

Some future potentials some potential futures

Martin Utley

Clinical Operational Research Unit
Department of Mathematics
University College London

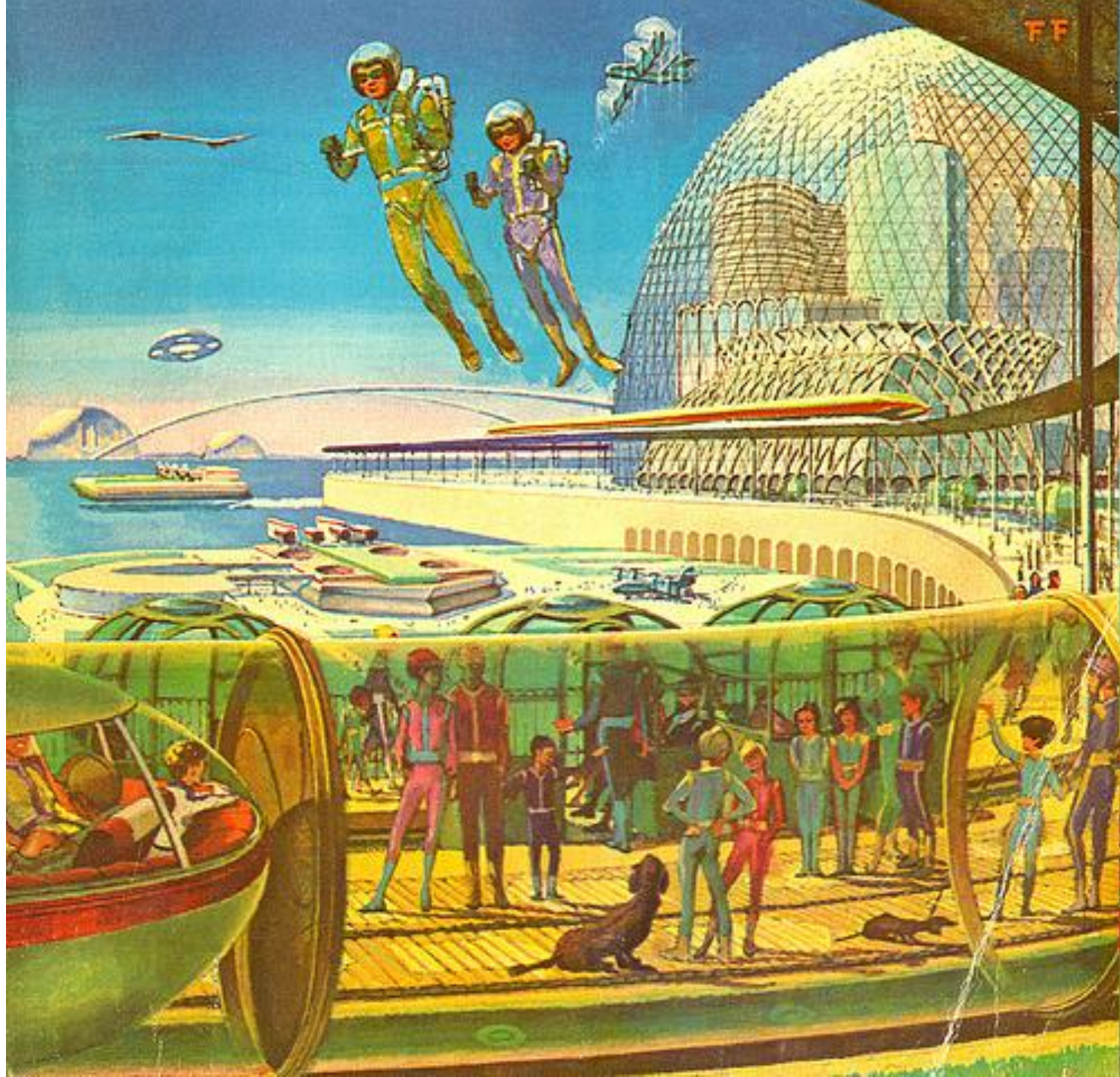
www.ucl.ac.uk/operational-research

UCL CORU

A group of mathematicians, lapsed physicists, a surgeon and a computer scientist dedicated to tackling problems in health care using a range of analytical / modelling techniques. Current work includes

Effectiveness of thoracic surgery
Monitoring risk adjusted clinical outcomes
Impact of bridging technologies on transplant
Vaccine procurement and utilisation
vCJD via blood transfusion
Maternal and neonatal mortality in Africa
Demand forecasting

Outpatients 2015



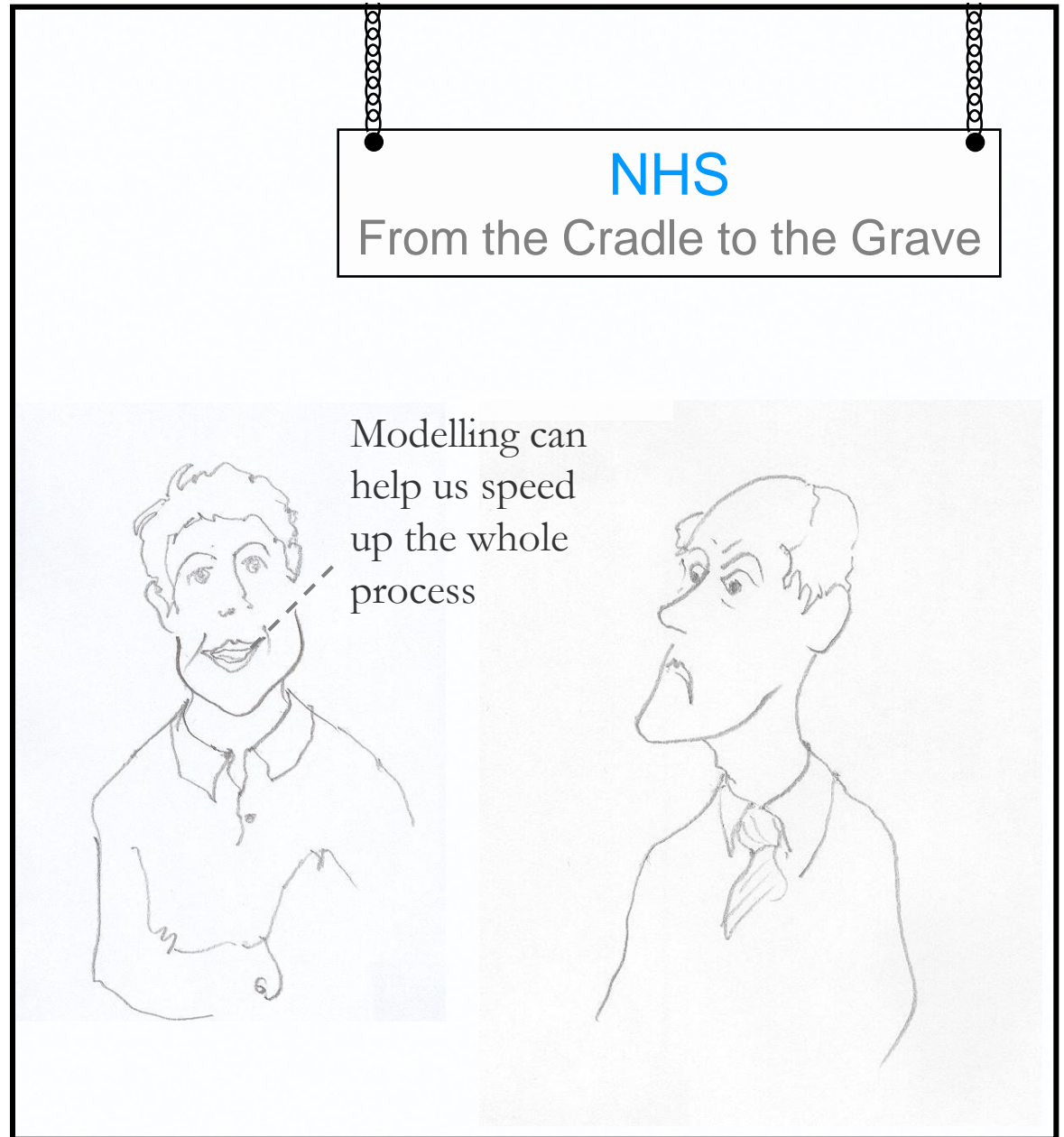


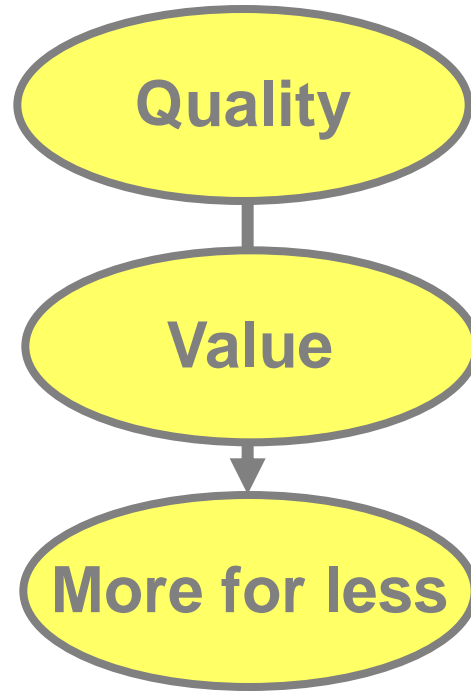
Declaration of interests

I believe in the NHS

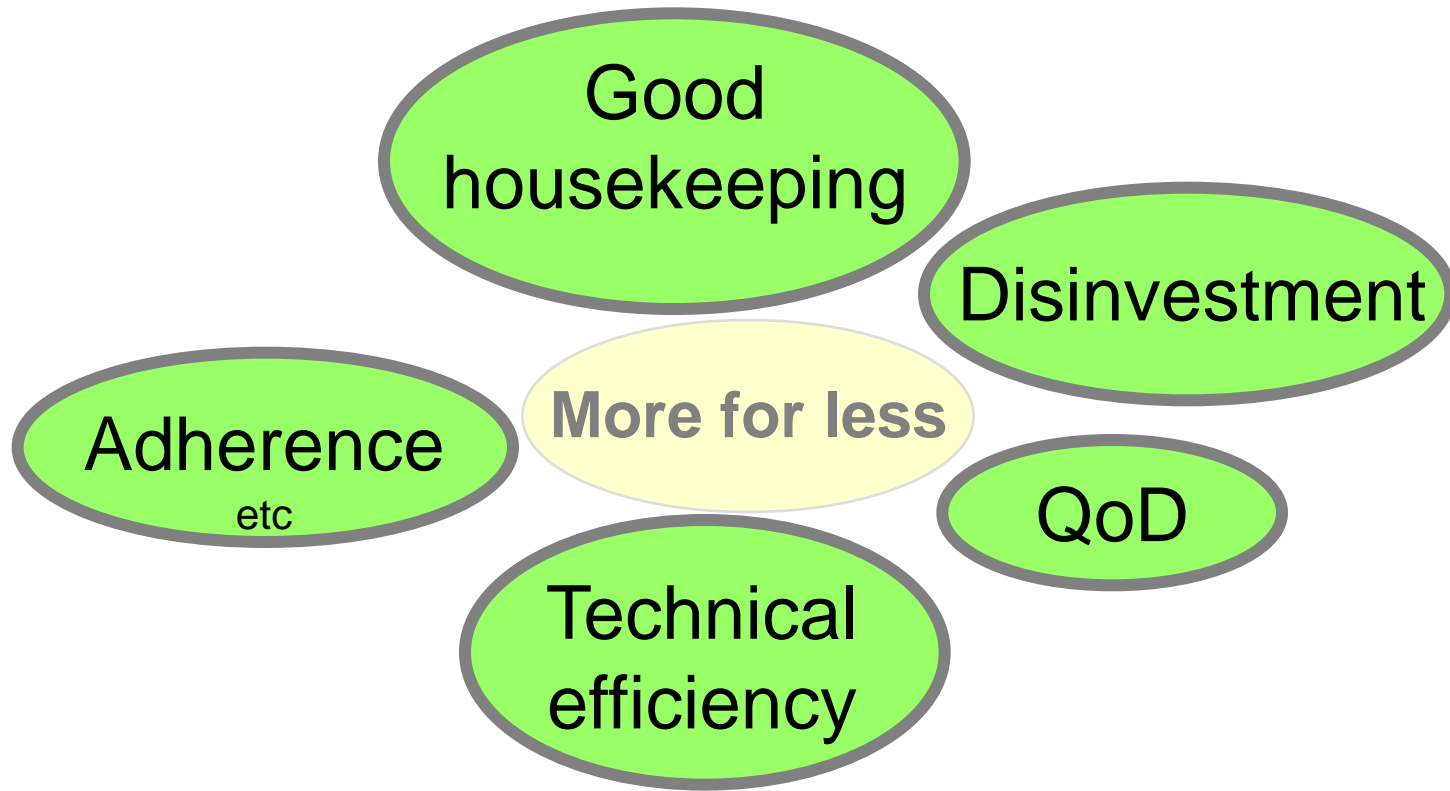
I believe in modelling in the NHS

Part of my job is convincing people to fund modelling studies





Better patient outcomes through implementing evidence based interventions



Good housekeeping

Disinvestment

Adherence
etc

More for less

QoD

Technical efficiency

Good
housekeeping

Disinvestment

Adherence
etc

More for less

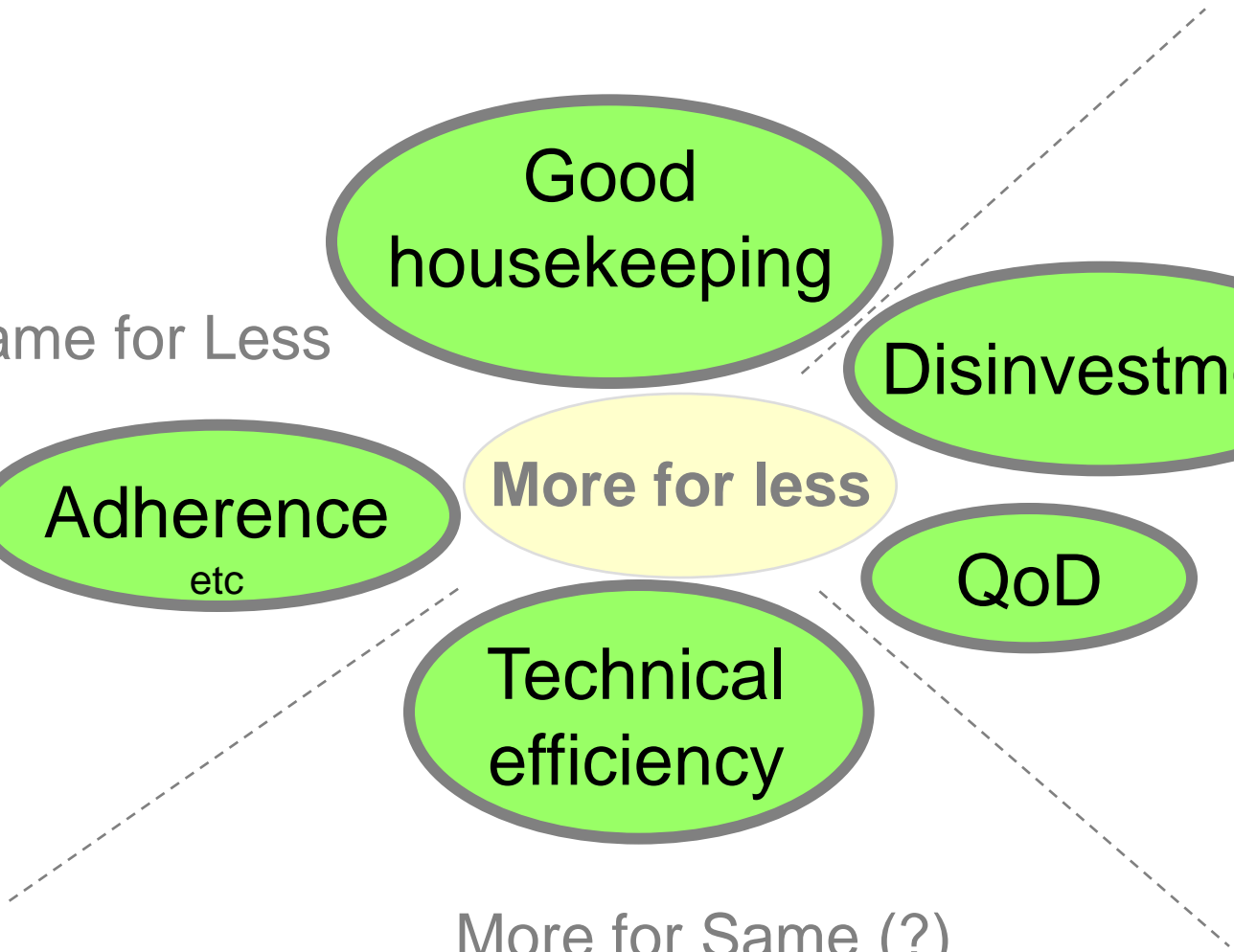
QoD

Technical
efficiency

Less is More

More for Same (?)

Same for Less



Good housekeeping

Disinvestment

More for less

Adherence
etc

QoD

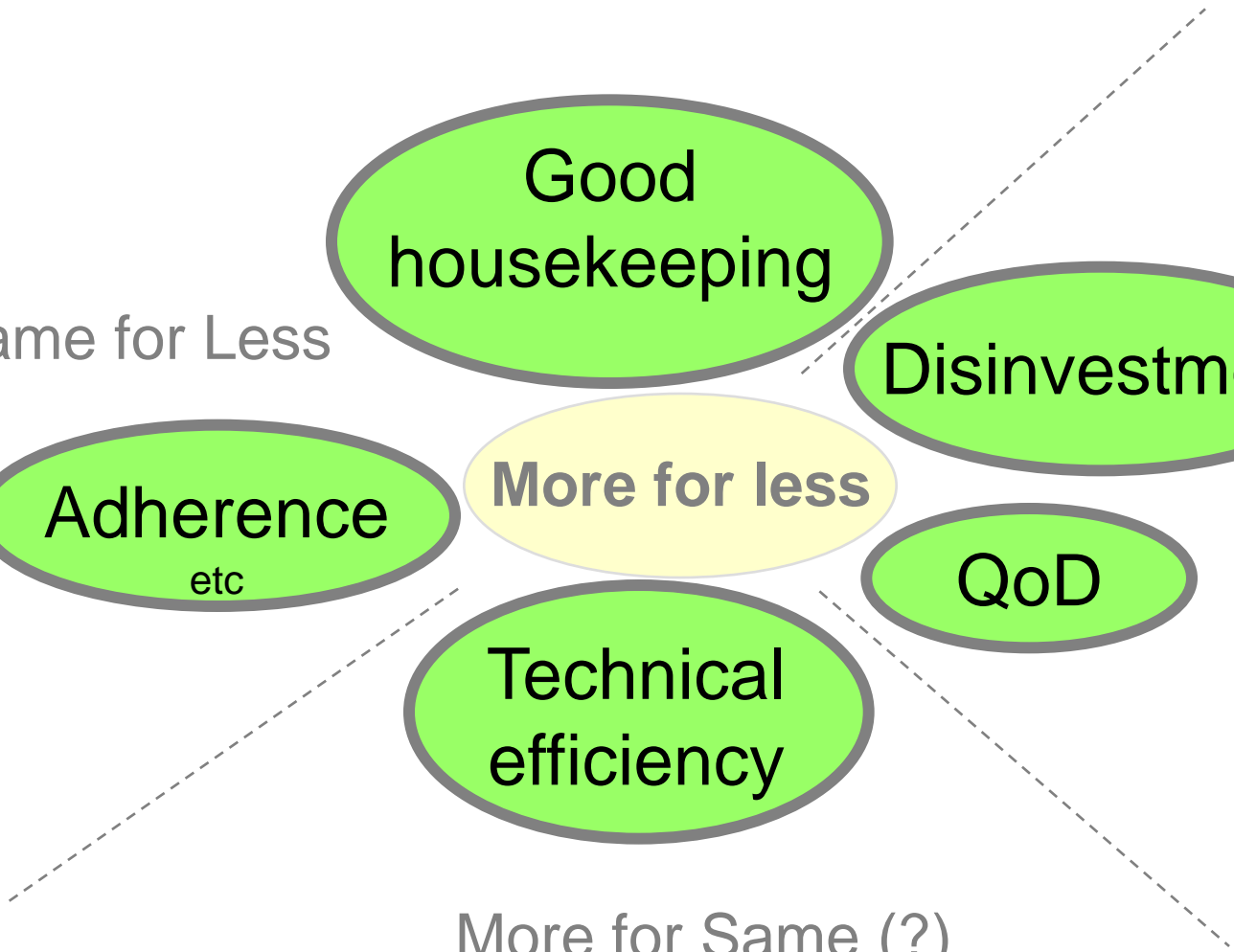
Technical efficiency

Less is More

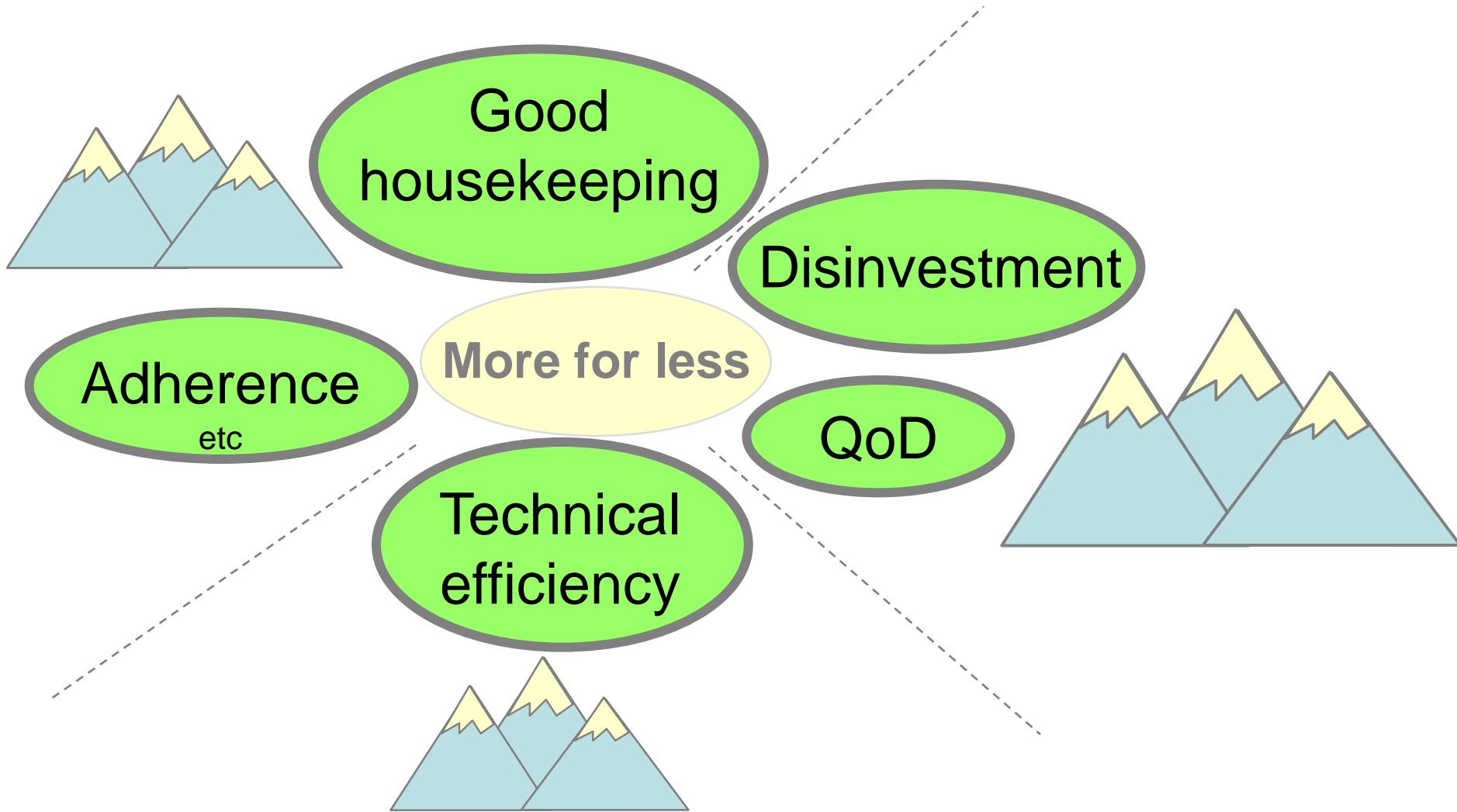
More for Same (?)

Most modelling sits here

Same for Less

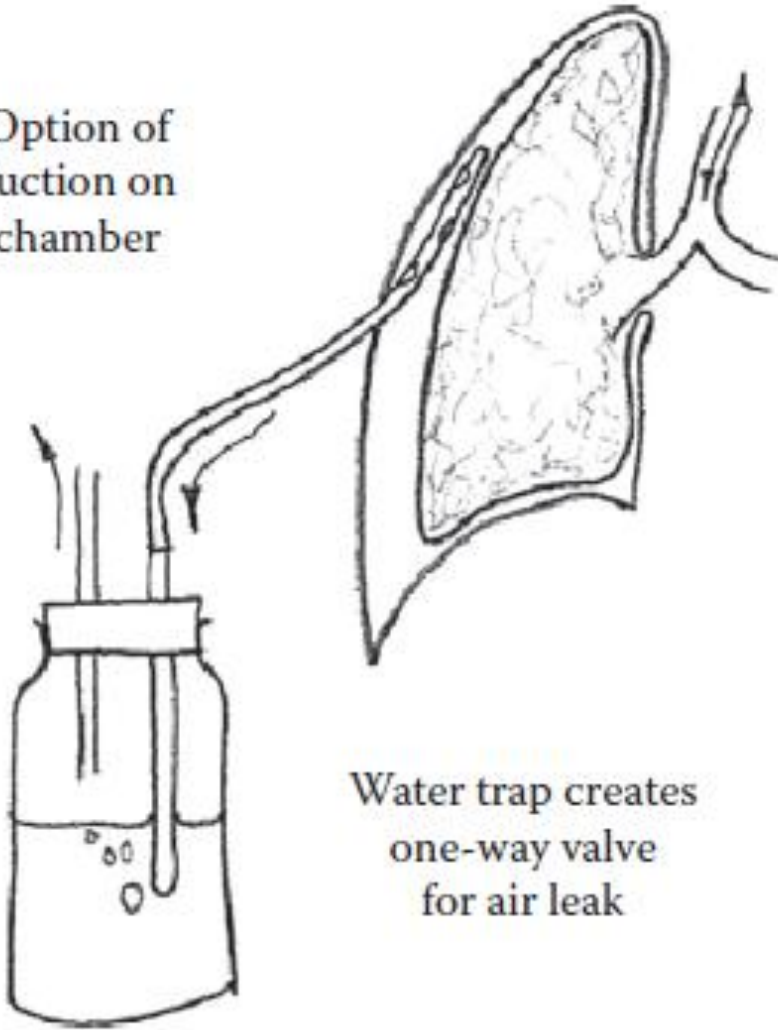


Barriers include culture (organisational / political / societal) clinical autonomy and rivalries between sectors / professions.



Modelling can fall at these barriers but can also break them down

Option of
suction on
chamber

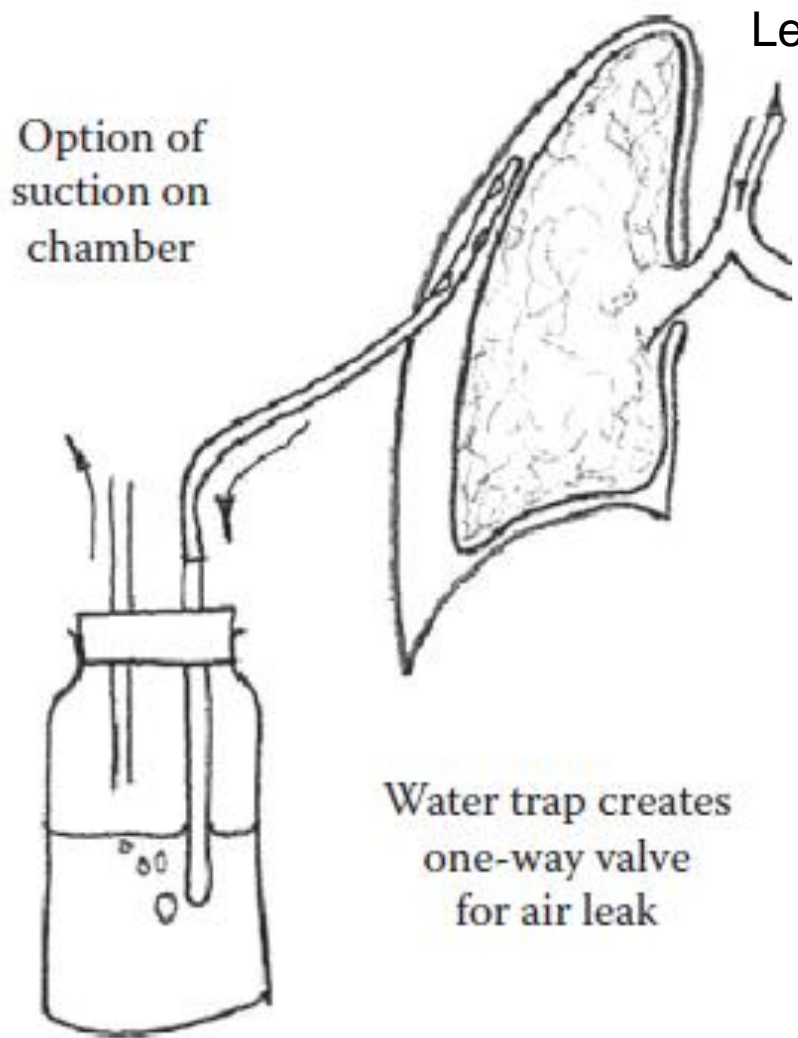


Water trap creates
one-way valve
for air leak

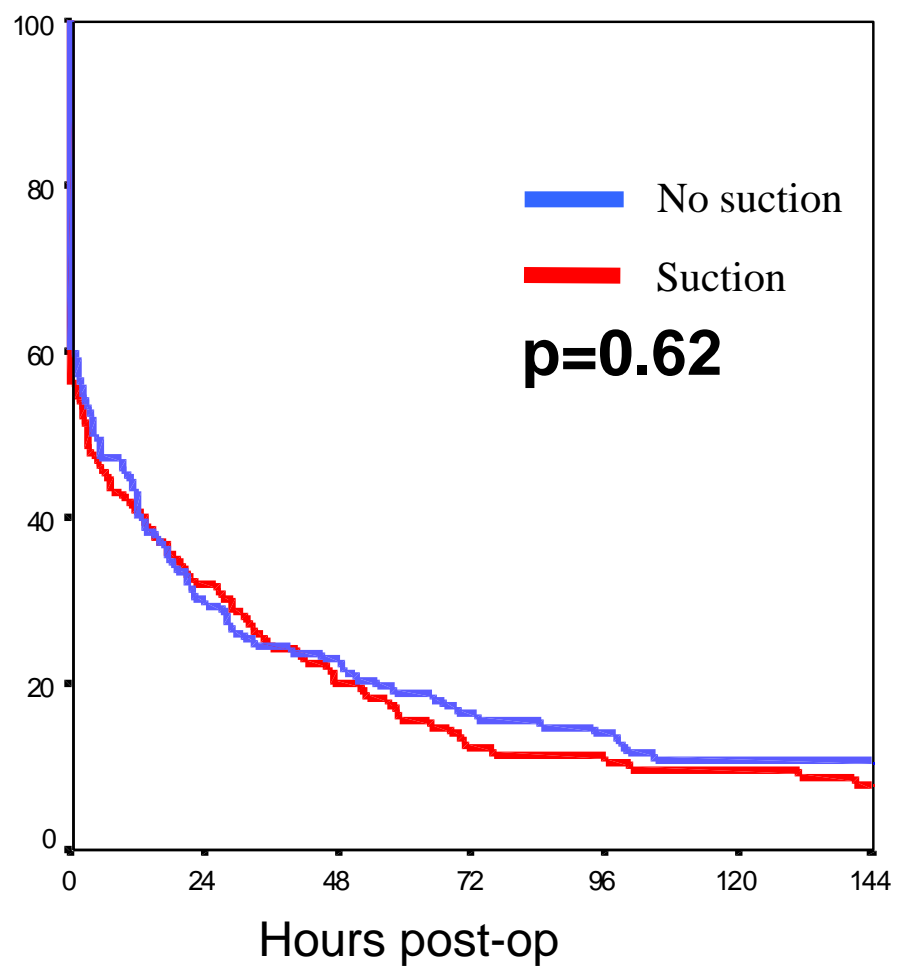
1 department, 3 surgeons, 2 protocols



get the evidence

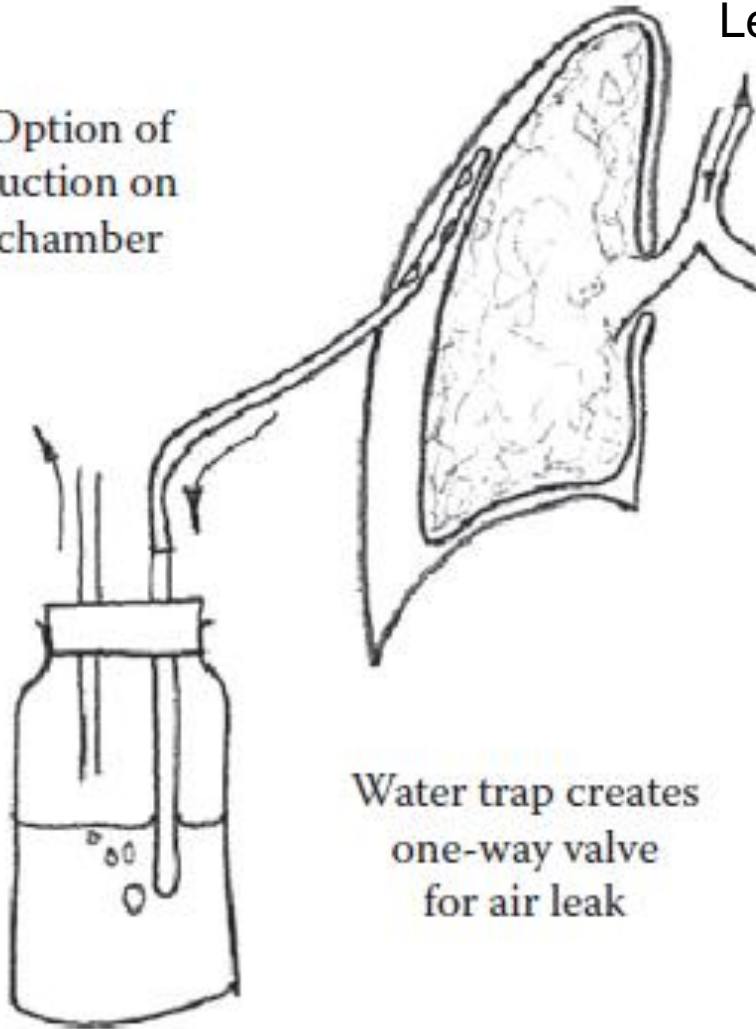


Leak persistence

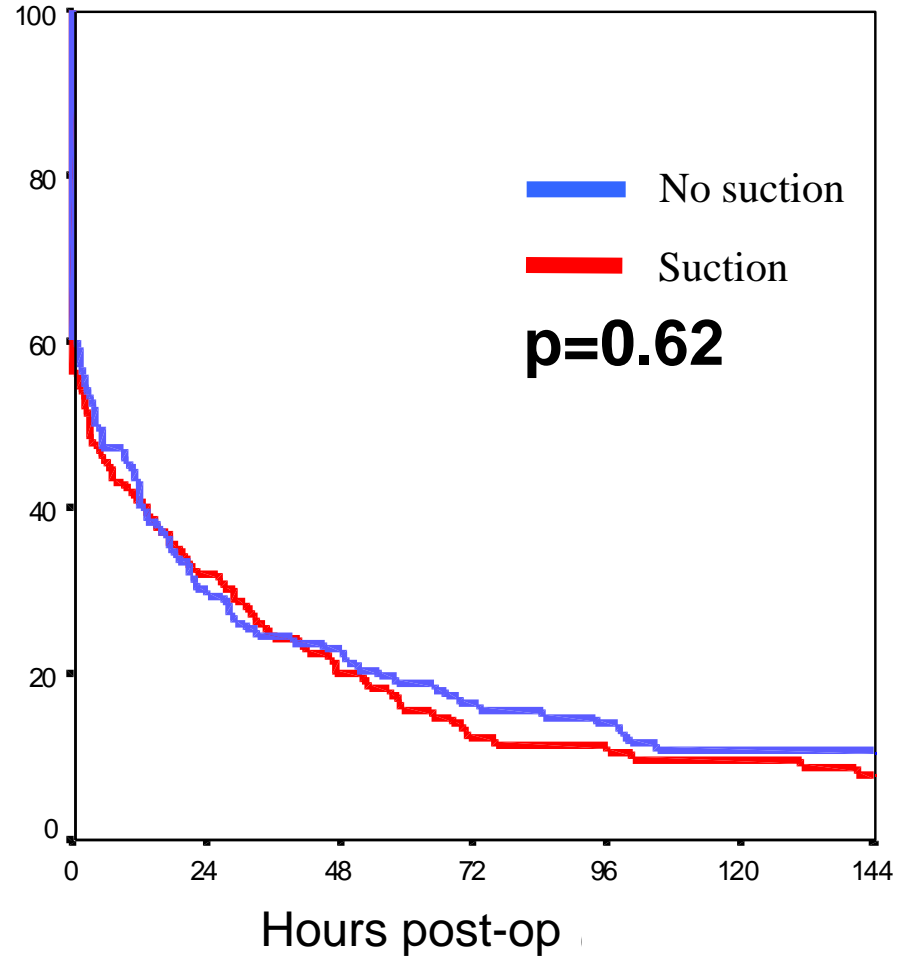


Alphonso N, Tan C, Utley M, Cameron R, Dussek J, Lang-Lazdunski L, Treasure T
A prospective randomized controlled trial of suction versus non-suction to the under-water seal drains following lung resection, European Journal of Cardio-thoracic Surgery 2005;**27**:391-394.

Option of suction on chamber



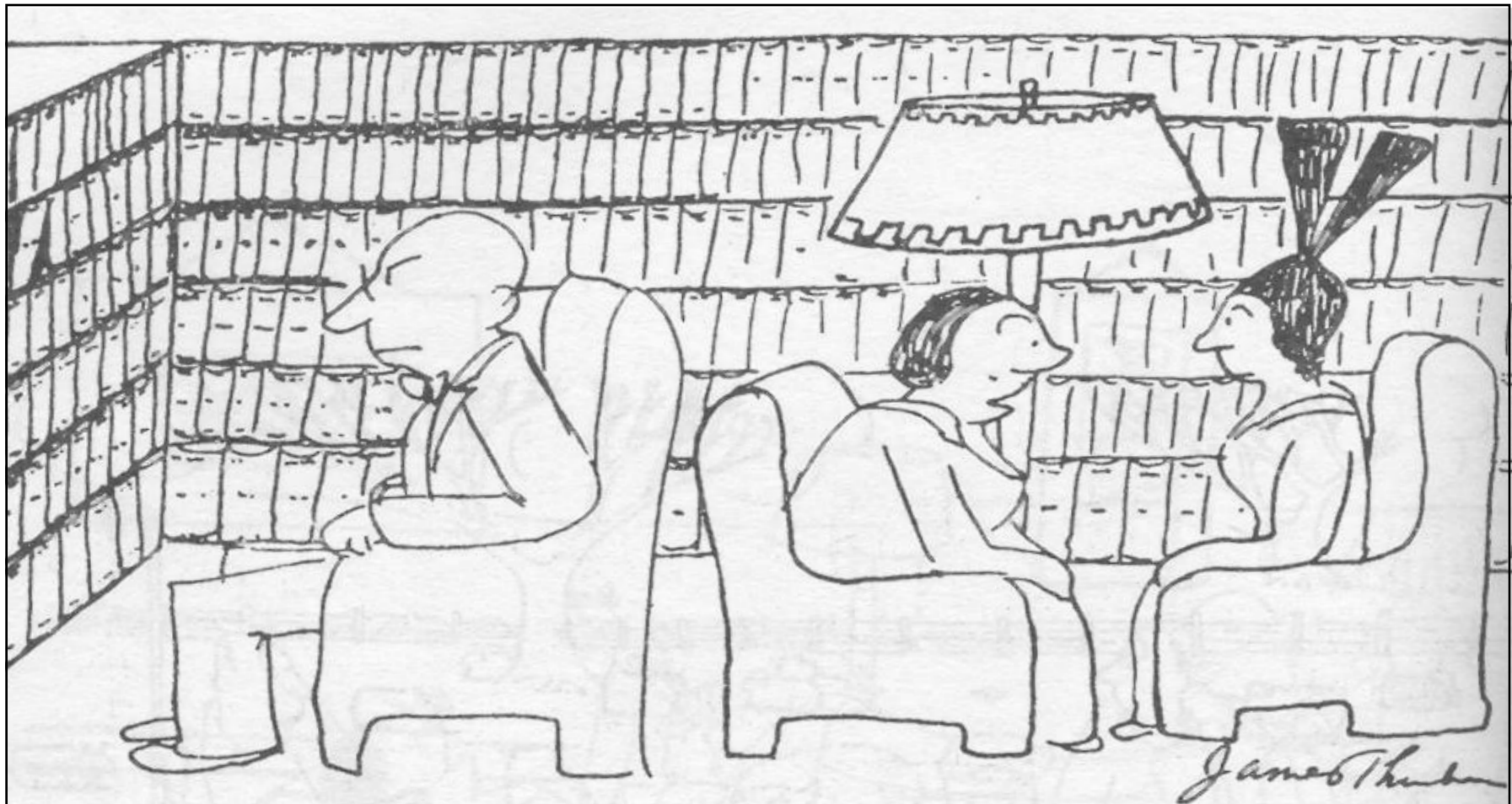
Leak persistence



Same department, 2 yrs later, 5 surgeons



5 protocols



'He doesn't believe a single word he's read in the past ten years.'

Modelling has vast untapped potential

Programme budgeting

Capacity planning within and across different sectors

Risk pooling between commissioners

Risk sharing between commissioners / providers

scheduling

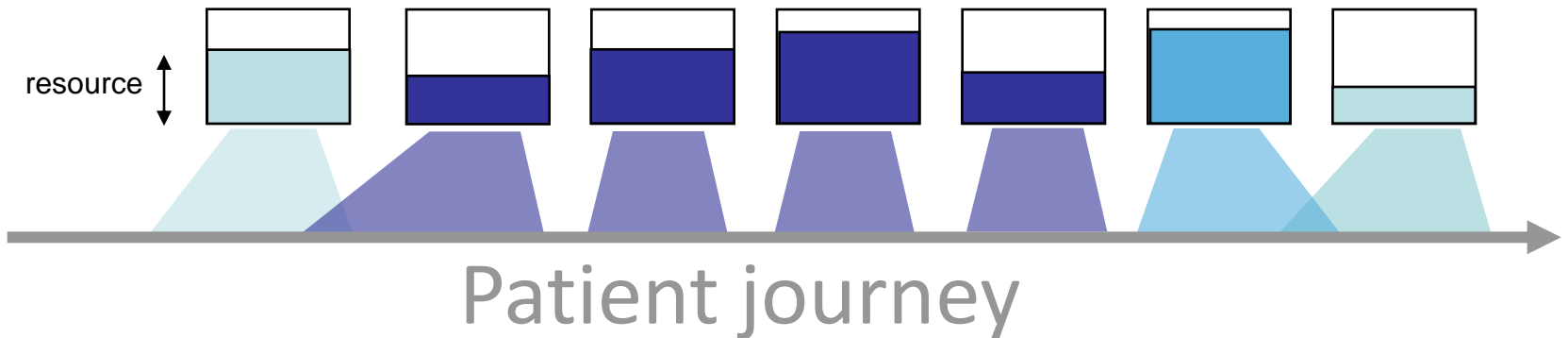
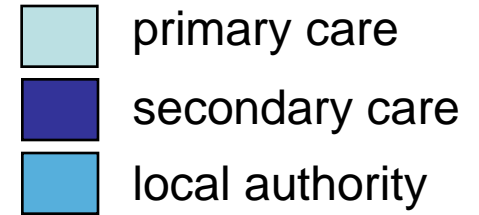
forecasting demand

locating facilities

monitoring outcomes and processes

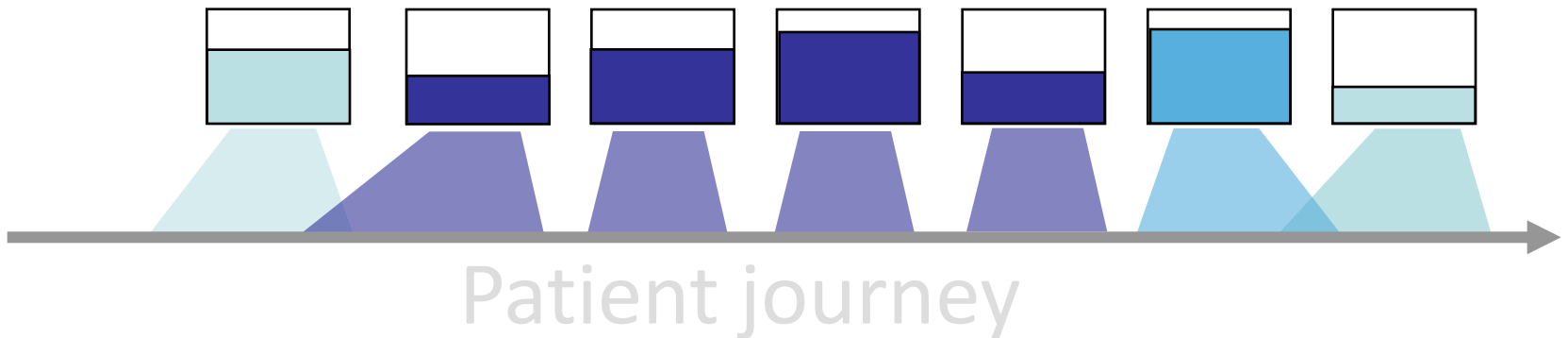
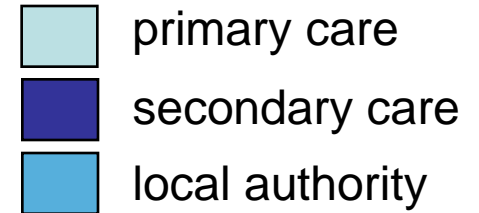
Cross-sector capacity planning

what level of resource to provide at each step?
what utilisation is desirable at each step?



Cross-sector capacity planning

what level of resource to provide at each step?
what utilisation is desirable at each step?



A sector-by-sector, department-by-department approach leads to poor system performance.

Modelling at whole system level can point towards improved outcomes and utilisation of *key* resources.

Modelling has vast **untapped** potential

Programme budgeting

Capacity planning within and across different sectors

Risk pooling between commissioners

scheduling

Risk sharing between commissioners / providers

forecasting demand

locating facilities

monitoring outcomes and processes

Some barriers

An alien form of evidence - are our “Black Swans” seen as ugly ducklings?

Steady state models for a changing world

Models often exclude the cost of change

Failure (client and modeller) to look at broader system

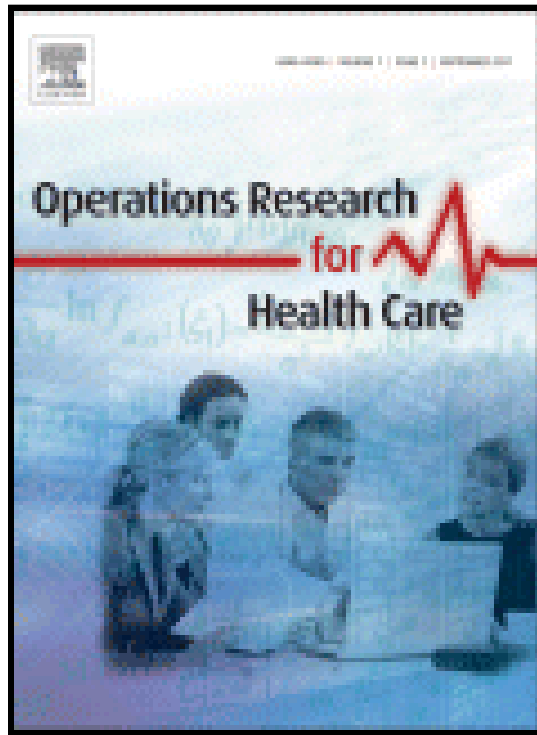
Modelling as last resort, ammunition, fig-leaf, delay

Analytical resource fractionated, over-stretched & undervalued

When we disseminate **models**, we forget the value in **modelling**

**Do we
always
need
better
models?**





New Elsevier journal

Interested in applications and lessons learned as well as new models.

1st edition out soon

Sir Muir Gray on Value

OR agenda for stroke services

OR in health policy

Snapshot of US Health OR

<http://www.journals.elsevier.com/operations-research-for-health-care>

Good housekeeping

Disinvestment

Adherence
etc

More for less

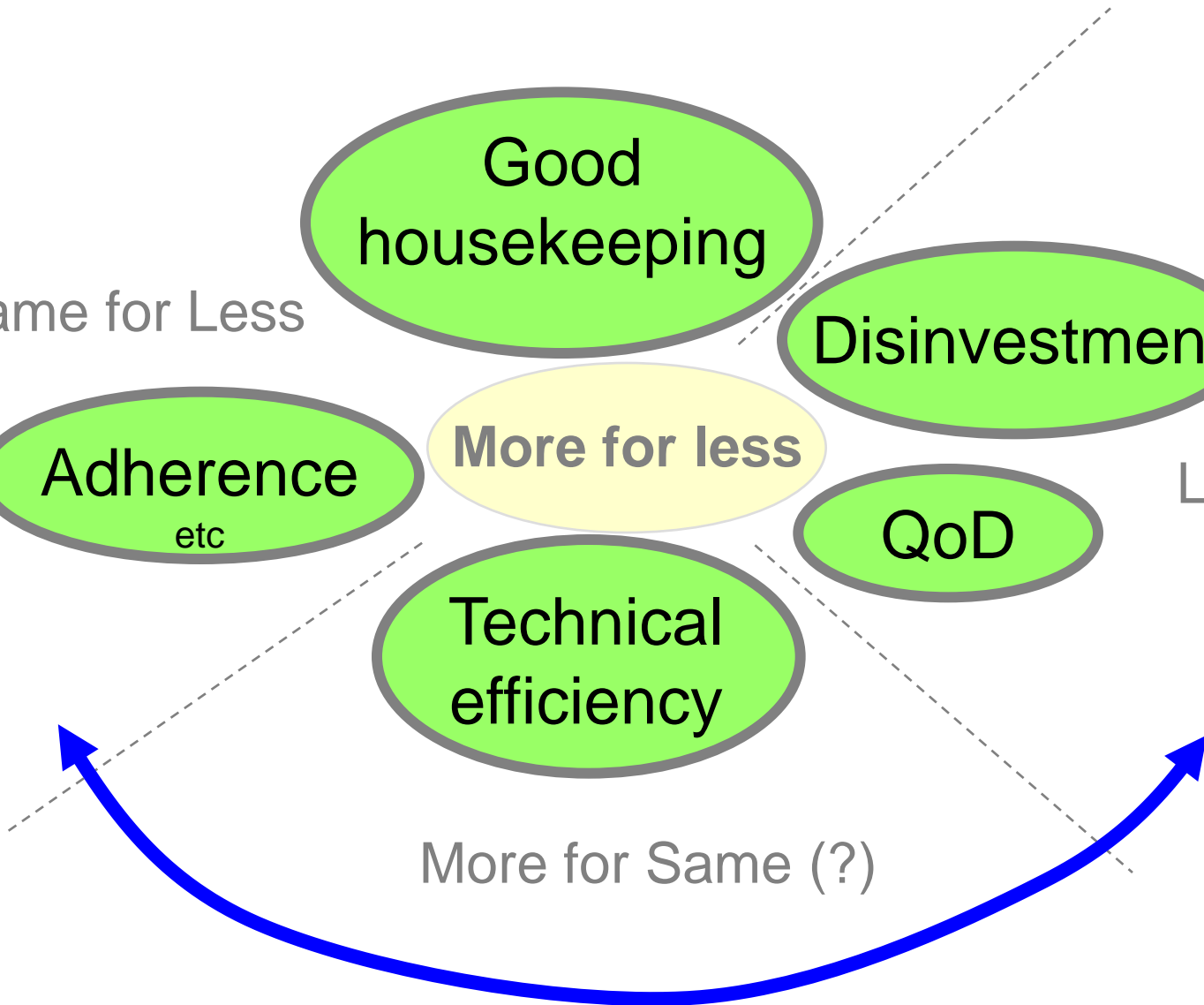
QoD

Technical efficiency

Less is More

More for Same (?)

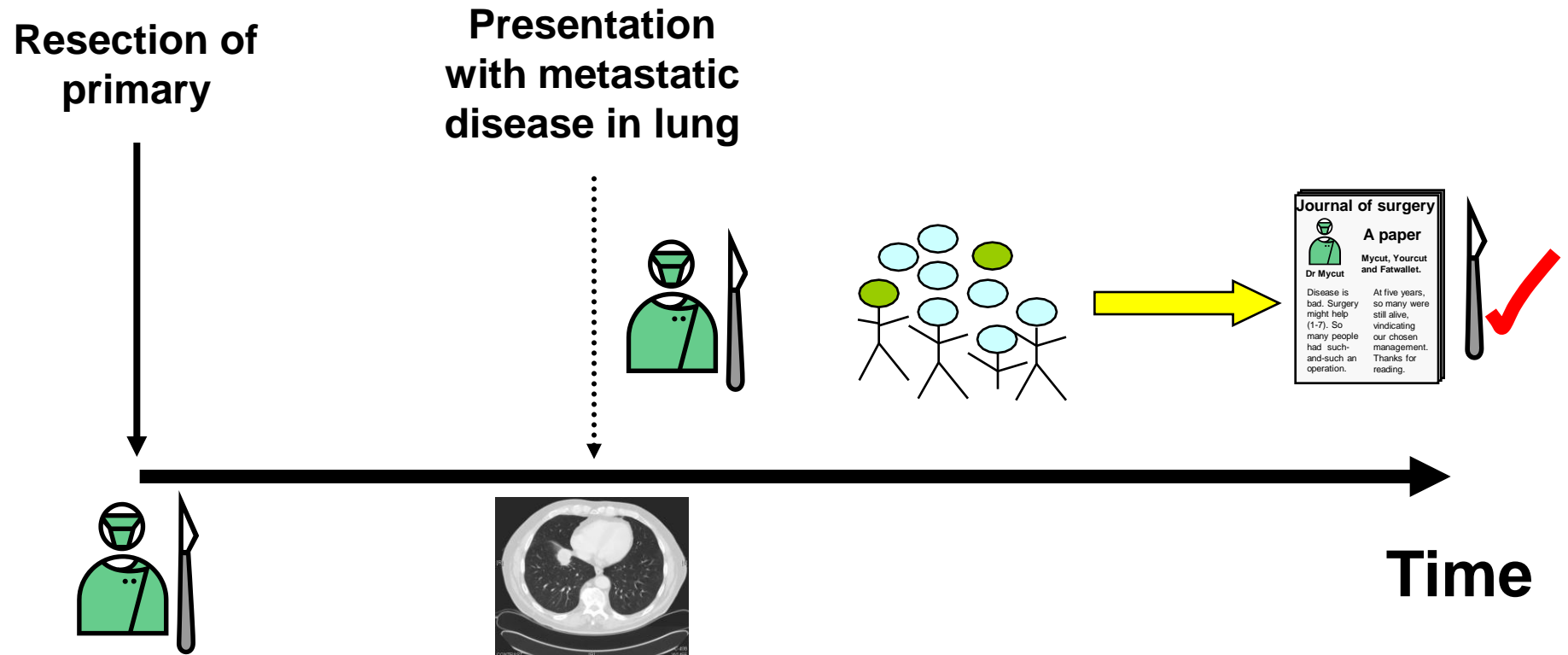
Same for Less



Challenging existing practice

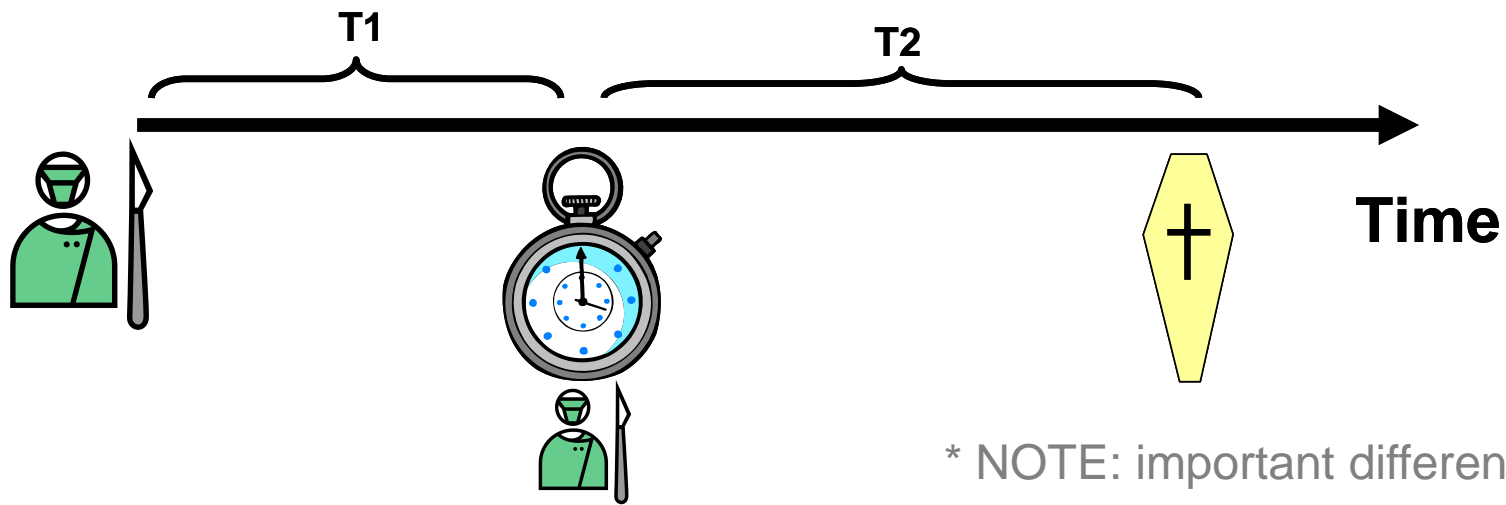
Pulmonary metastasectomy
in colorectal cancer

Is presumption of efficacy justified?



Estimate survival “expected” for patients similar* to those in follow-up studies

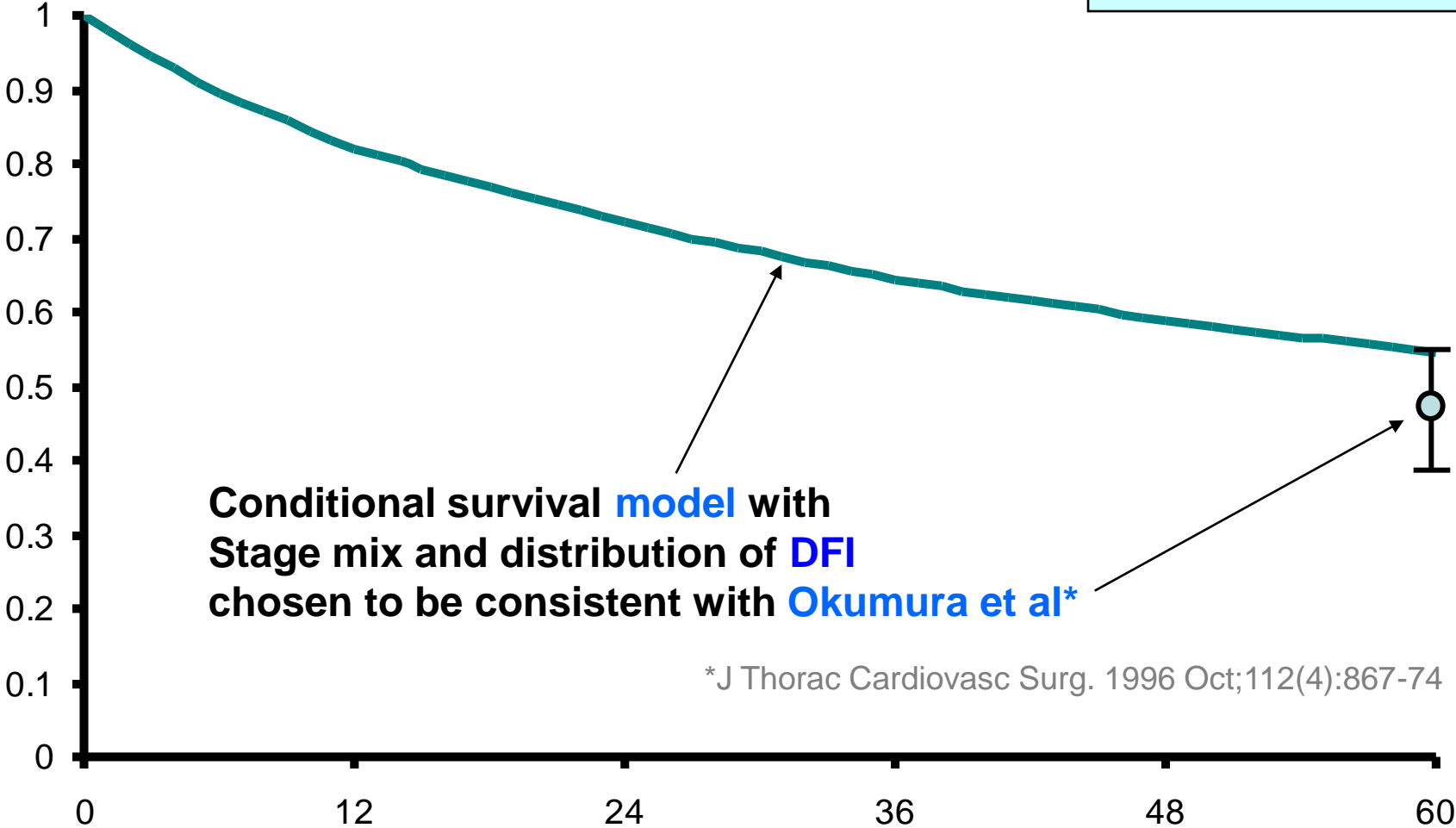
- Estimate survival by **stage** and by length of time **T1**.
- Match **stage-mix** and distribution of **T1** to that reported



* NOTE: important differences remain

WARNING
these premises are
unstable

Proportion of patients still alive



Conditional survival **model** with
Stage mix and distribution of **DFI**
chosen to be consistent with **Okumura et al***

*J Thorac Cardiovasc Surg. 1996 Oct;112(4):867-74

* "Disease free interval", "Death free interval"

Systematic review

Fiorentino F, Hunt I, Teoh K, Treasure T, Utlely M, *Pulmonary metastasectomy in colorectal cancer: a systematic review and quantitative synthesis*, Journal of the Royal Society of Medicine (2010) 103(2):60-6.

Treasure T, Fallowfield L, Farewell V, Ferry D, Lees B, Leonard P, Macbeth F, Utlely M, *Pulmonary metastasectomy in colorectal cancer: Time for a trial*, European Journal of Surgical Oncology 2009;35(7):686-9.

Utlely M, Treasure T, Linklater K, Møller H, *Better out than in? The resection of pulmonary metastases from colorectal tumours*, in Eds Xie X, Lorca F, Marcon E, Operations Research for Health Care Delivery Engineering, Proceedings of the 33rd meeting of the European working group on Operational Research Applied to Health Services, St Etienne, July 2007. ISBN:978-2-86272-507-9 (2008) pp:493-500.

Modelling

Treasure T, Internullo E, Utlely M, *Resection of pulmonary metastases: a growth industry*, Cancer Imaging 2008; 8:121-124.

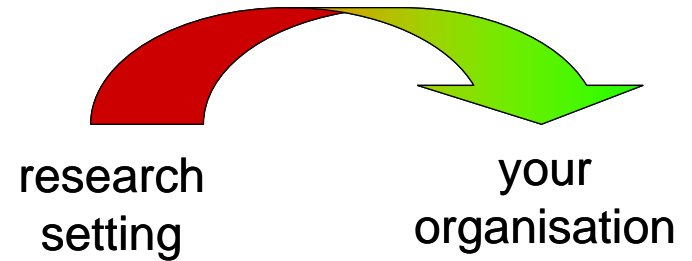
Debate

Treasure T, Utlely M, Hunt I, *When professional opinion is not enough*, BMJ 2007;334:831-2.

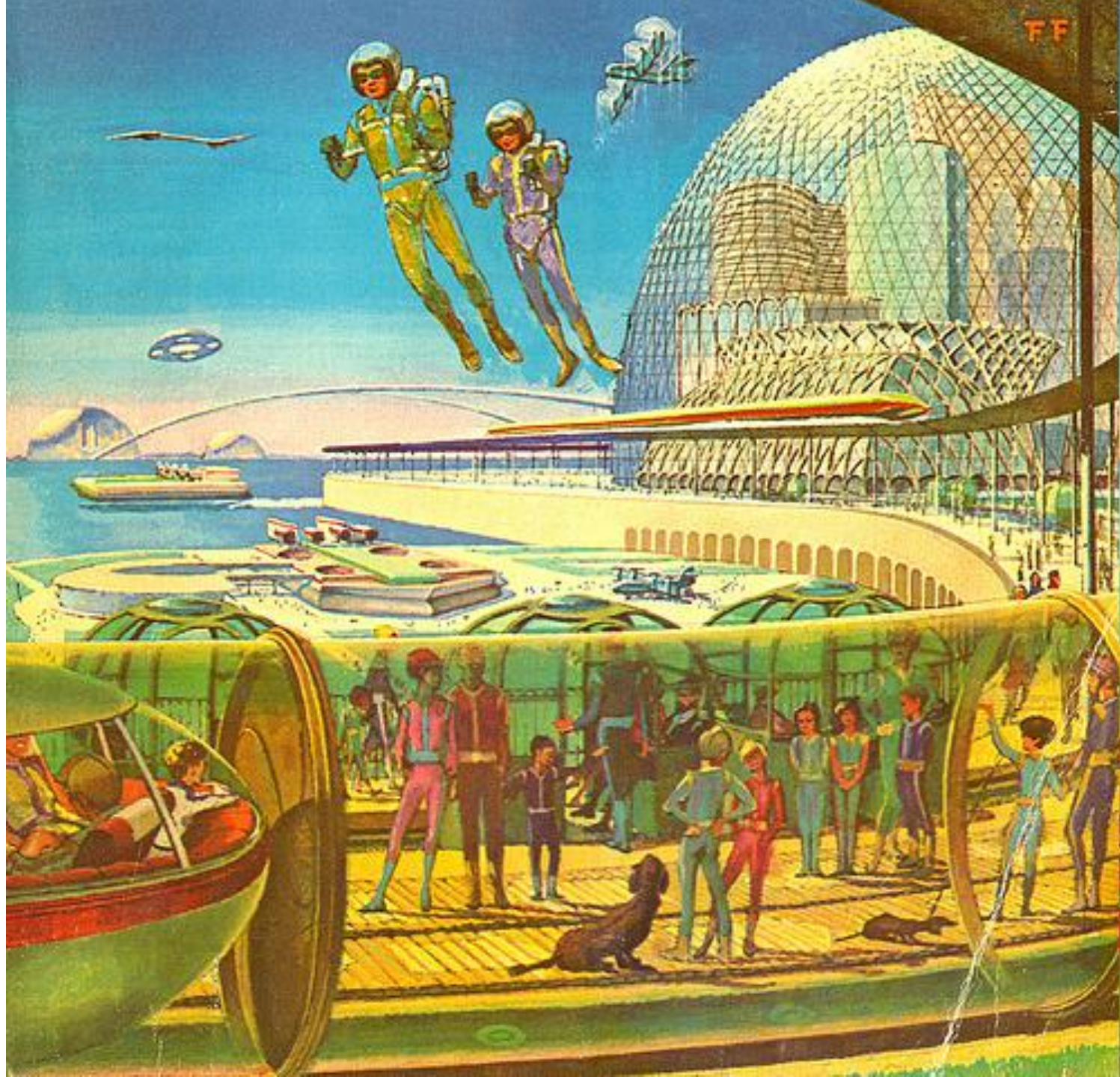


CRUK funded RCT

Bringing research to life



Modelling as a focus for discussion,
data, sharing of tacit knowledge



I then showed a sequence of slides on an excellent example of using technology, data, and predictive modelling to assist the work of an infection control team in Portsmouth.

For details, see <http://www.vitalpac.co.uk>

The future is here

The future is here



The future is here





Make this our time

