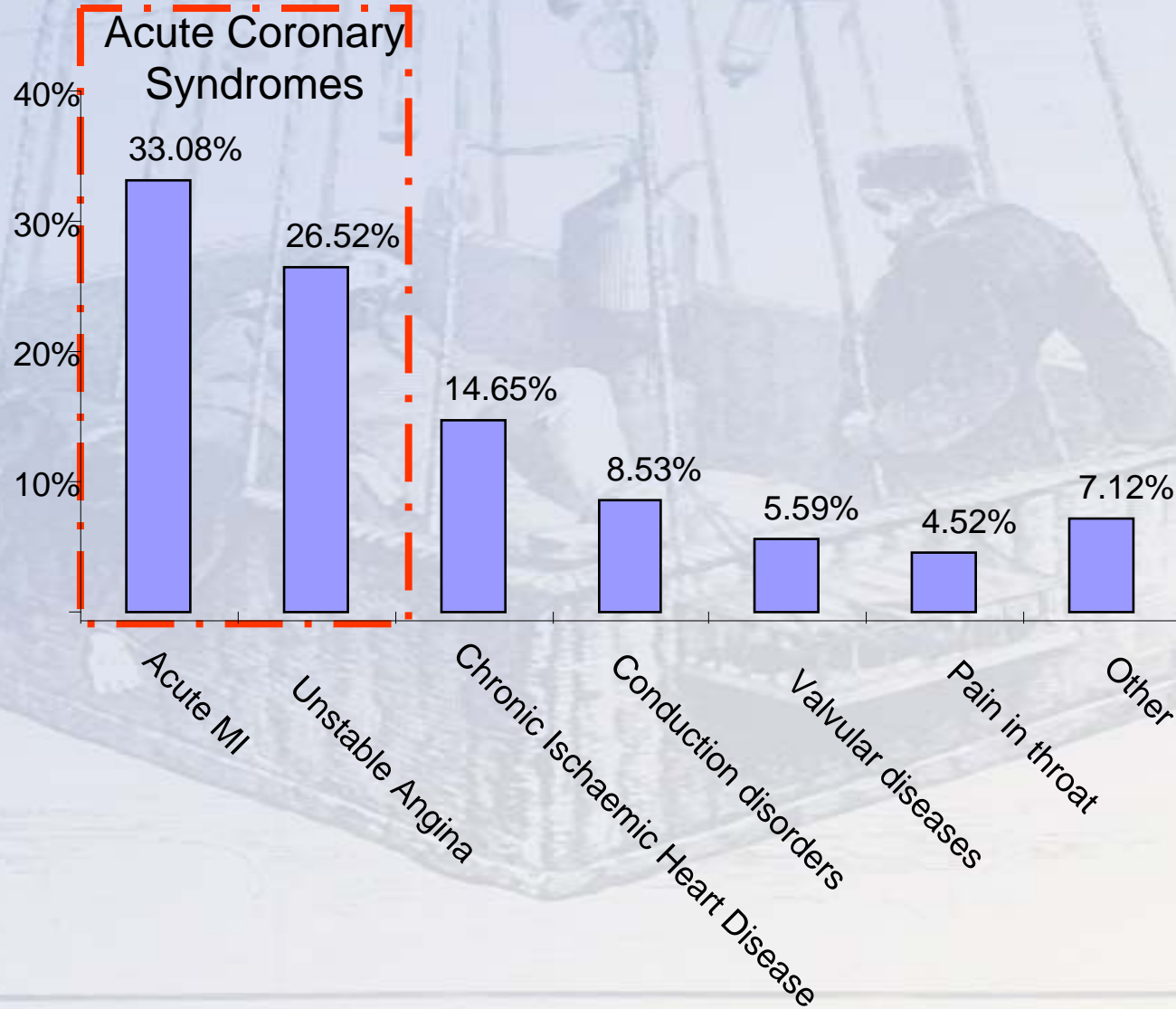
# Population

- Age 35 – 90 Mean 63.45 (Std Dev 11.21)
  - Maori **54.65** (10.164)
  - Male 62.62 (11.02)
  - Female 64.98 (11.20)

- Ethnicity **Hawke's Bay**
  - European 80.4% 78.3%
  - Maori 8.2% 12.9%
  - Other 11.4% 9.1%

- Sex (Male) 68.2%
  - 2<sup>nd</sup> Admit **73.6%**

# Index Admission Primary Diagnosis



# Comorbidities

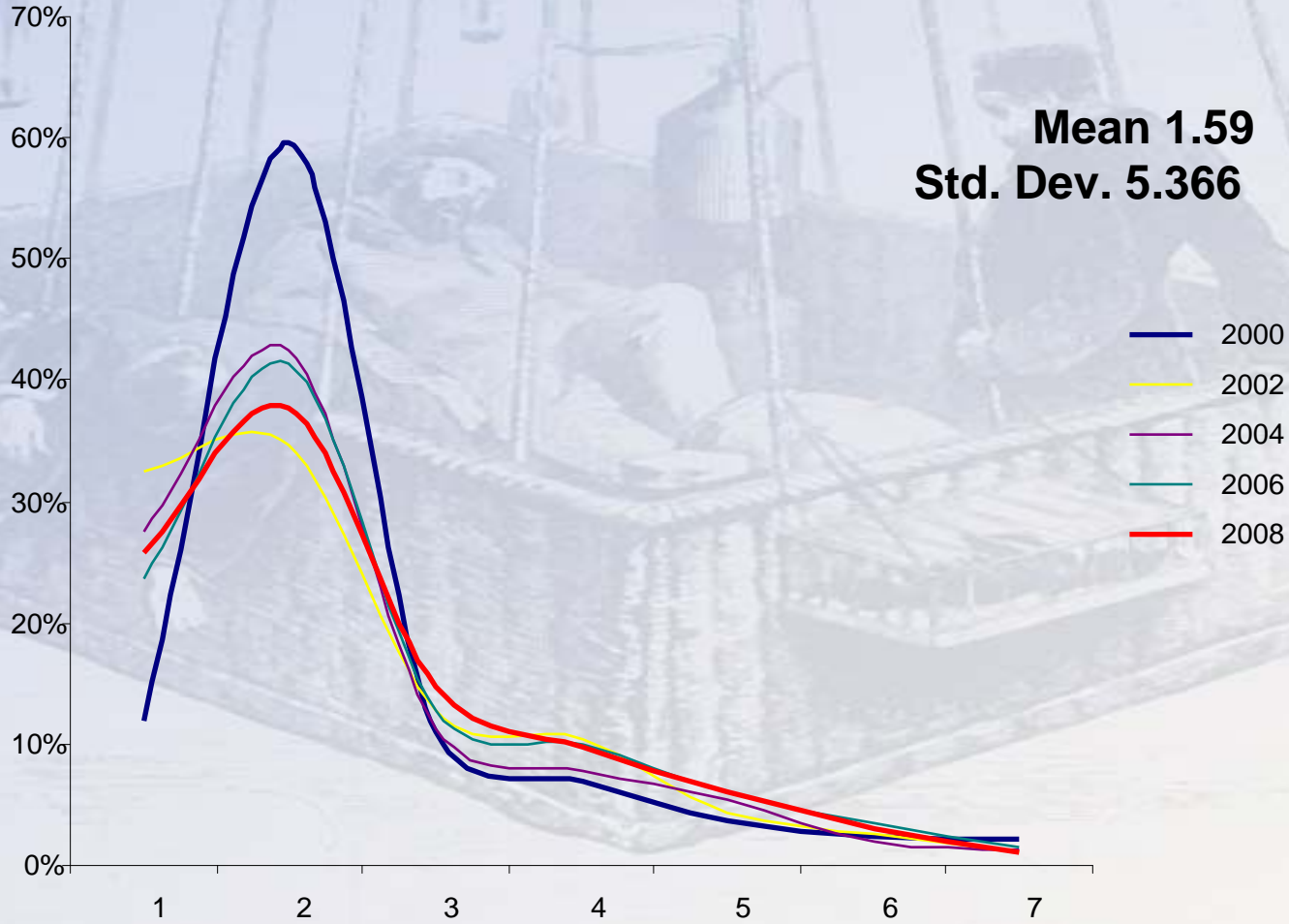
	Population	HBDHB
• Ever Smoked	44.0%	48.0%
• Hypertension	41.0%	45.6%
• Dyslipidemia	21.1%	23.2%
• Diabetes	15.5%	16.5%
• Current Smoker	10.9%	11.4%
• Anemia	2.1%	2.6%
• COPD	2.1%	0.8%
• Obesity	2.0%	2.3%

❖ *All comorbidity data is lower than reported in international literature which suggests low rates of clinical coding of comorbidity data at the NMDS.*

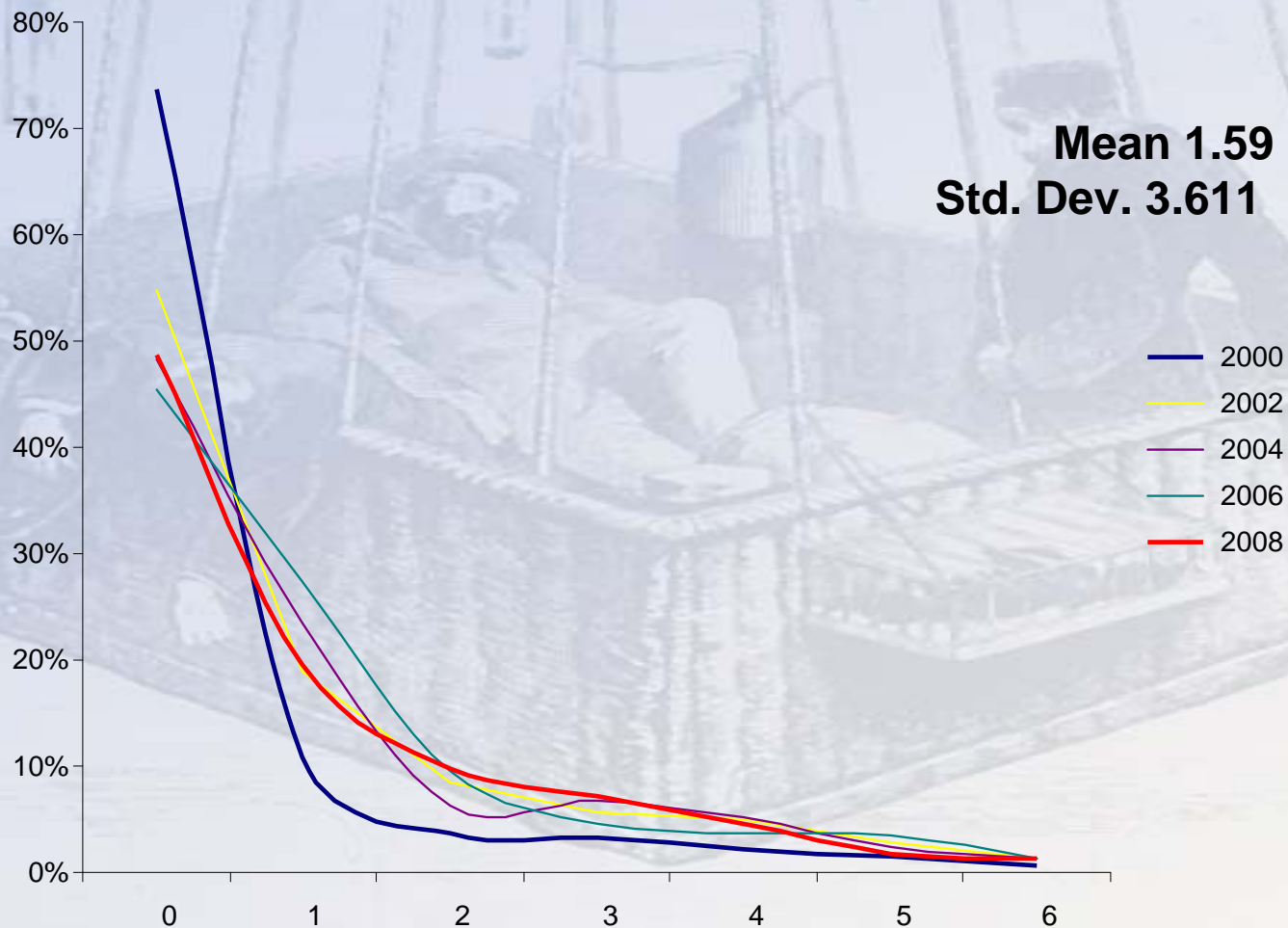
# Procedures

Procedure	Total %	HBDHB
Angiogram	38.7%	26.4%
PCI	29.3%	40.1%
CABG	11.9%	13.7%
Other	20.2%	19.9%

# Index Length of Stay - PCI

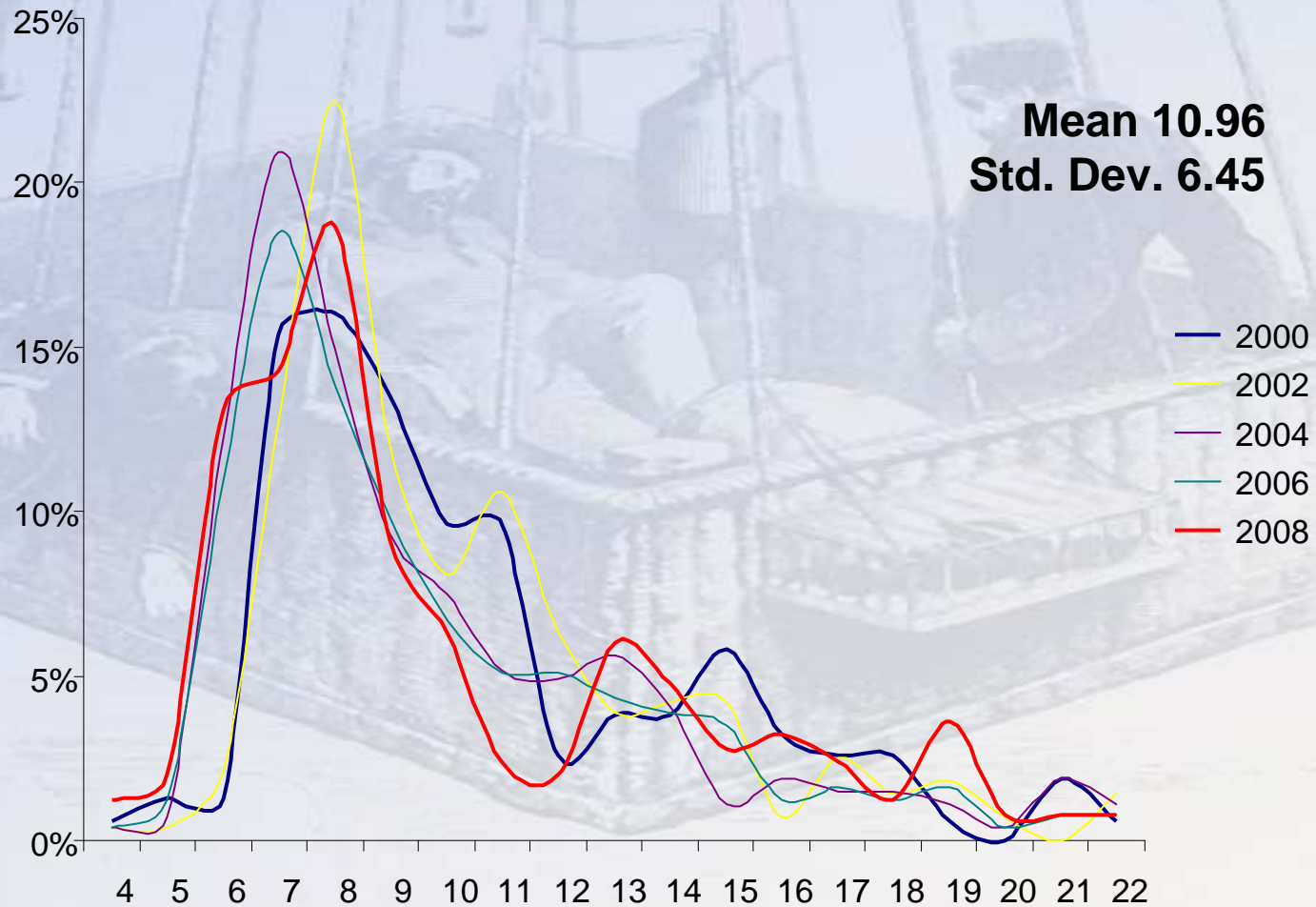


# Index Length of Stay - Angiogram





# Index Length of Stay - CABG



# Readmission Demographic

- Age 35 – 90 Mean 65.74 (Std Dev 11.73)
  - Maori 58.38 (9.83)
  - HB European 69.62 (11.18)
  - HB Maori 61.20 (9.00)

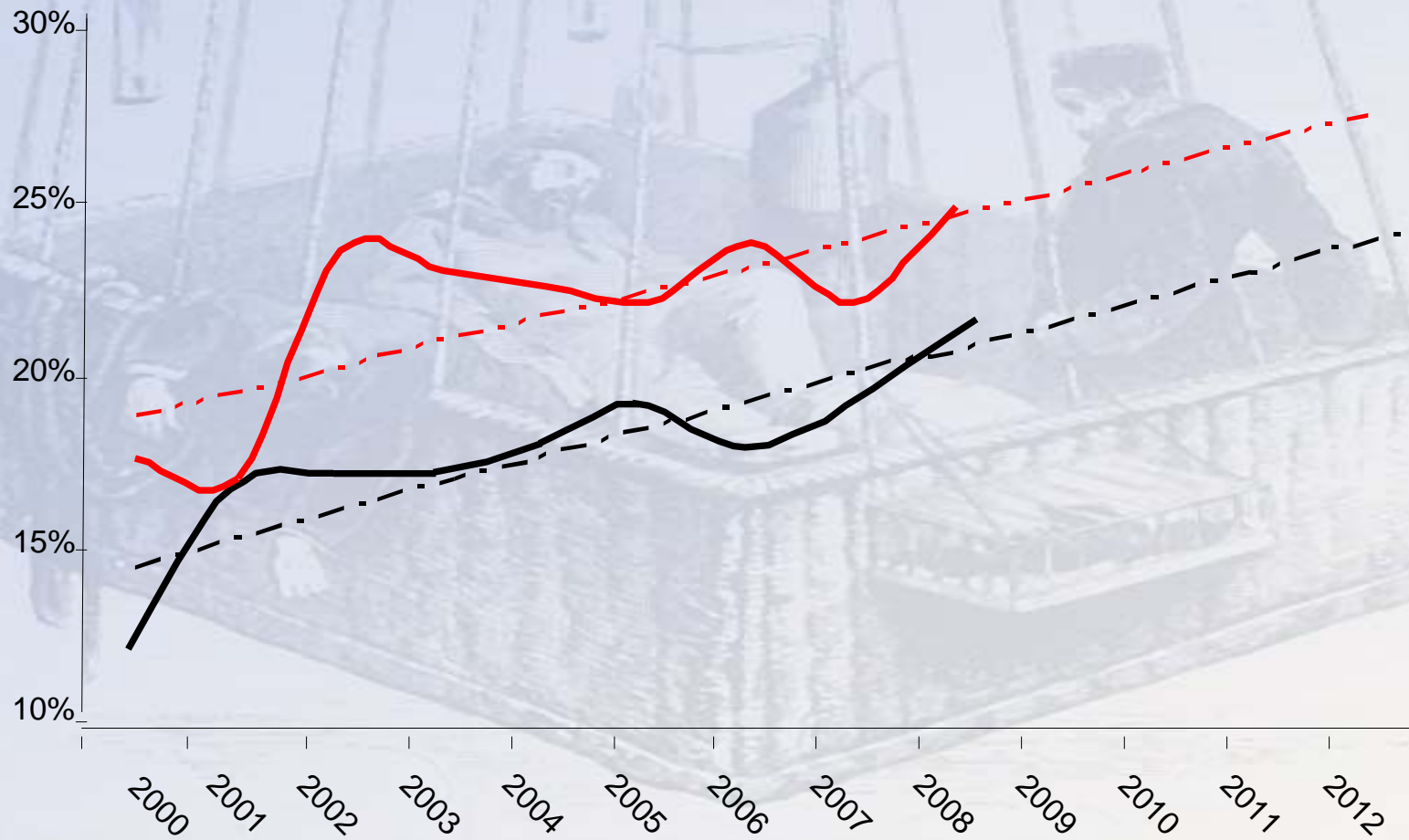
- Ethnicity 

		Hawke's Bay
– European	80.9%	75.5%
– Maori	8.7%	14.6%
– Other	10.4%	9.9%

- Sex (Female) **39.6%**

# Readmission Trends

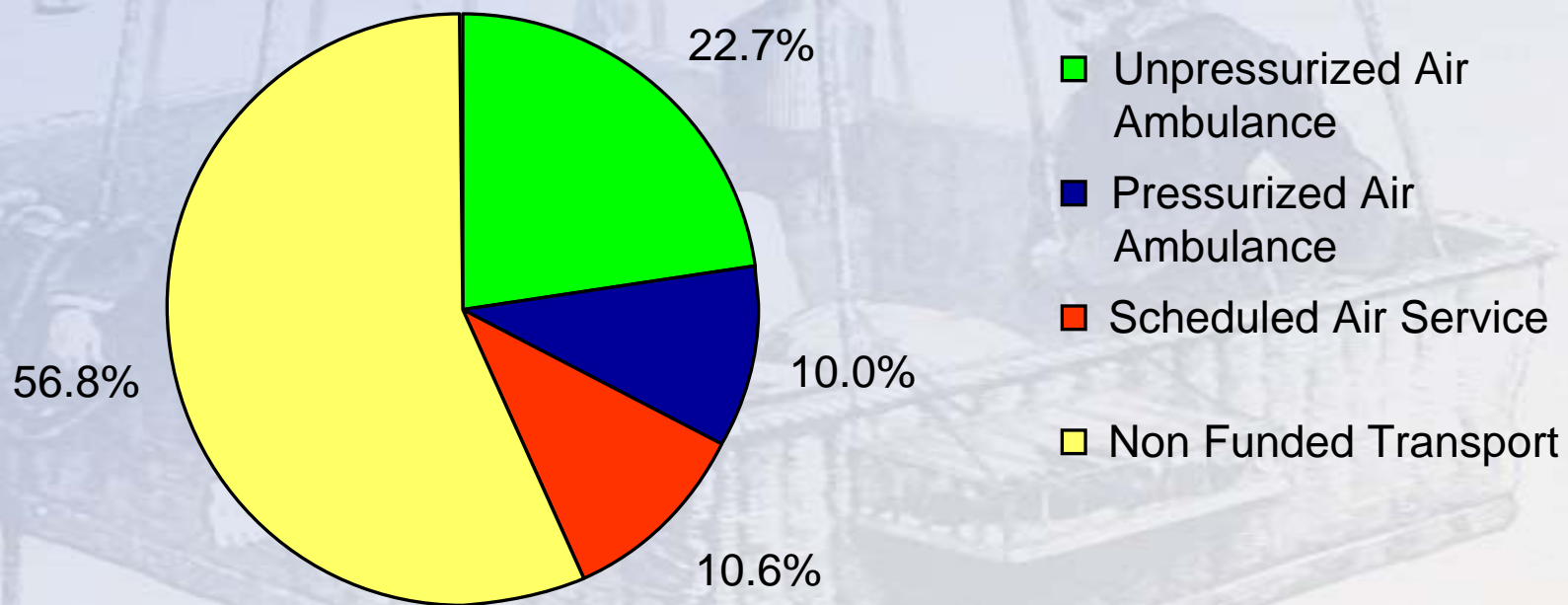
—◆— All Readmissions      —◆— HBDHB Readmissions  
- - - Trend (All Readmissions)      - . - . Trend (HBDHB Readmissions)



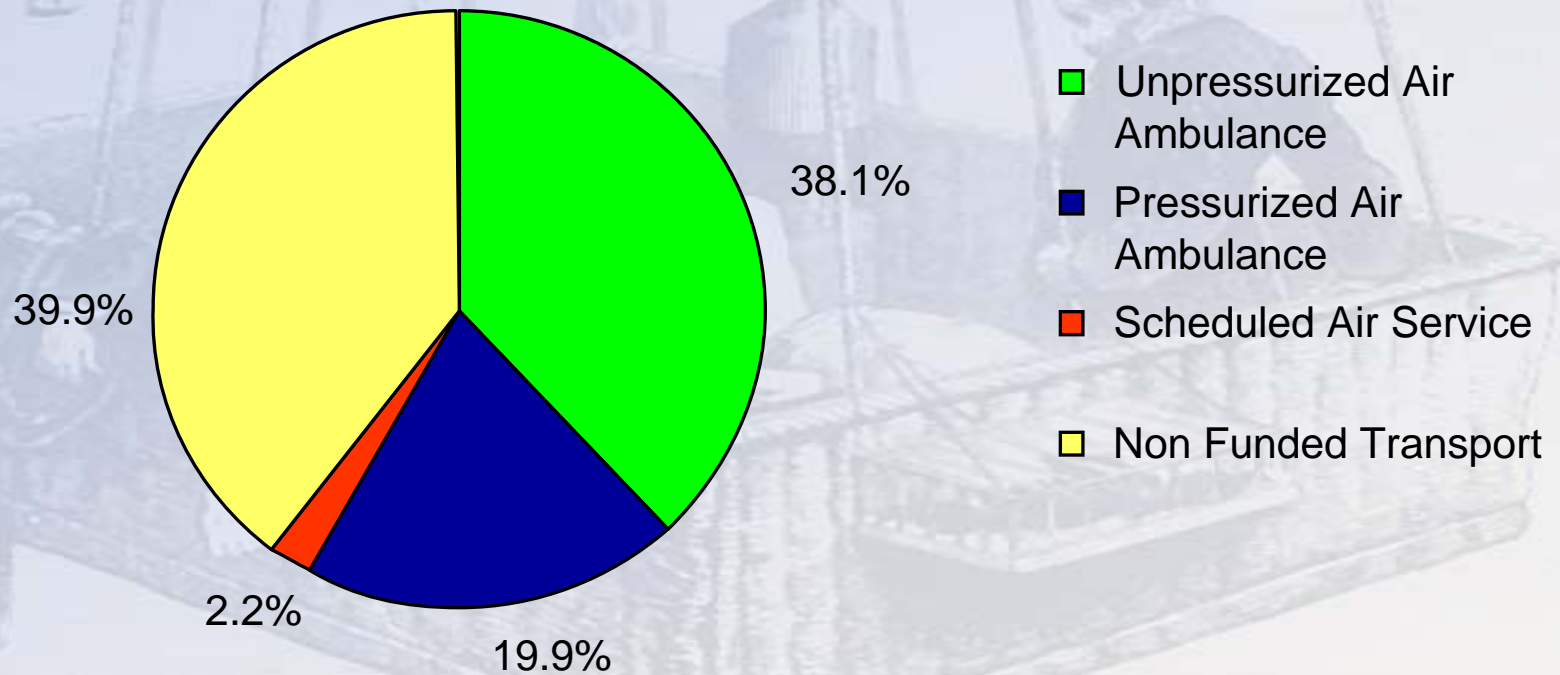
# Readmission by Procedure

Type	S.E.	Sig.	Exp (B)
Angiogram	.346	.069	.532
PCI	.342	<b>.010</b>	<b>.415</b>
CABG	.411	.592	.802

# Repatriation of Hawke's Bay residents



# Hawke's Bay unplanned readmissions

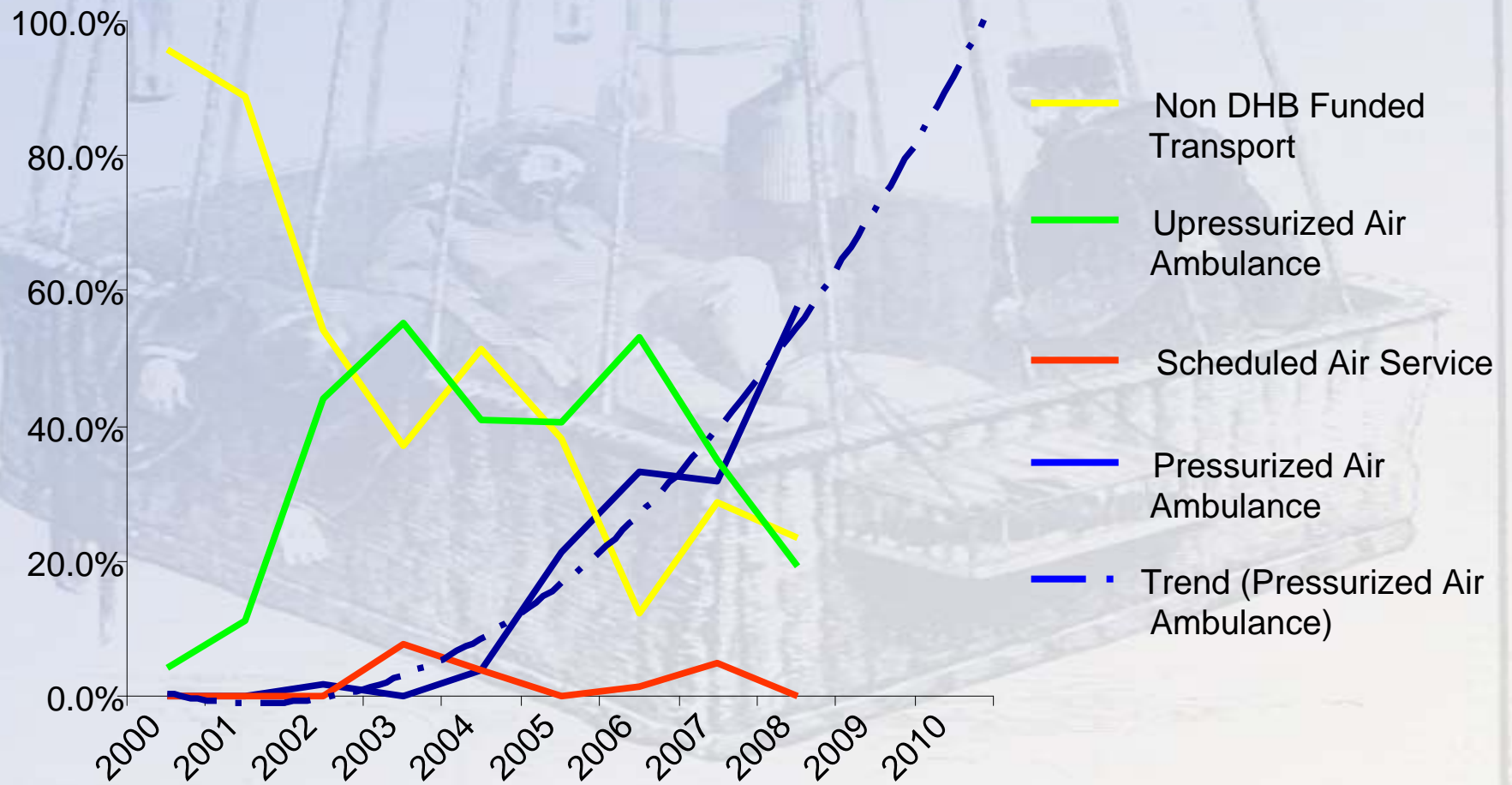


# Unplanned readmission by transport type

Type	S.E.	Sig.	Exp (B)	95% CI for Exp (B)	
UPAA		.005			
PAA	.312	.409	1.293	.702	2.383
SAS	.360	<b>.004</b>	<b>0.356</b>	.176	.722

- ❖ *Unpressurized Air Ambulance was the control group for binary logistical regression*

# Repatriation Readmission Trends





# Summary of Findings

- Patients who travel in Air Ambulance are at increased risk of readmission to hospital within 3 days of discharge.
- BUT.... there is no statistical difference between pressurized and unpressurized air ambulance readmission rates
- Readmission rates are increasing and Hawke's Bay's readmission rate is now 25%
- PCI has a lower readmission rate than any other procedure
- Maori patients from Hawke's Bay appear to not be disadvantaged in access to tertiary cardiothoracic services

# Future Research



- National validation of Hawke's Bay results
- Explore unfunded transport results
- Further research into specific population groups
- Qualitative research into aviation nursing practice "Are we caring too much in the air"
- Examine CABG patient population results

# Study Limitations

- It was not possible to identify the first attendance of a patient for a cardiac condition from the ICD codes
- The study is limited to publicly funded cardiac procedures
- Reliability of administrative datasets and interpretation of their application is problematic

# Acknowledgements

- Professor Bob Marshall – Principal Supervisor  
Eastern Institute of Technology
- Judy Searle RN – Associate Supervisor  
Eastern Institute of Technology
- Dr. Rachel Forrest – Research Assistant & Statistician  
Eastern Institute of Technology
- Hawke's Bay Medical Research Foundation
- Wendy – I have visited the Island of Doubt



# References

- Ajani, A. E., Reid, C. M., Duffy, S. J., Andrianopoulos, N., Lefkovits, J., Black, A., et al. (2008). Outcomes after percutaneous coronary intervention in contemporary Australian practice: insights from a large multicentre registry. *Med J Aust*, 189(8), 423-428.
- Avendano, M., & Soerjomataram, I. (2008). Monitoring trends in acute coronary syndromes: can we use hospital admission registries? *Heart*, 94(12), 1524-1525.
- Eagle, K. A., Lim, M. J., Dabbous, O. H., Pieper, K. S., Goldberg, R. J., Van de Werf, F., et al. (2004). A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month postdischarge death in an international registry. *JAMA*, 291(22), 2727-2733.
- Jensen, M. K., Chiuve, S. E., Rimm, E. B., Dethlefsen, C., Tjonneland, A., Joensen, A. M., et al. (2008). Obesity, behavioral lifestyle factors, and risk of acute coronary events. *Circulation*, 117(24), 3062-3069.
- Jozic, J., Orford, J., Steinhubl, S., Berger, P., Hsu, A., & Topol, E. (2008). Timing and correlates of very early major adverse clinical events following percutaneous coronary intervention. *J Invasive Cardiol*, 20(3), 113-118.
- Robson, B., & Harris, R. (2007). *Hauora: Māori Standards of Health IV. A study of the years 2000–2005*. Wellington: Te Rōpū Rangahau Hauora a Eru Pōmare, School of Medicine and Health Sciences, University of Otago.
- Shaw, L. J., Shaw, R. E., Merz, C. N., Brindis, R. G., Klein, L. W., Nallamothu, B., et al. (2008). Impact of ethnicity and gender differences on angiographic coronary artery disease prevalence and in-hospital mortality in the American College of Cardiology-National Cardiovascular Data Registry. *Circulation*, 117(14), 1787-1801.