Flying to work – is it safe?

"Should they stay or should they go?"

London September 2012

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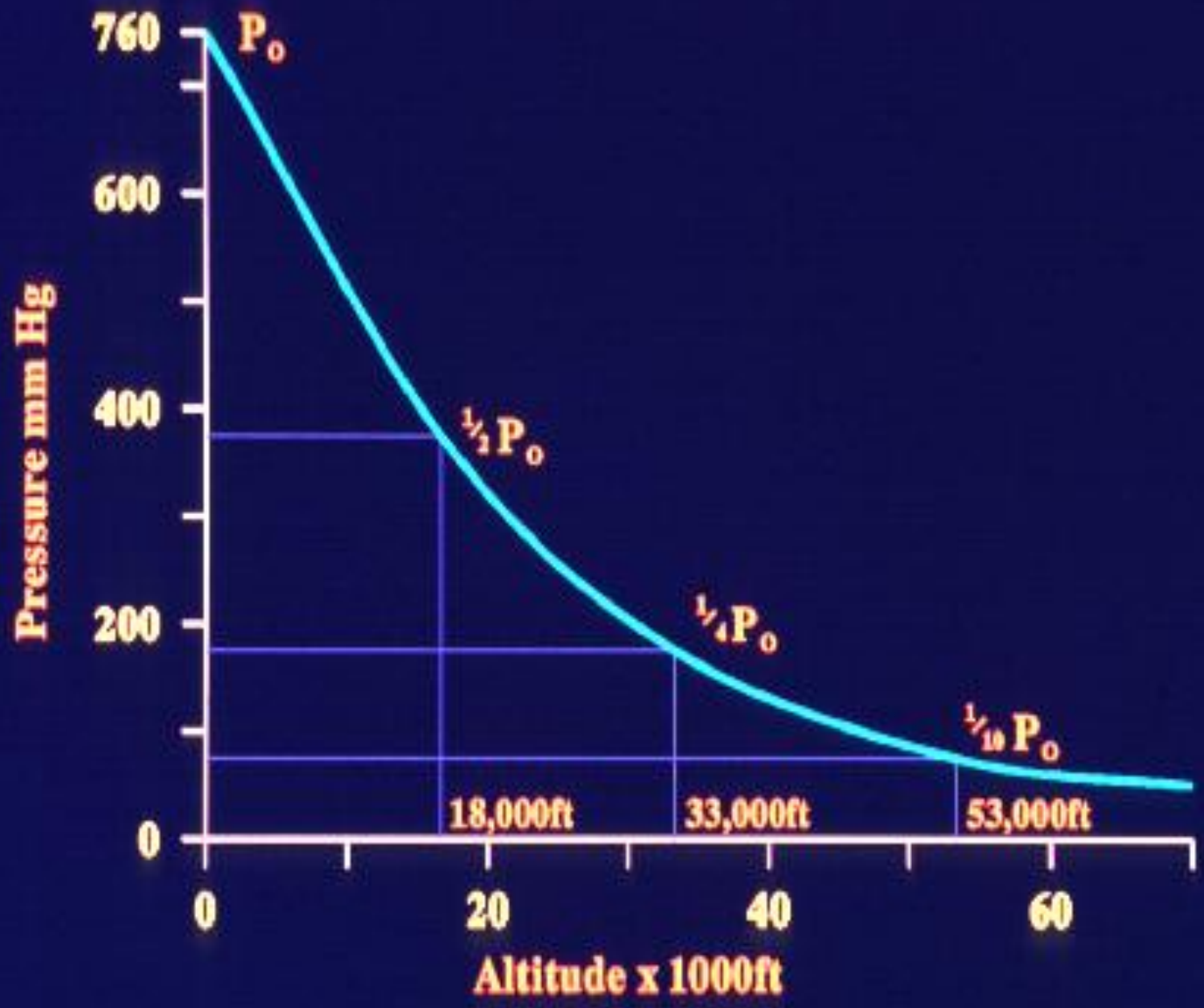
A GOOD SEND-OFF.

Collector (to airman, going up in risky weather to please public). "SUBSCRIBE TO THE AMBULANCE, SIR?"

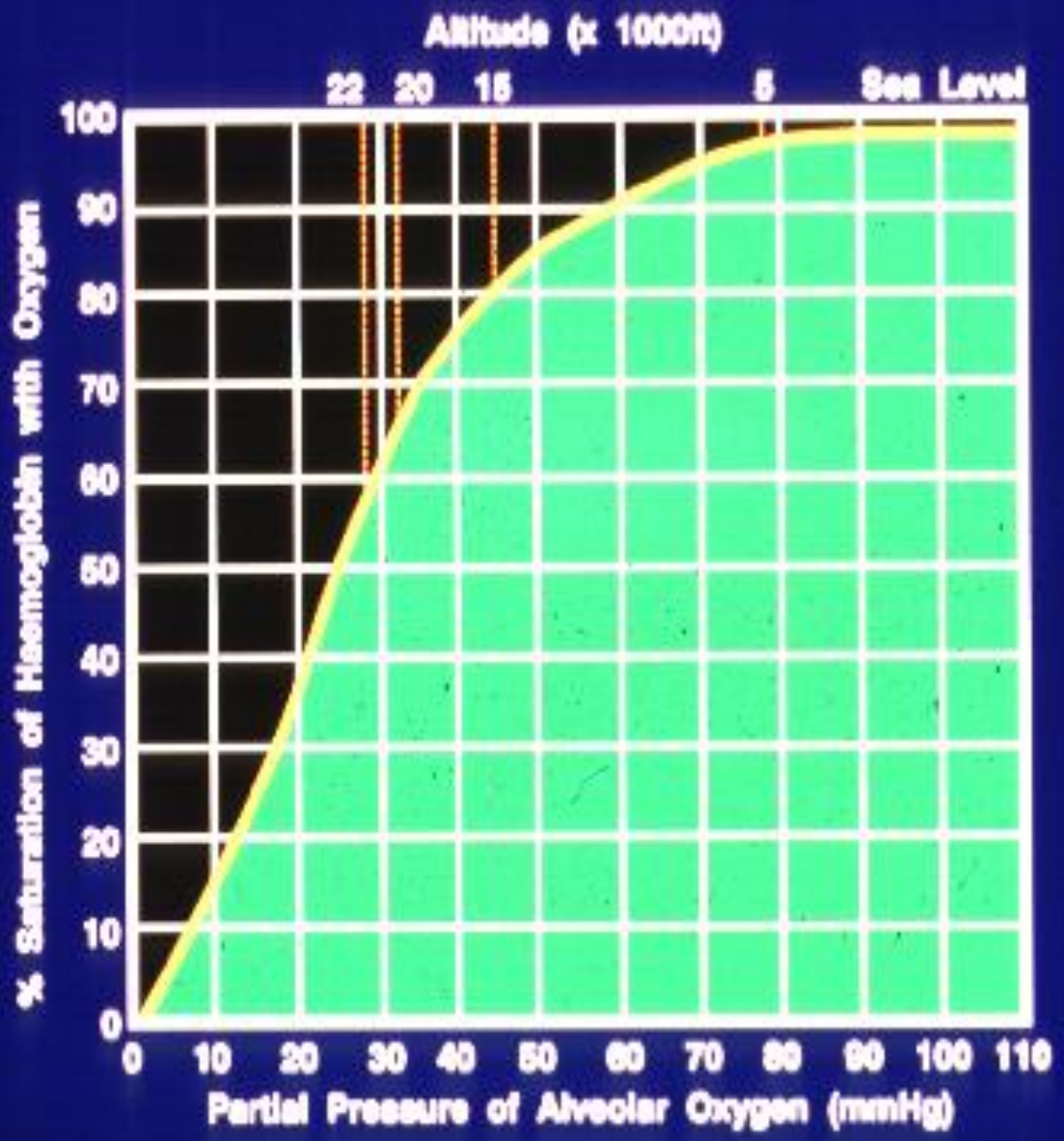
QF 32 Nov 2010


ETIHAD

ALTITUDE/PRESSURE RELATIONSHIP



Relationship Between The Oxygen-carrying Capacity Of The Blood And The Partial Pressure Of Alveolar Oxygen At Various Altitudes



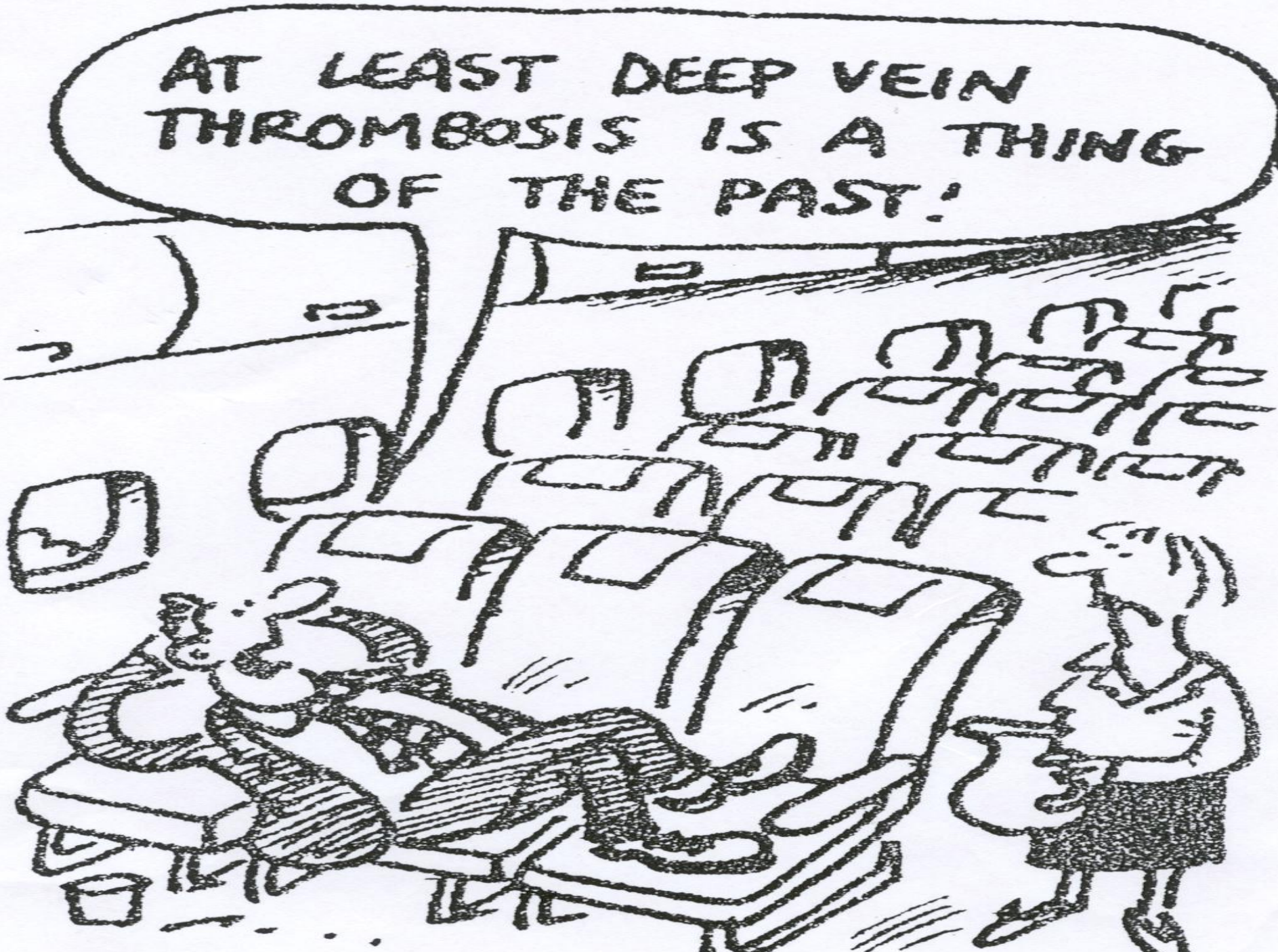
Basics

Hazard:

- The potential to produce harm or an adverse effect.

Risk:

- The probability that an event will occur i.e. quantification and time...consequence


AT LEAST DEEP VEIN THROMBOSIS IS A THING OF THE PAST!

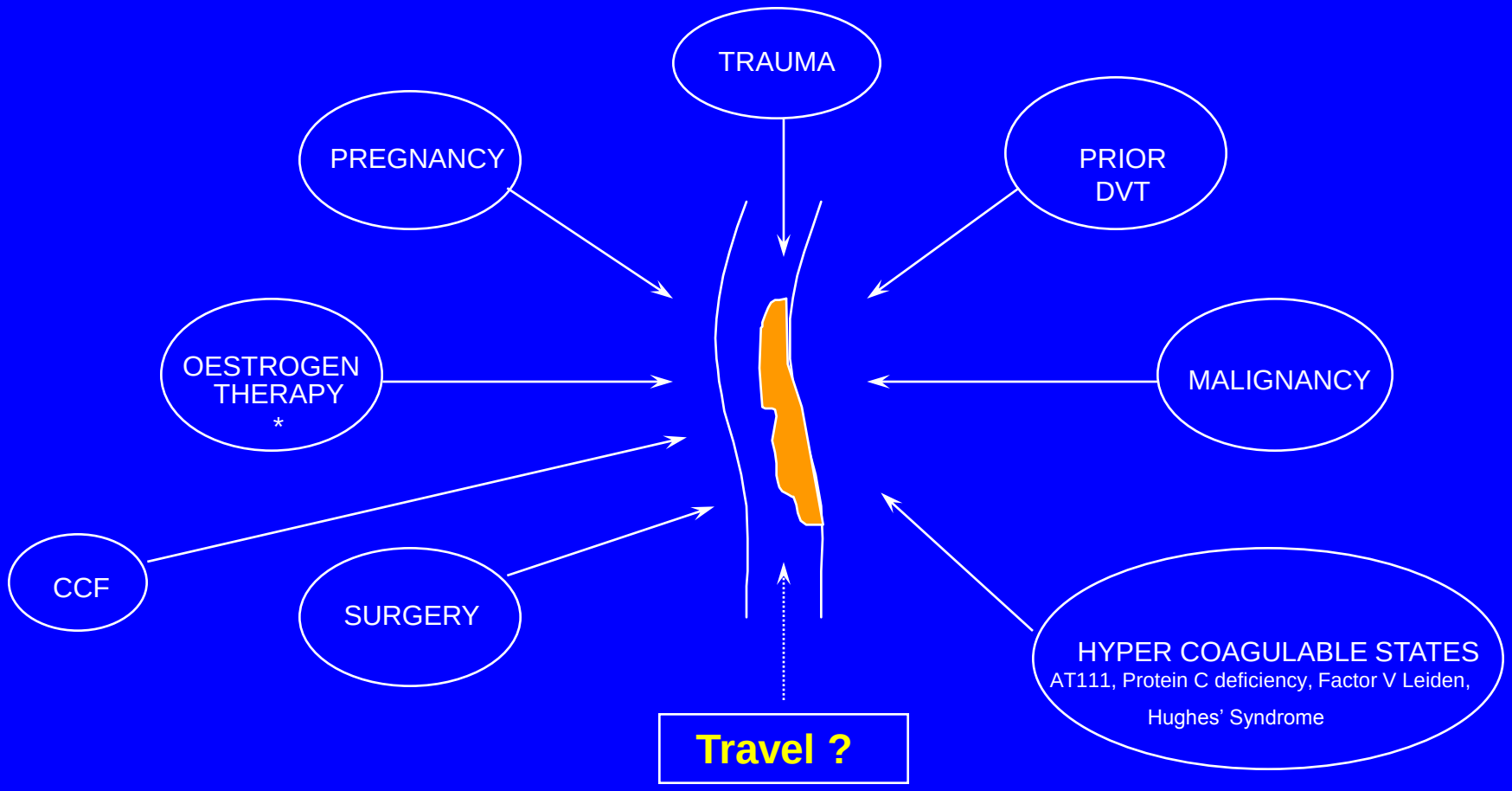

QANTAS

Prevalence of VTE

General Population

- 1.6 /1000 (Nordstrom, 1992)
- 1.8 /1000 (Hansson, 1997)

Risks of Thromboembolism



VTE

- **1940 (Simpson)**: described association with sitting in deck chairs in the Blitz
- **1954 (Homans)**: 5 patients with VTE; prolonged sitting - 2 associated with air travel, 2 with car journeys and 1 sitting in the theatre
- **1988 (Cruickshank): 6** case reports “economy class syndrome” - misnomer

VTE and Travel

(Kraajenhagen) 2000

- 788 patients with ? DVT. Odds ratio for air travel 1.0 (0.3 - 3.0). Does not support association

Travellers' Thrombosis (Ferrari, 1999)

Case Control Study

n = 160 (Travel > 4 hours, in previous 4 weeks)

- History of travel in VTE (24.5% v 7.5%) [P<0.0001]
- Odds ratio for VTE = 3.98 (1.9-8.4, 95% CI)
- Travel: 28 car, 9 aircraft, 2 train
- Duration of travel: 5.4 ± 2.1 hours.

Travellers' Thrombosis

- Lapostolle et al : Retrospective study 1993 - 2000 of pax arriving at CDG (NEJM, 2001)
- 135.29 million pax with 56 cases of PTE
- Prevalence: 4.8 /million (>10,000 km)
  1.5 /million (> 5000 km)
  0.01 /million (< 5000 km)


SINGAPORE AIRLINES

Travellers' Thrombosis

- **2000 (Bendz**): Transient activation of coagulation (x 2 – x 8) in volunteers exposed to hypobaric hypoxia (no controls)
- **2001 (Scurr)**: 10% prevalence of "VTE" in those flying > 8hrs. Positive scan legs.


I say Nigel …
……are we at risk of having a DVT?

Incidence of VTE

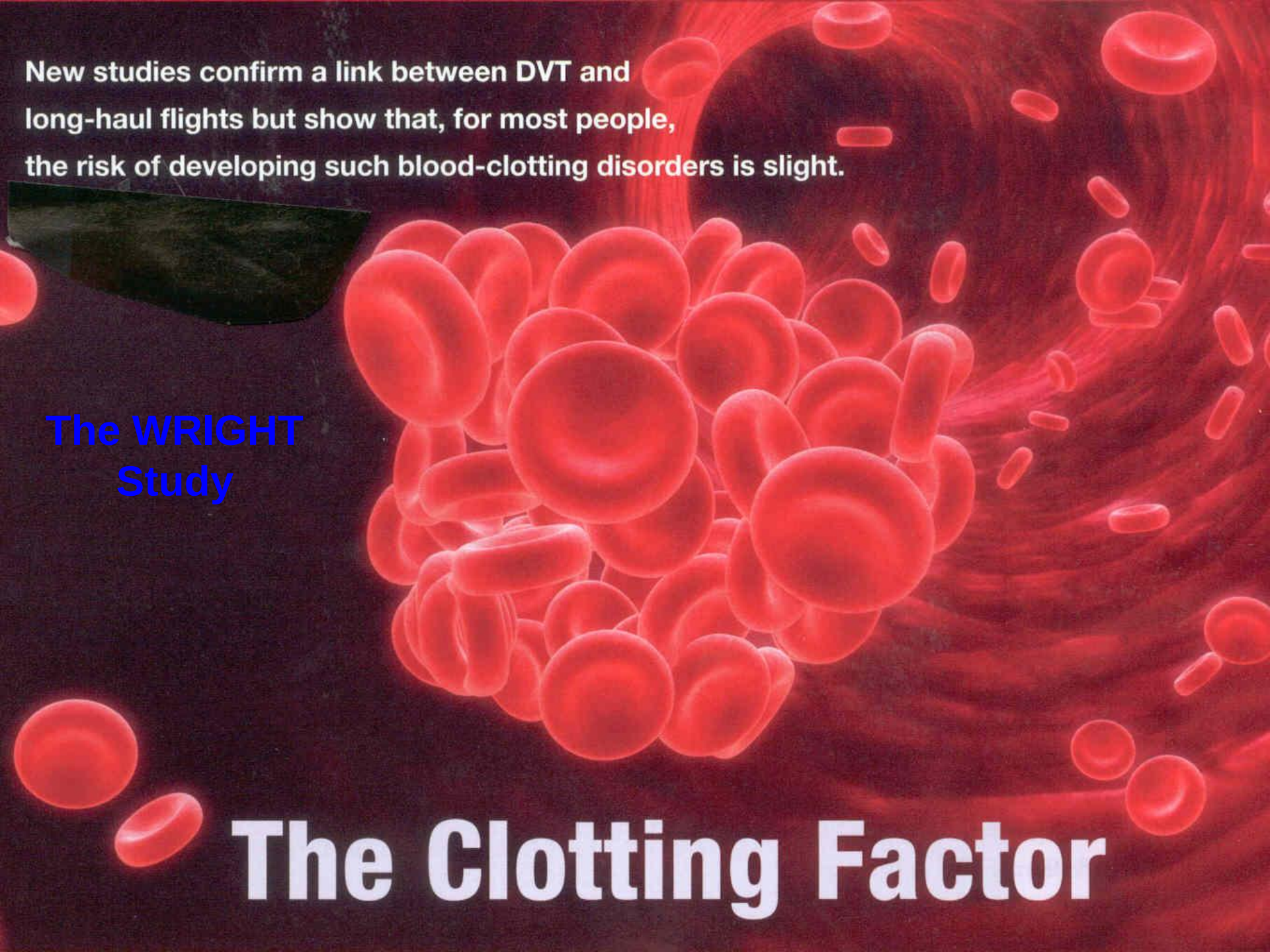
- **Flight Crew:** PMR for pulmonary embolism & phlebitis = 93 (OPCS, 1995)
- **Flight Crew:** Incidence 0.2/1000/year (Johnston et al, Lancet 2001)

Travellers' Thrombosis

- Definitive study in Journal of the American Medical Association in 2006:

http://jama.ama-assn.org/cgi/content/full/295/19/2251

- No activation of coagulation in a controlled chamber study


New studies confirm a link between DVT and
long-haul flights but show that, for most people,
the risk of developing such blood-clotting disorders is slight.
The WRIGHT Study
The Clotting Factor

Travellers' Thrombosis

- Risk of venous thrombosis is moderately increased for all modes of travel (air, car, bus or train)……
- Well recognised risk factors: weight, blood clotting abnormalities, oral contraceptives

MEGA Study (PLoS Medicine 2006)

WRIGHT Project

- **Travelling (**car, bus or train**)** for more than 4 hrs doubles the risk of VTE: OR 2.1 (95% CI 1.5 - 3.0)
- Incidence of VTE after flight > 4hrs: 3.2/1000/yr
- Absolute risk: 1/4656 flights
- Higher risk subgroups

PLoS Medicine Sept 2007


TAX

Travellers' Thrombosis

- "prolonged dependency stasis imposed by airplane flights, automobile trips and even attendance at the theatre, is able, unpredictably, to bring on thrombosis"

Howmans J. N.Eng.J Med 1954; 250:148-9

DVT Prevention Strategy

Upgrade?

- No
- No difference between business and economy class in the incidence of VTE (BEST Study, 2003)

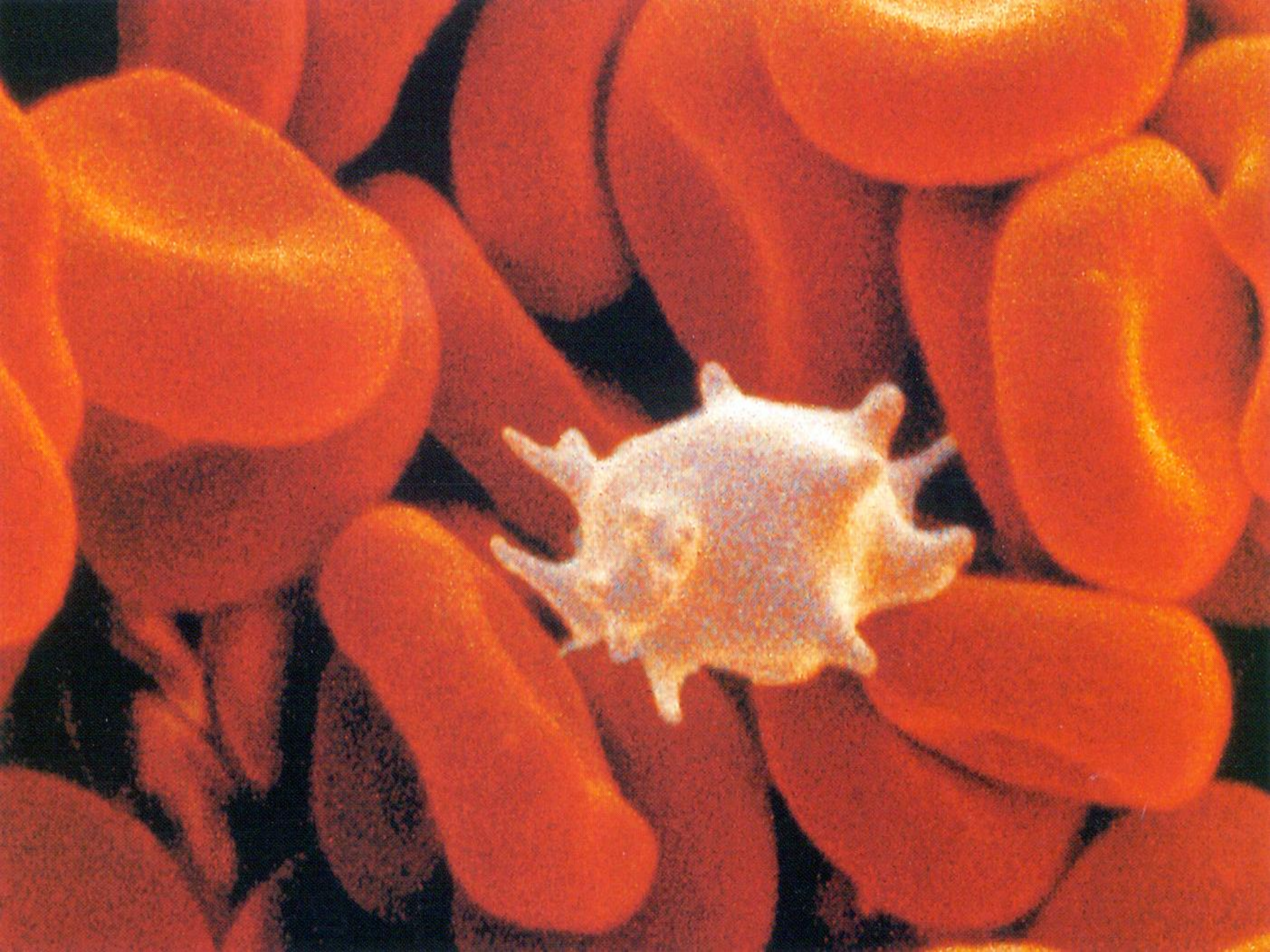
Risk Factors VTE

- Immobilisation has been linked to 75% of air travel associated VTE.
- Non aisle seats

Belcarro et al LONFLIT Study (2002)

DVT Prevention Strategy

- Risk assessment
- Mobility
- Stockings
- Anticoagulants: LMW Heparin/Warfarin
- Aspirin of NO value …..



American College of Chest Physicians: Evidence-Based Practice Guidelines

8th Edition (2008)

- General measures: avoid tight clothing, good hydration and frequent calf muscle exercises *(Grade 1c)*
- If additional risk factors add ***properly fitted*** below knee GCS with15-30mm Hg pressure at the ankle *(Grade 2c)* or a single dose of LMWH injected prior to departure *(Grade 2c)*
- Advise against the use of aspirin for VTE prevention *(Grade 1b) .....*

Aspirin (ASA)

- Recent study suggests long term aspirin may reduce recurrence rate (RR) following one unprovoked episode of VTE

- Following a course of warfarin (3 – 18/12)

- RR (28/205) **6.6%** in ASA Rx v (43/197) **11.2%** in placebo

N Engl J Med 2012;366:1959-67

Cabin Air Quality

Photo reproduced courtesy of United Airlines

Cabin Air Quality

- Media “Hype”..... “bad cabin air causes DVT”

- Diverse “symptoms”:
  headache
  dizziness
  abdominal discomfort
  nausea
  fever
  respiratory infections

CAA Cabin Air Quality Research (2001)

Pyrolysis Products of Aviation Lubricants

"No single component or set of components can be identified which at conceivable concentrations would definitely cause the symptoms reported in cabin air quality incidents."

Committee on Toxicity (COT)

- COT Highly ethical: Advise FSA and Government
- Evidence base broad: stakeholders
- 1st Public Meeting 11th July 2006
- Final report 20th September 2007

Committee on Toxicity (COT)

Conclusions

- **Not** possible to conclude whether cabin air exposures (general or following incidents) cause ill health in commercial air crews
- **Research** to ascertain whether substances in cabin environment could harm health
- Should **not** focus on named substances

UK Study Cranfield University 2011

- Sampling complete on cargo and pax carriers both scheduled and charter
- Aircraft: BAe146, B757, Airbus 319/321
- Results: no evidence of harmful compounds in the cabin
- Swab testing of surfaces: no concerns

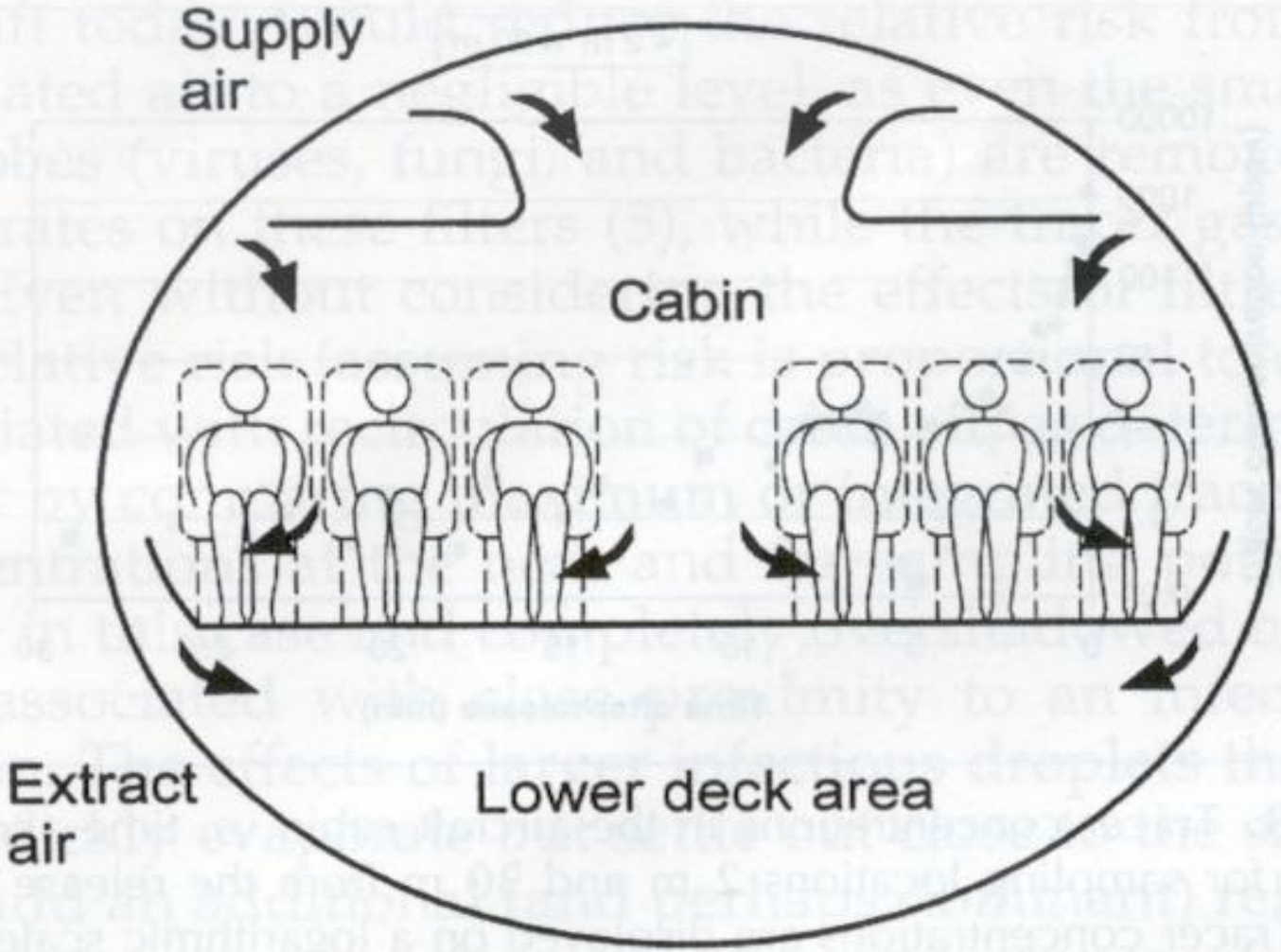
Aircraft cabin air: a risk for infection?

- Recirculation rate at about 50%
  - 10-20 complete changes per hour
  - HEPA filters: remove bacteria and viruses (SARS)
  - low humidity: 10 –15%

- **The Journey**

  - Train/Underground: Respiratory Tracts

RECIRCULATION & EXPOSURE—RYDOCK



Rydock JP. Av Space Env Med 2004; 75 (2): 168 - 71

Transmission of Infectious Disease on Aircraft

Risk of Infection?

- Type of organism and how infectious
- Type of passenger and how susceptible
- **Method of transmission**
- Duration of the flight

Transmission of Tuberculosis on Aircraft

- Risk
  - Ground delays > 30 mins without adequate ventilation
  - Duration of flight > 8 hrs
  - Close proximity to index case (droplet transmission)

- **No evidence that:**

  an individual has developed active TB after a flight

  air recirculation facilitates transmission

Transmission of Tuberculosis on Aircraft

- 2 flights with same index case
  - Honolulu – Chicago
  - . Chicago - Baltimore
- 925 people on aeroplanes
- 802 (87%) contacted
- 6 had skin-test conversions
- all had seats in same section as index
- highest risk within 2 rows of index (Rydock 2004)

N Engl J Med 1996; 334: 933-8

Transmission of influenza on Aircraft

- Risk:
  - close proximity

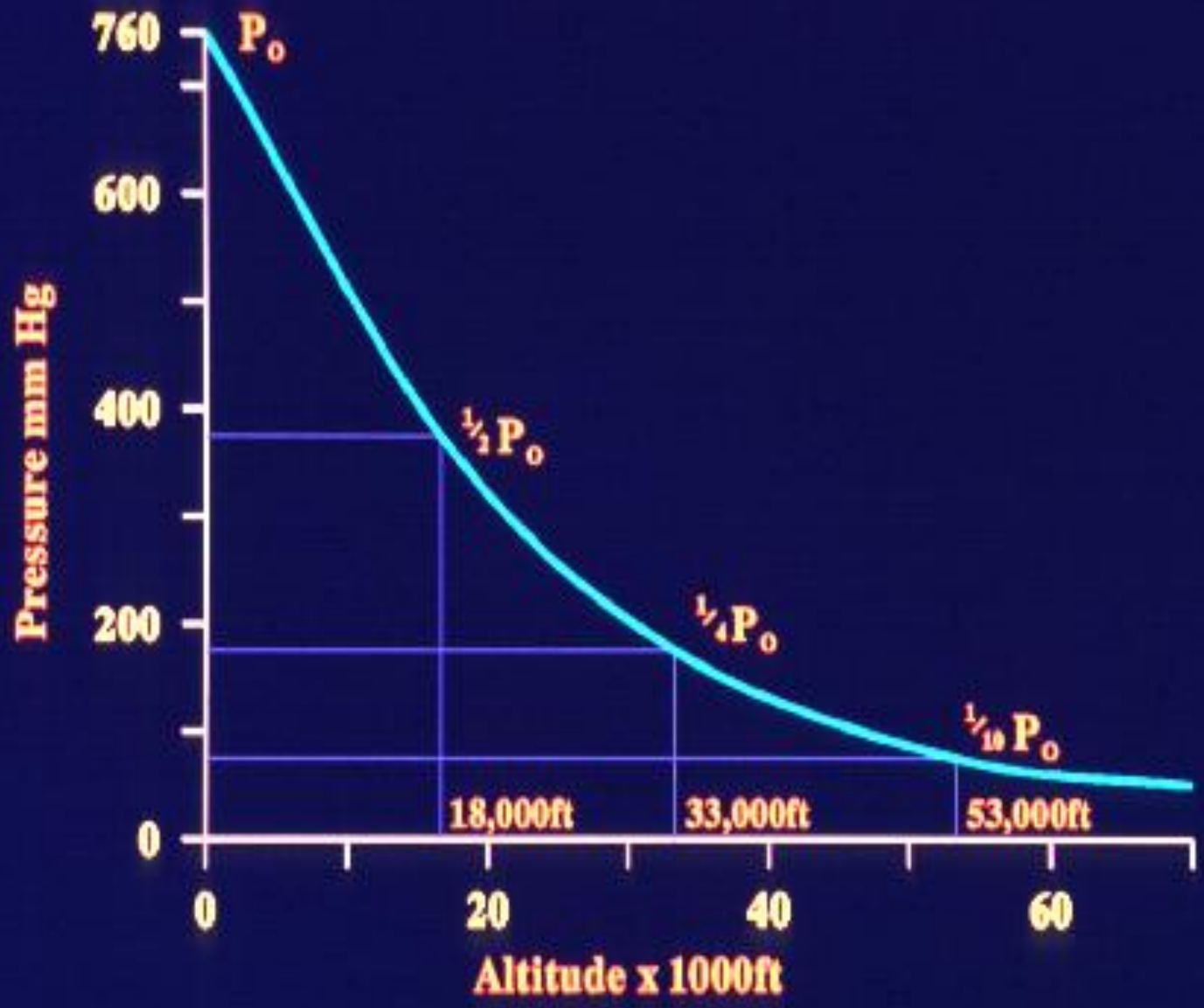
- Australia 1999: BAe 146, 75 passengers
  - 3 hour 20 min flight
  - AC fully functional
  - 15 secondary cases (20% attack rate)
  - plume around index case

Cabin Air Quality

Conclusions

- No evidence that cabin air is substandard or unhealthy
- No evidence linking cabin air quality with crew/passenger illness

ALTITUDE/PRESSURE RELATIONSHIP



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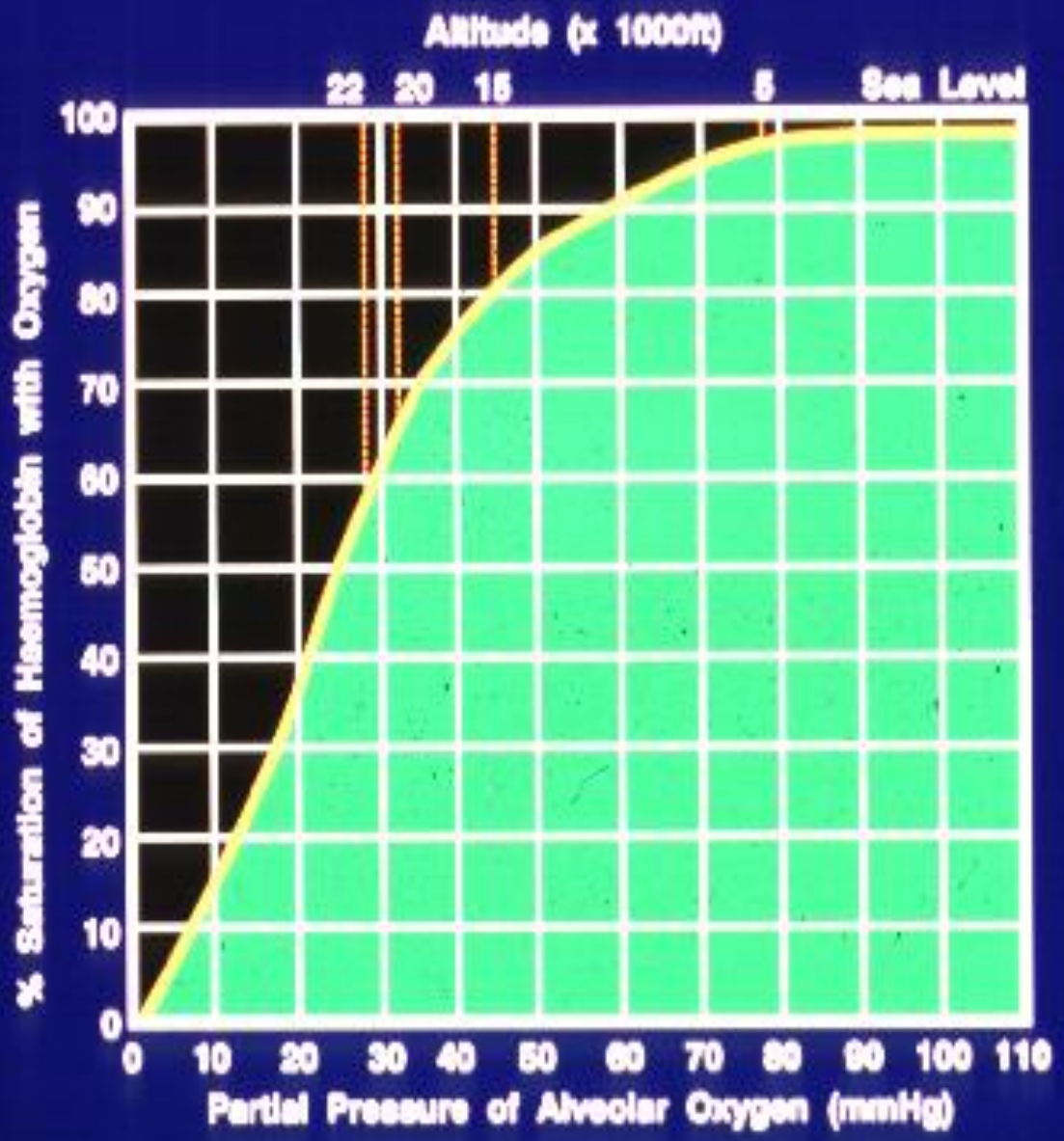


Cardiovascular Disease

- Most cardiac patients can tolerate cabin with the use of supplementary O_2 p.r.n.
- Post MI: can fly at 7 – 10 days
- Angioplasty/Stent: 3 - 5 days post procedure
- Bypass: 10 – 14 days since thoracic surgery and need absorption of air

Cardiovascular Disease

- Pacemakers/implanted defibs: no problem. Interference with aircraft systems not an issue


When will he be fit to fly?

Travel after surgery

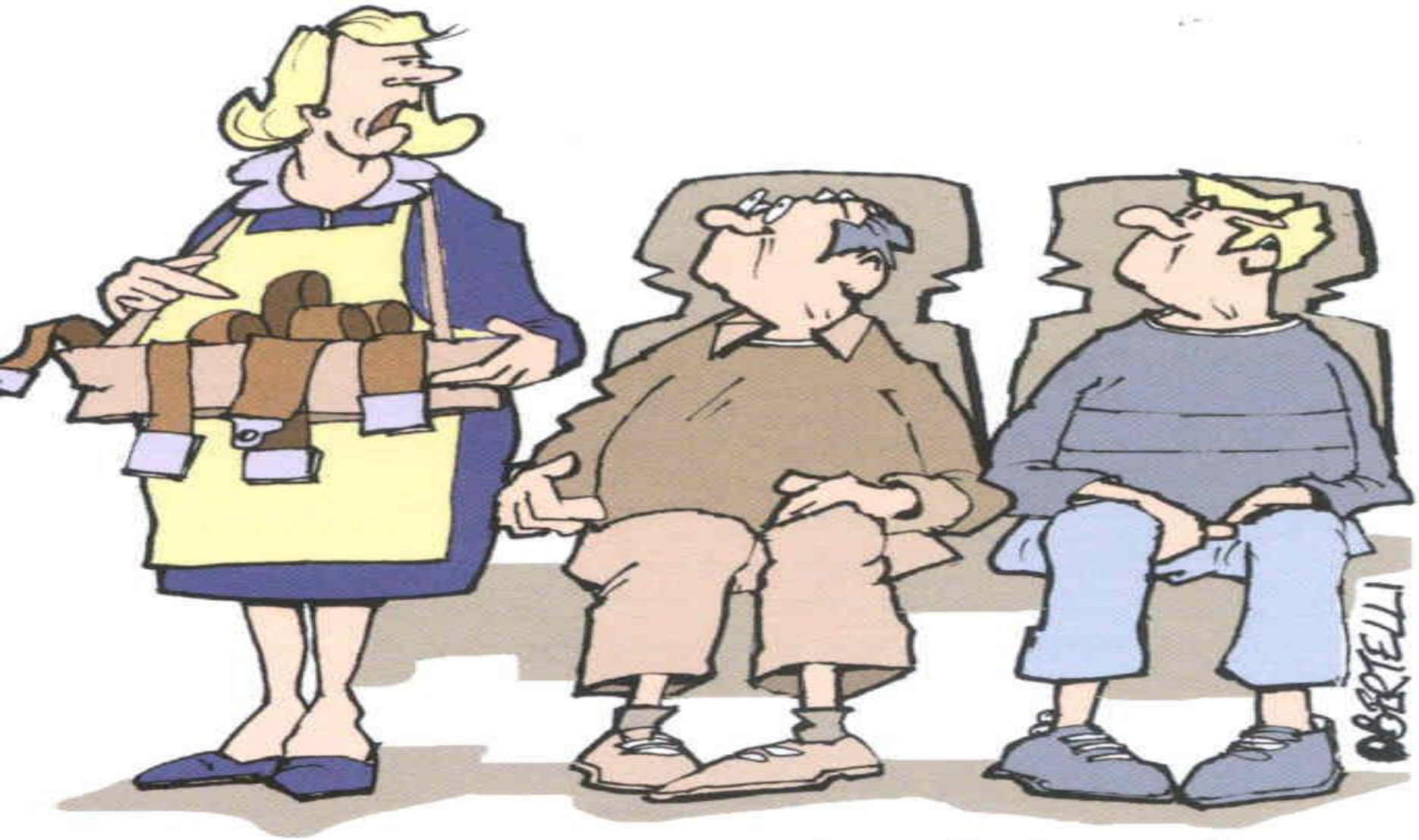
- Increased Oxygen consumption post op
- May be anaemic
- Gas expands by ~ 30% at cabin altitude
- Avoid air travel for 10 days post abdominal surgery
- Avoid 24hrs post procedures where gas introduced into the abdomen

Planning

- Inform the airline of the condition
- Treating physician involvement
- MEDIF Form if required

Summary

- More chance of an accident on the M25 on the way to LHR than in the air
- Just as likely to have a DVT on a train as on a 747
- More chance of respiratory infection on the tube on the way to LHR
- Travel by air possible even with underlying medical condition



Now don't give me a hard time, honey, it's in the small print. You pay £2 for the fare and another £350 for a seat belt


They should go.....
QANTAS

Sources of information

- Aviation Health Unit CAA

  www.caa.co.uk/fitnesstofly
- Medical Guidelines for Airline Travel

  www.asma.org

- 1 British Thoracic Society

  www.brit-thoracic.org.uk

  2 British Cardiac Society

  Fitness to fly for passengers with cardiovascular disease: Report of the Working Group of the British Cardiac Society Heart 2010 96; ii1-16
- BMA

  www.bma.org.uk
- Airline Websites
- BA Pax Clearance Unit: +44 (0)20 8738 5444


Questions?
Google: Aviation Health Unit
www.caa.co.uk/fitnesstofly