

What is Operational Research and what's it got to do with health?

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*with acknowledgement to:
Martin Utley (CORU)
Steve Gallivan (CORU)

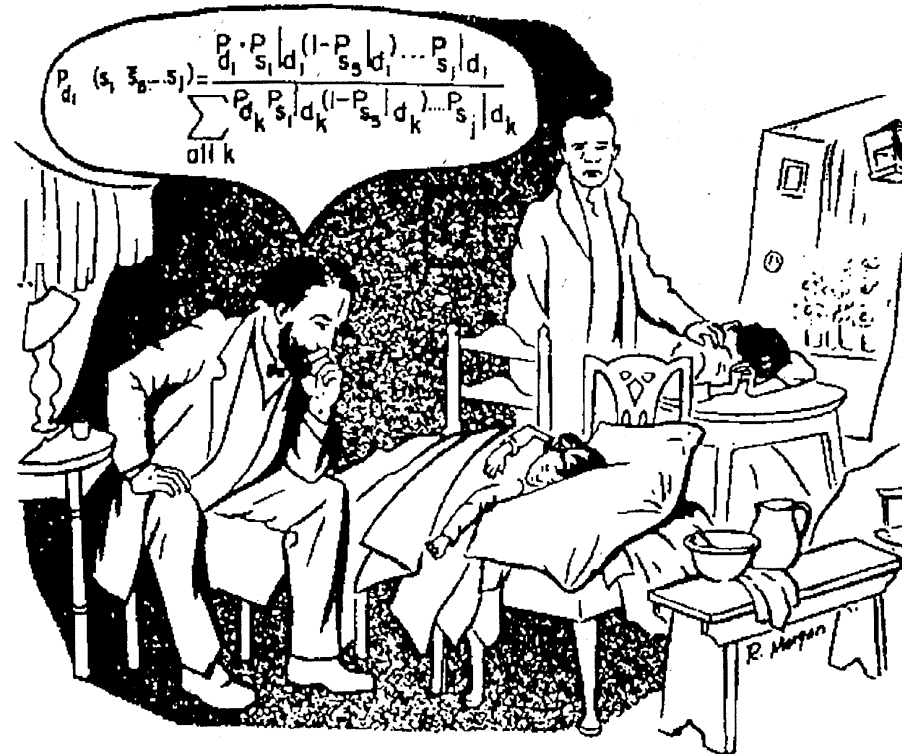
What is Operational Research?



There is no single definition. One good one is:

The use of mathematical modelling to help in making decisions about complex systems

What does CORU do?



...use Operational Research techniques in close collaboration with clinicians, nurses and managers to try to improve patient care.

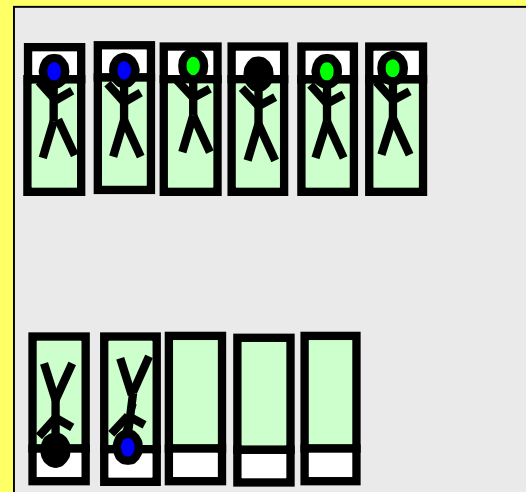
Case Study 1: Ward Overload!



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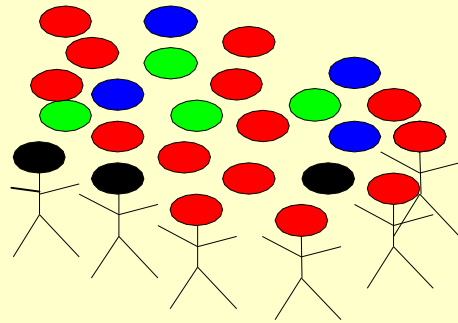
Current Occupancy



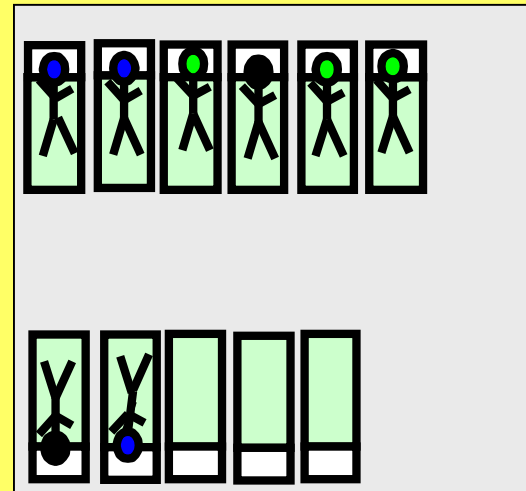
Case Study 1: Ward Overload!



Variable admissions



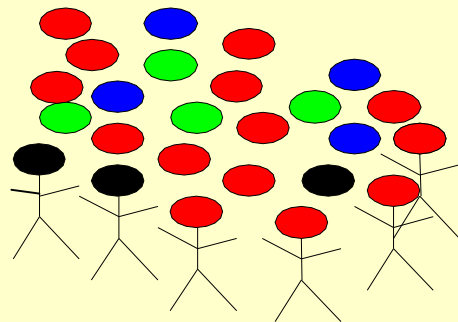
Current Occupancy



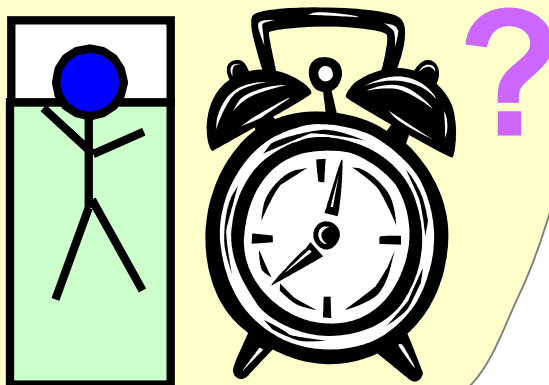
Case Study 1: Ward Overload!



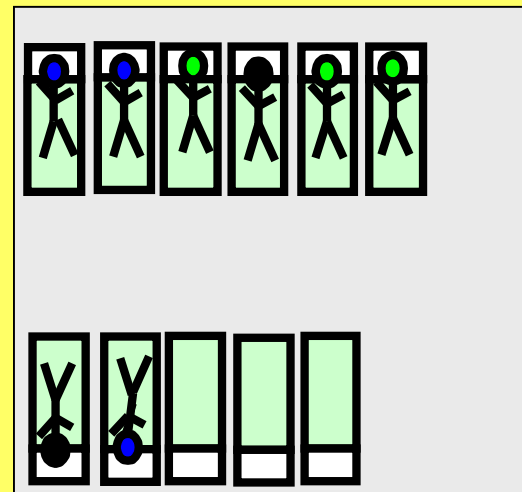
Variable admissions



Variable length of stay



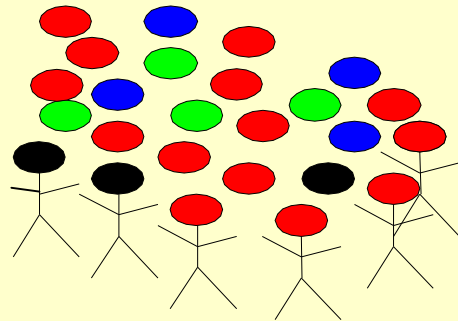
Current Occupancy



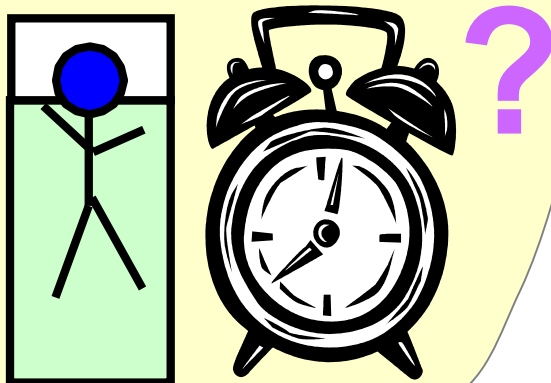
Case Study 1: Ward Overload!



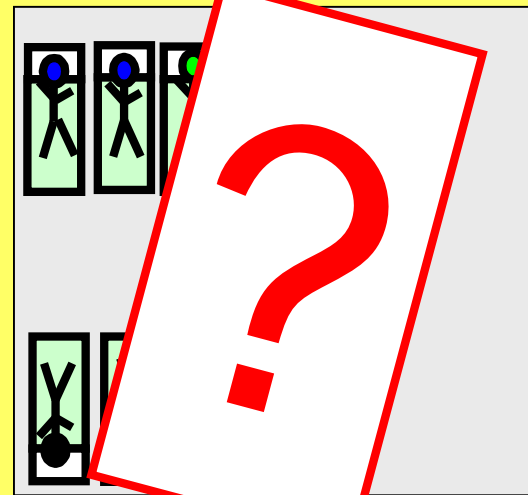
Variable admissions



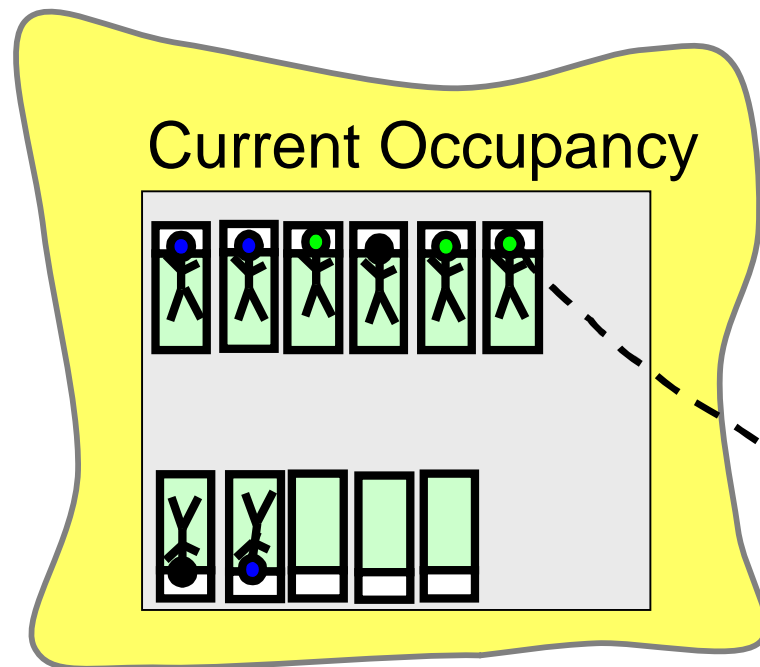
Variable length of stay



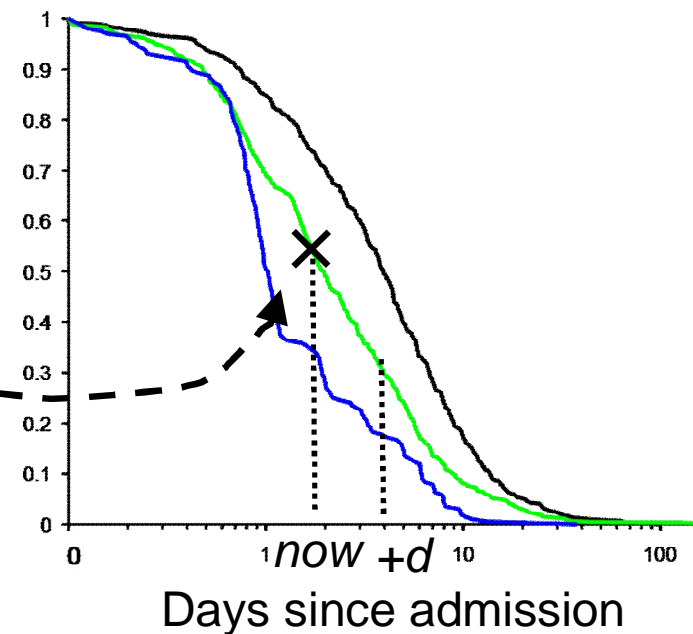
Future Occupancy



Case Study 1: Ward Overload!

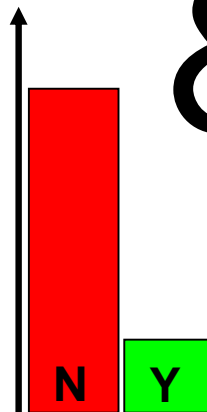
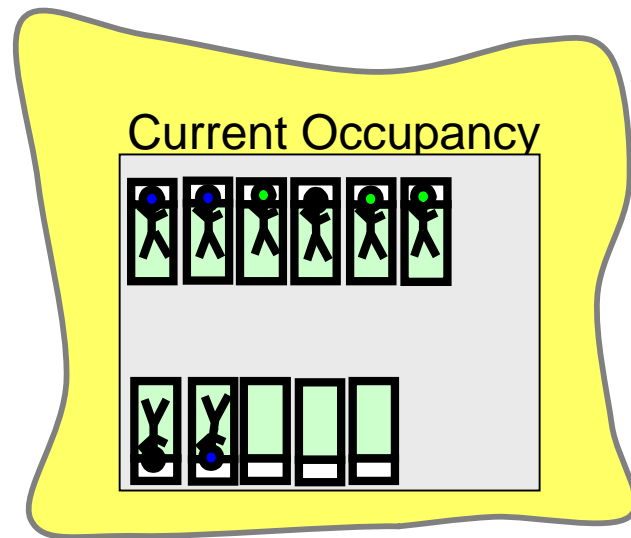


Probability patient
still on ward



We know who is on the ward now, how long they've been there and have some idea of their length of stay distribution...

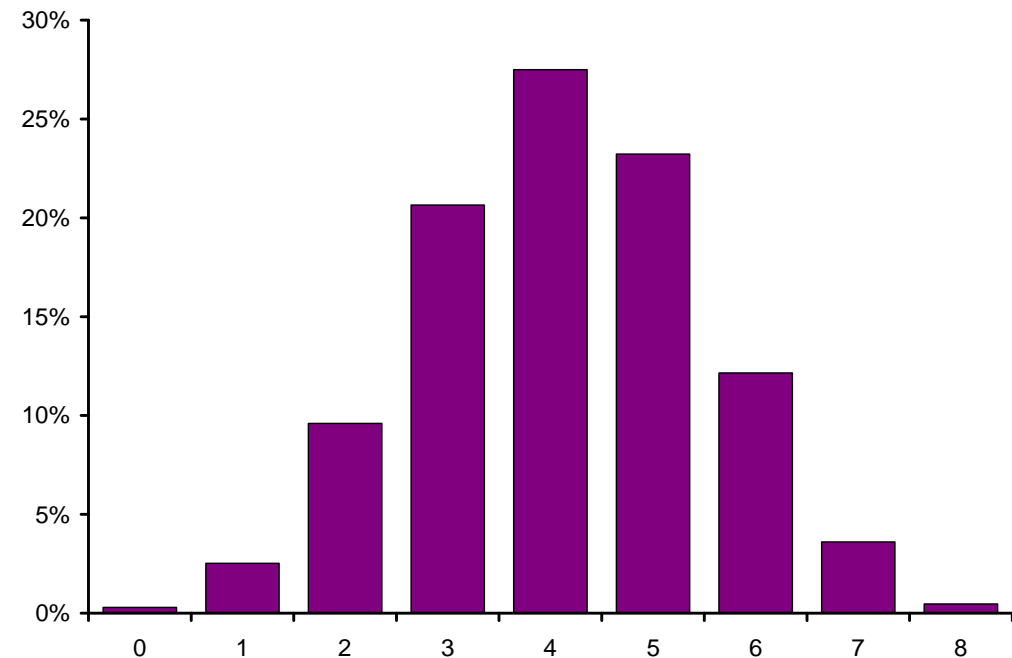
Case Study 1: Ward Overload!



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Probability



Number of current patients still on ward in d days

Still on ward in d days?

Case Study 1: Ward Overload!



Future admissions

Two types :

– Emergency admissions

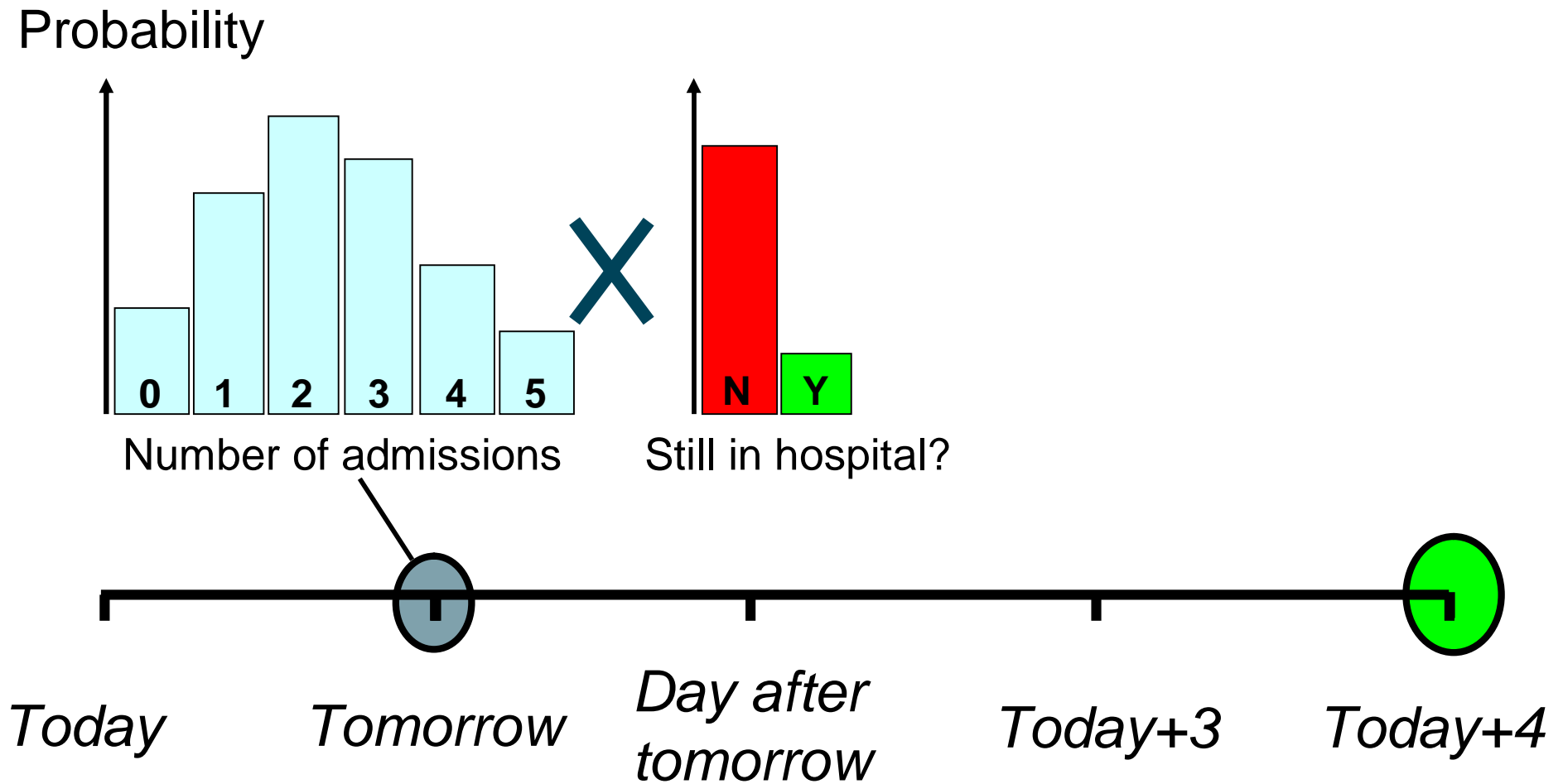


– Booked admissions

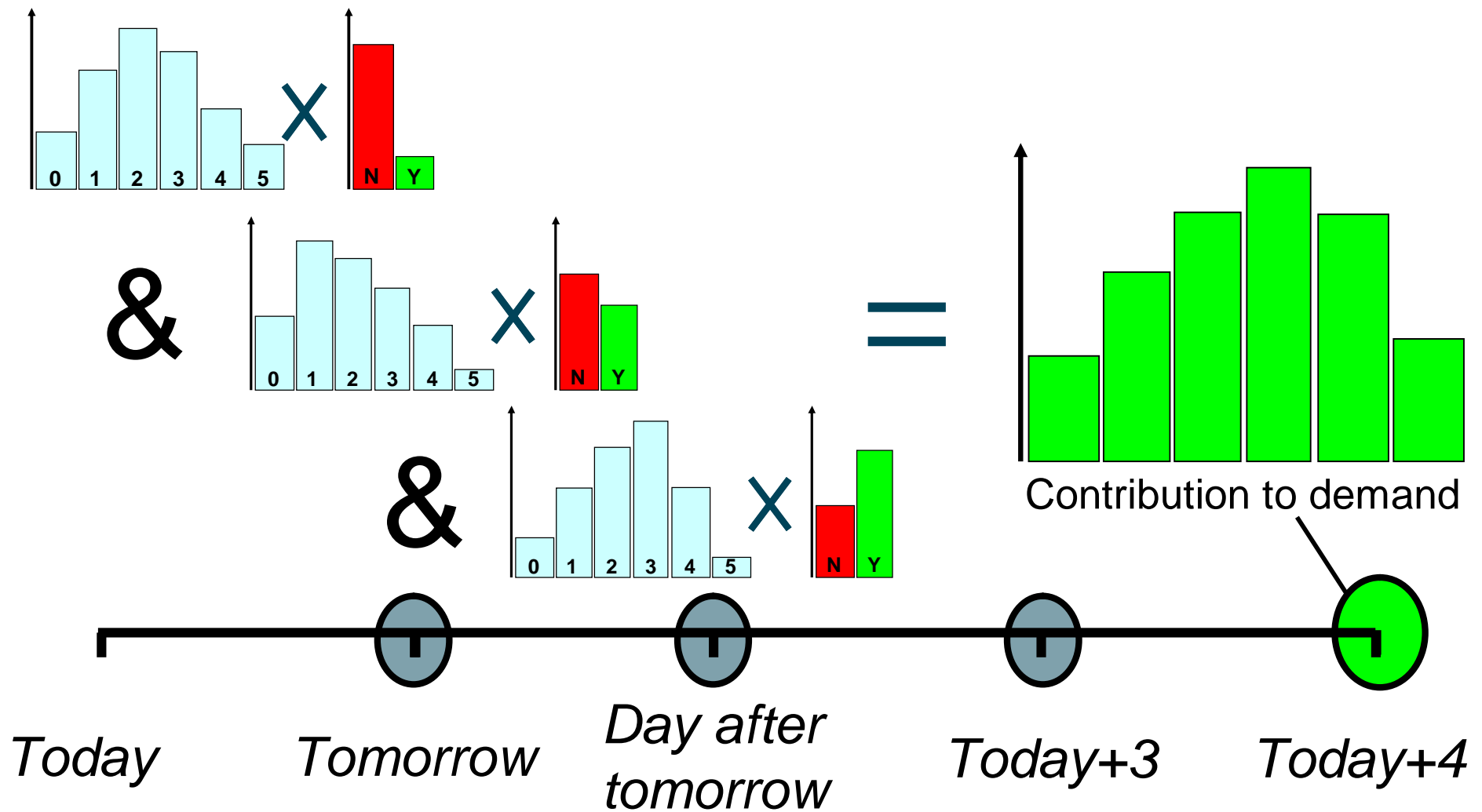
Handwritten medical notes on a grid paper, dated January 2005. The notes are organized by time slots and include patient names, admission times, and cancellations. Some entries are circled or crossed out.

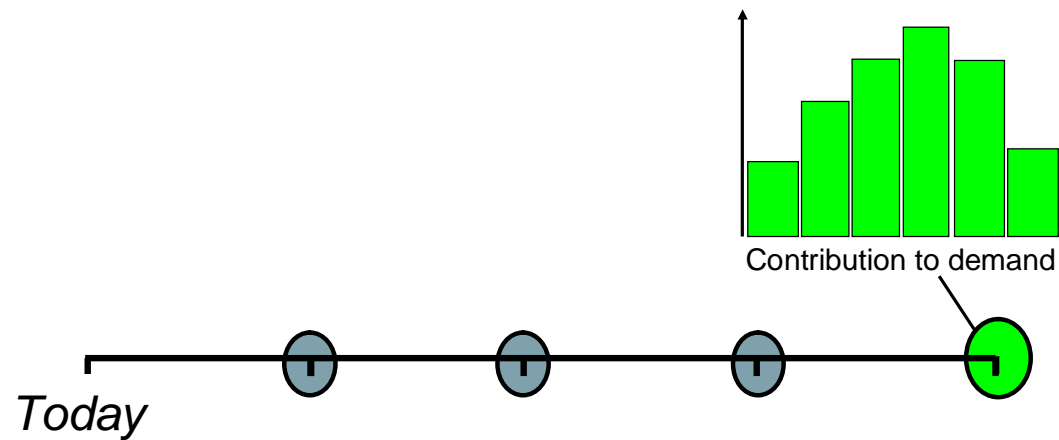
Time	Admission	Cancellation
8.00 am	3313	
8.30		Mr. Hartley, cancelled by PICU @ 08.00
9.00		Mr. Hartley, cancelled by PICU @ 08.00
9.30		Mr. Hartley, cancelled by PICU @ 08.00
10.00		Mr. Hartley, cancelled by PICU @ 08.00
10.30		Mr. Hartley, cancelled by PICU @ 08.00
11.00		Mr. Hartley, cancelled by PICU @ 08.00
11.30		Mr. Hartley, cancelled by PICU @ 08.00
12.00		Mr. Hartley, cancelled by PICU @ 08.00
12.30		Mr. Hartley, cancelled by PICU @ 08.00
1.00		Mr. Hartley, cancelled by PICU @ 08.00
1.30		Mr. Hartley, cancelled by PICU @ 08.00
2.00		Mr. Hartley, cancelled by PICU @ 08.00
2.30		Mr. Hartley, cancelled by PICU @ 08.00
3.00		Mr. Hartley, cancelled by PICU @ 08.00
3.30		Mr. Hartley, cancelled by PICU @ 08.00
4.00		Mr. Hartley, cancelled by PICU @ 08.00
4.30		Mr. Hartley, cancelled by PICU @ 08.00
5.00		Mr. Hartley, cancelled by PICU @ 08.00
5.30		Mr. Hartley, cancelled by PICU @ 08.00
6.00		Mr. Hartley, cancelled by PICU @ 08.00
6.30		Mr. Hartley, cancelled by PICU @ 08.00
7.00		Mr. Hartley, cancelled by PICU @ 08.00
7.30		Mr. Hartley, cancelled by PICU @ 08.00
8.00		Mr. Hartley, cancelled by PICU @ 08.00

Case Study 1: Ward Overload!



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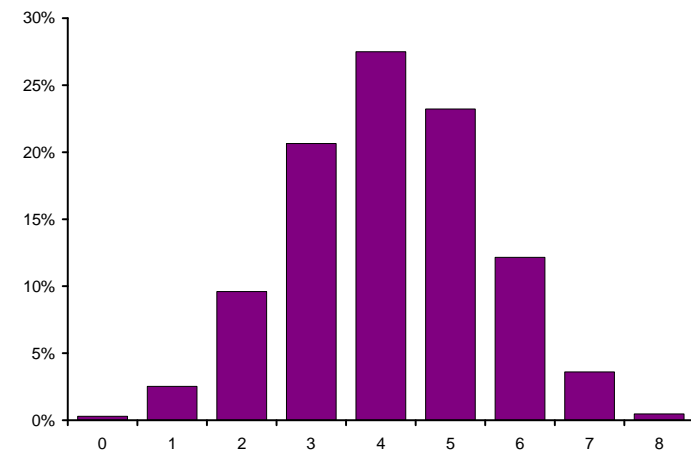




Future patients

&

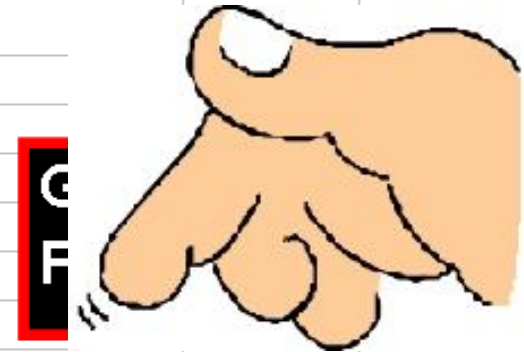
Current patients



Case Study 1: Ward Overload!



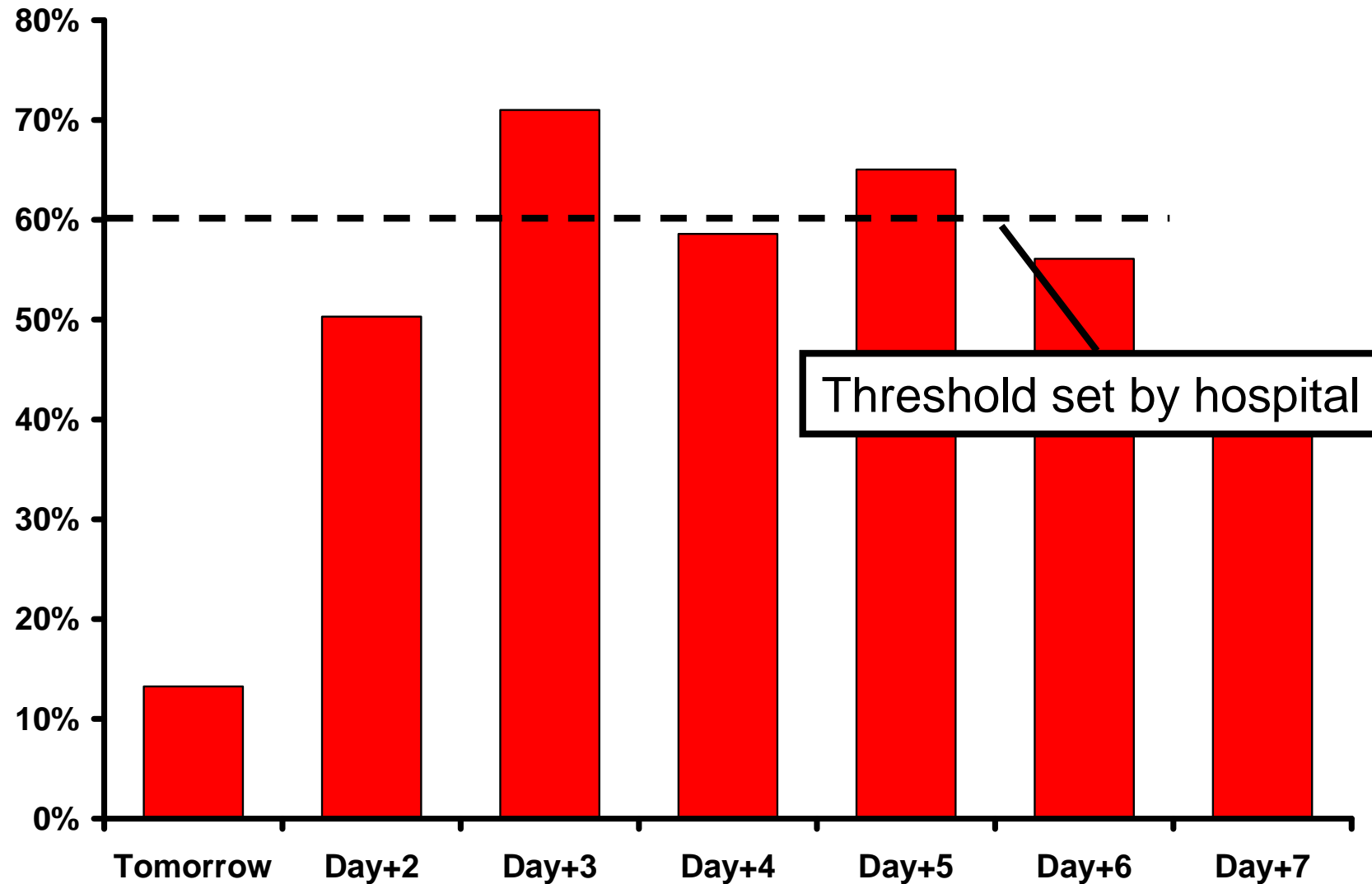
	A	B	C	D	E	F	G
1							
2		Current Patients	Length of Stay Type	Days stayed so far			
3		1	Long	1			
4		2	Medium	0			
5		3	Medium	2			
6		4	Long	1			
7		5	Short	1			
8		6	Short	2			
9		7	Medium	0			
10		8	Long	3			
11		9					
12							
13		Number of days ahead to consider		Day of week today			
14		7		Sunday			
15							
16							



Case Study 1: Ward Overload!



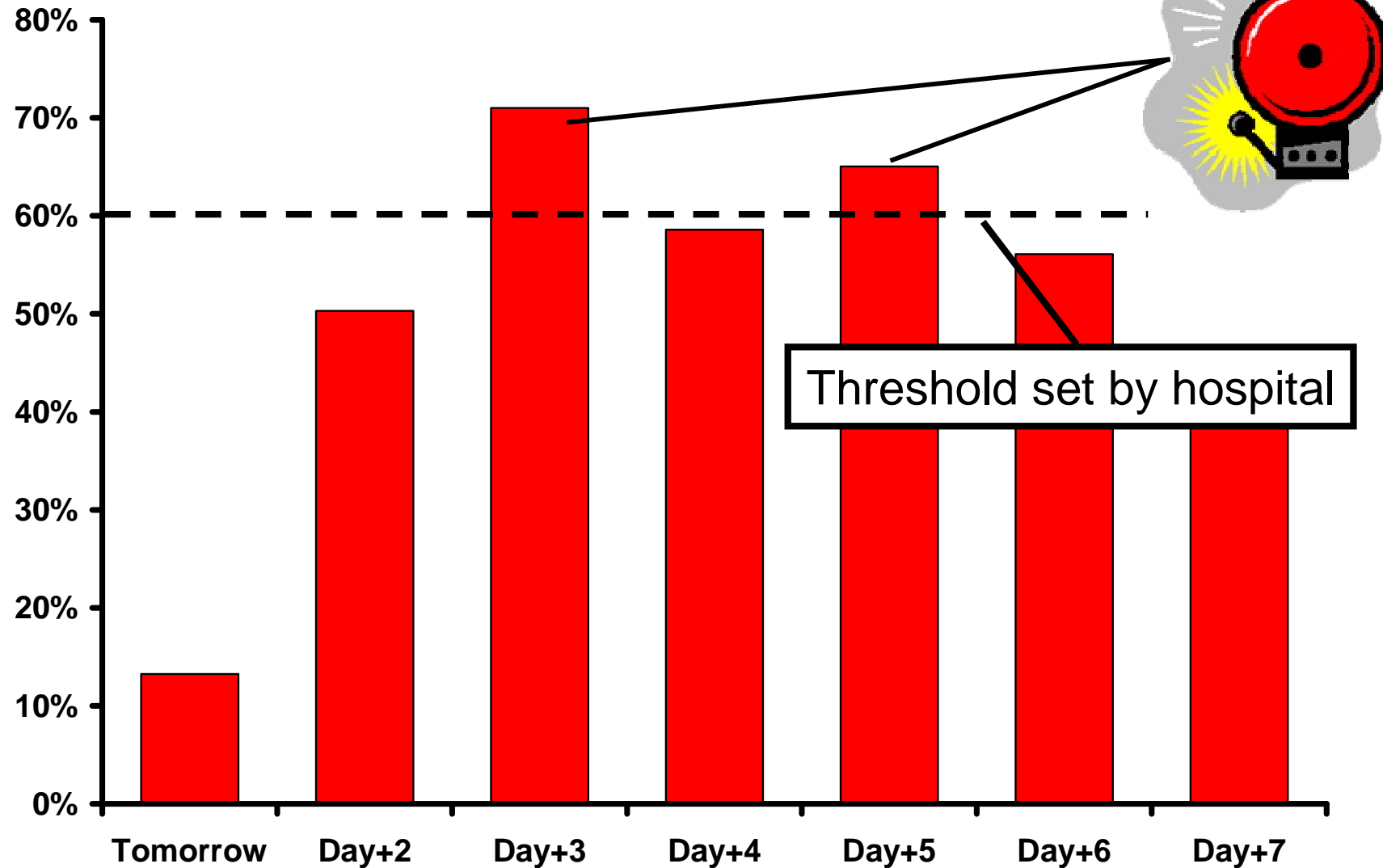
Probability that more than 9 beds will be needed



Case Study 1: Ward Overload!



Probability that more than 9 beds will be needed



Case Study 2: VLAD

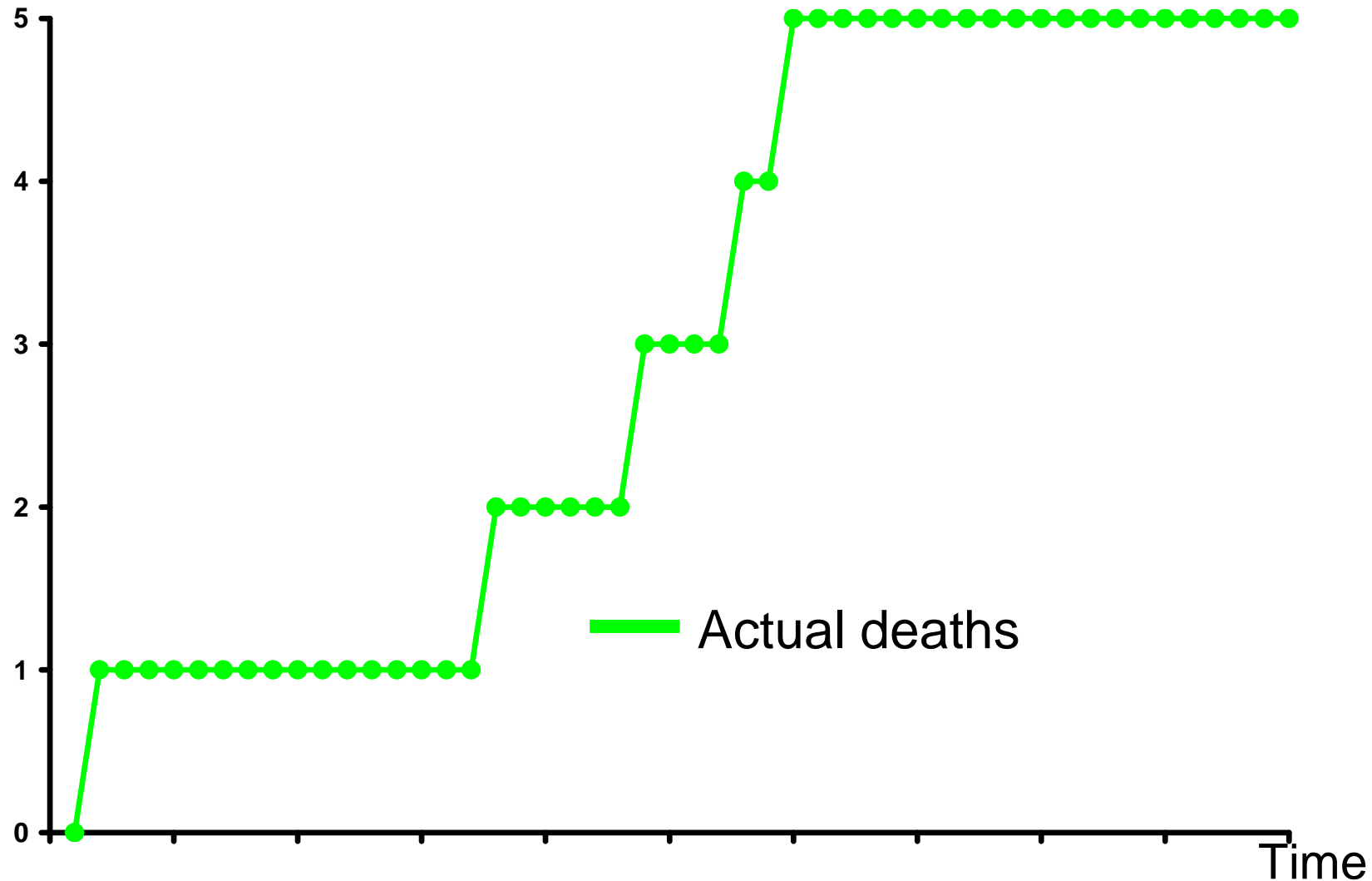


Variable **L**ife **A**adjusted **D**isplay

Case Study 2: VLAD



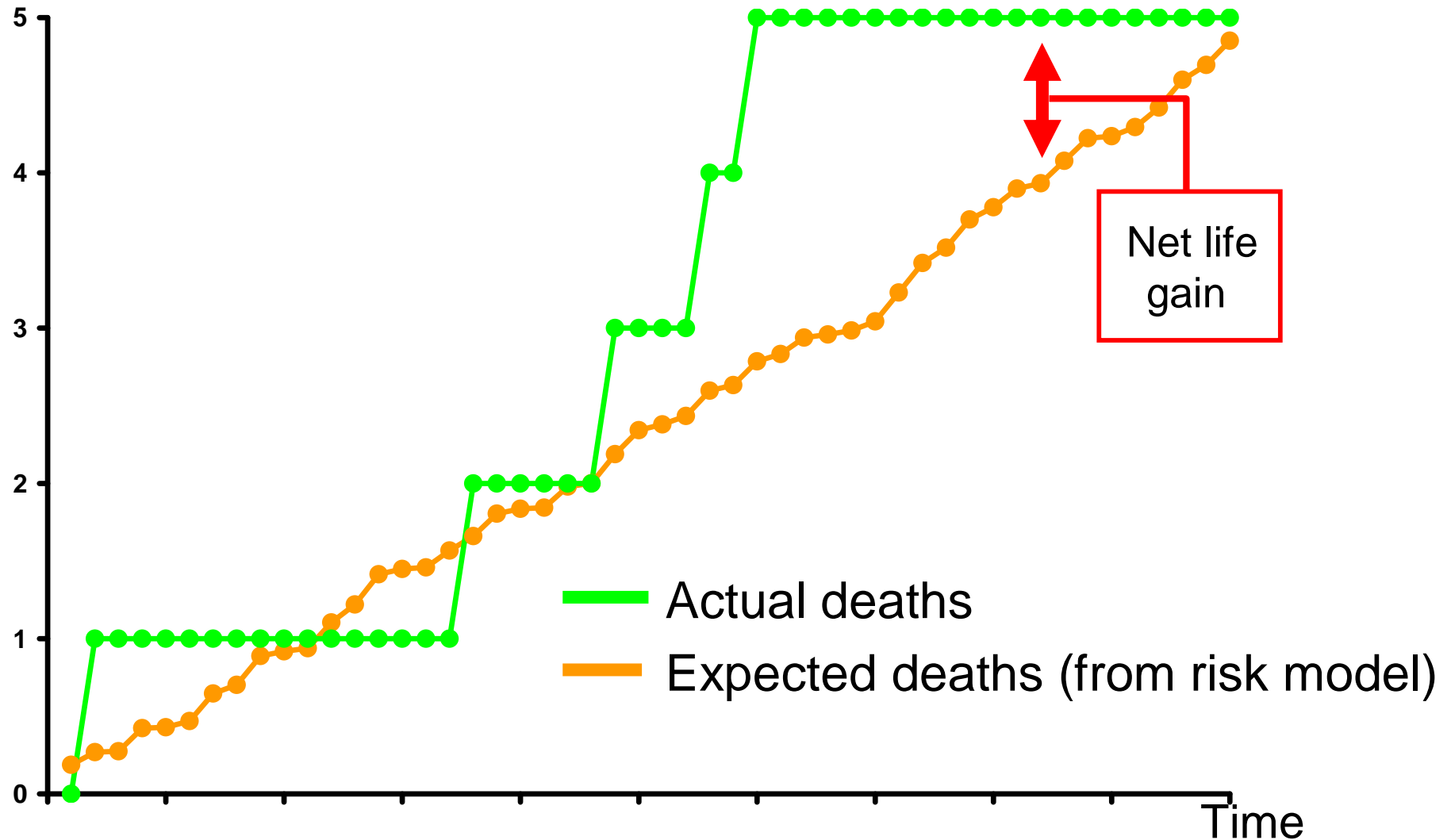
Cumulative deaths



Case Study 2: VLAD



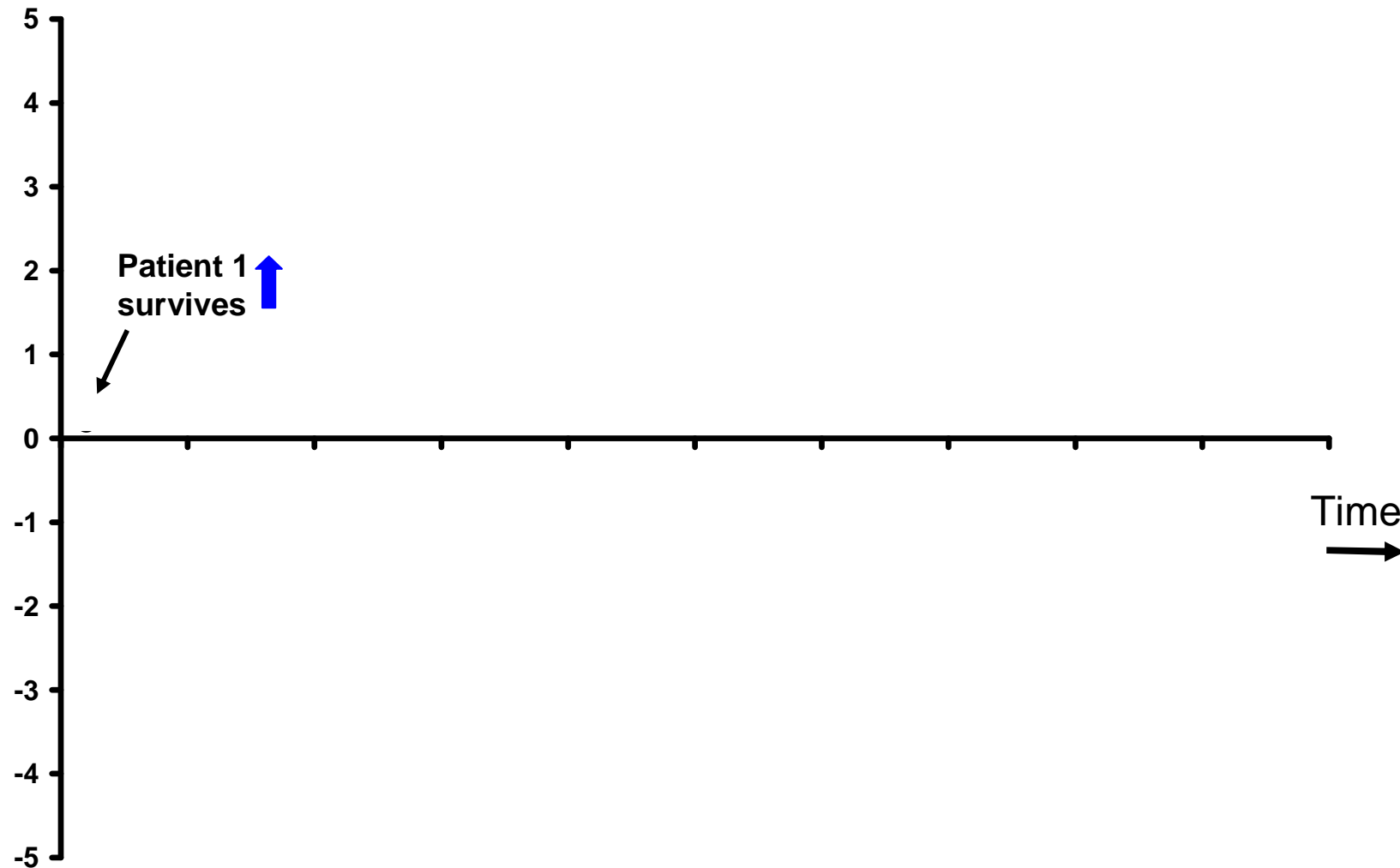
Cumulative deaths



Case Study 2: VLAD



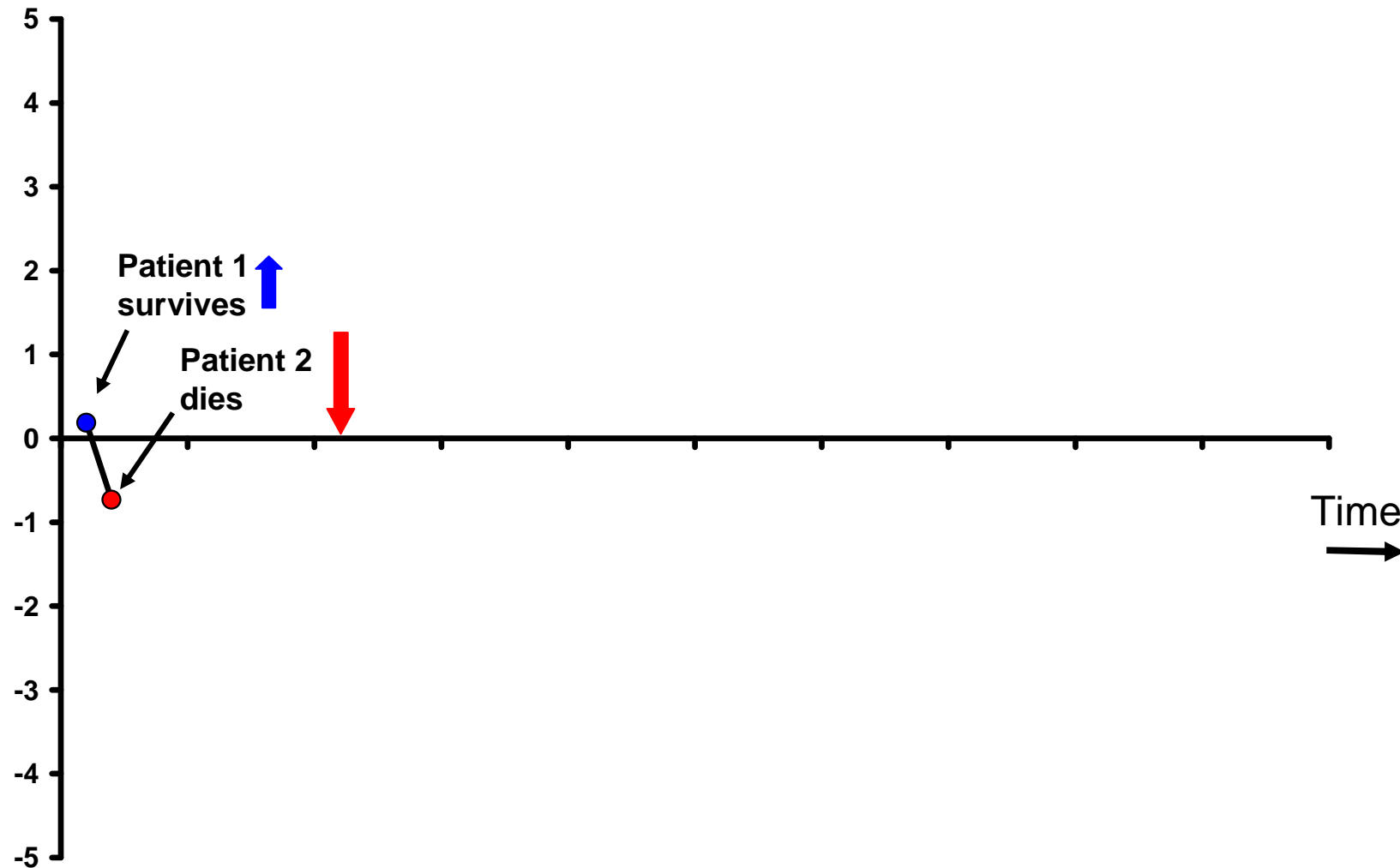
Cumulative expected – observed deaths



Case Study 2: VLAD



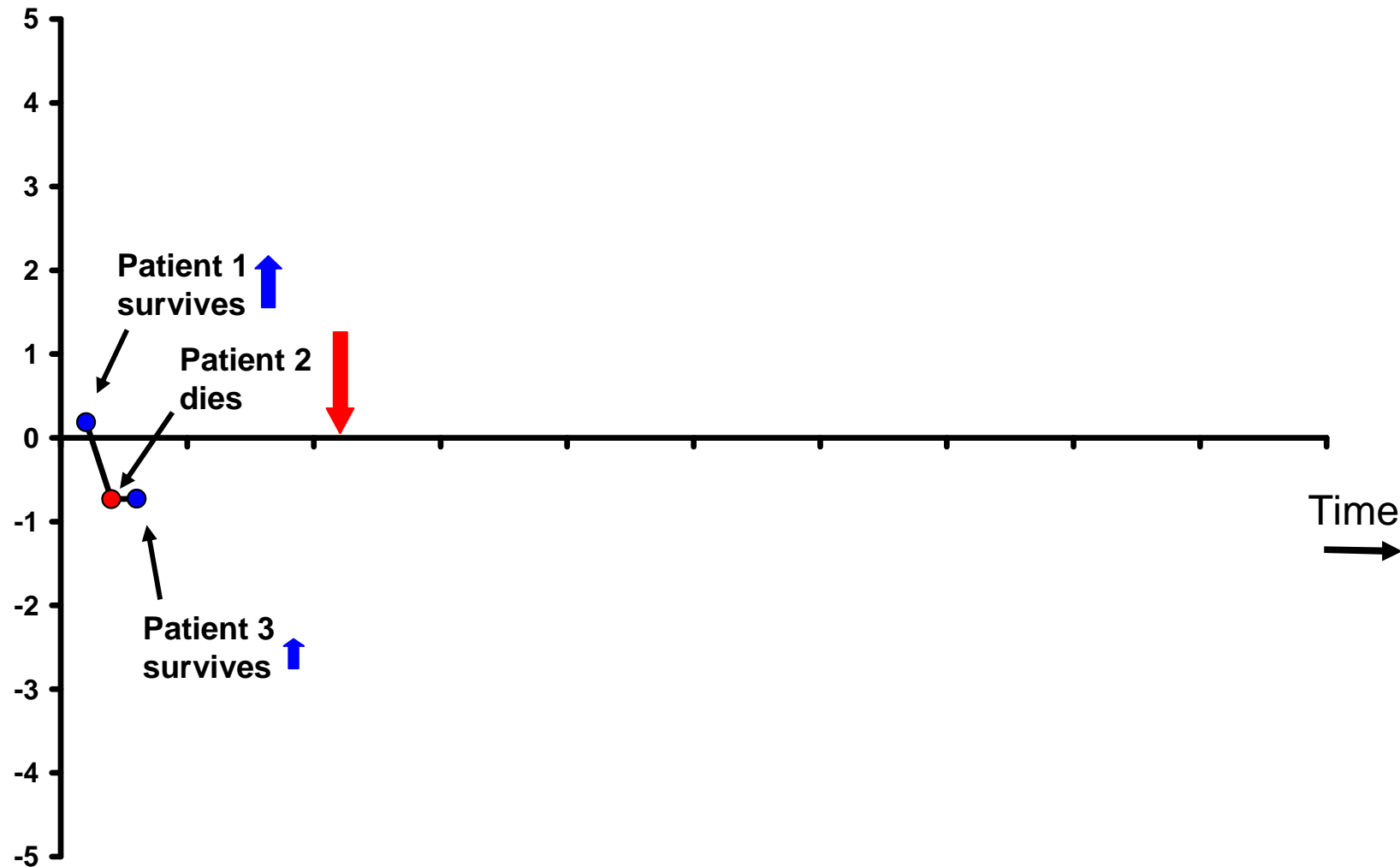
Cumulative expected – observed deaths



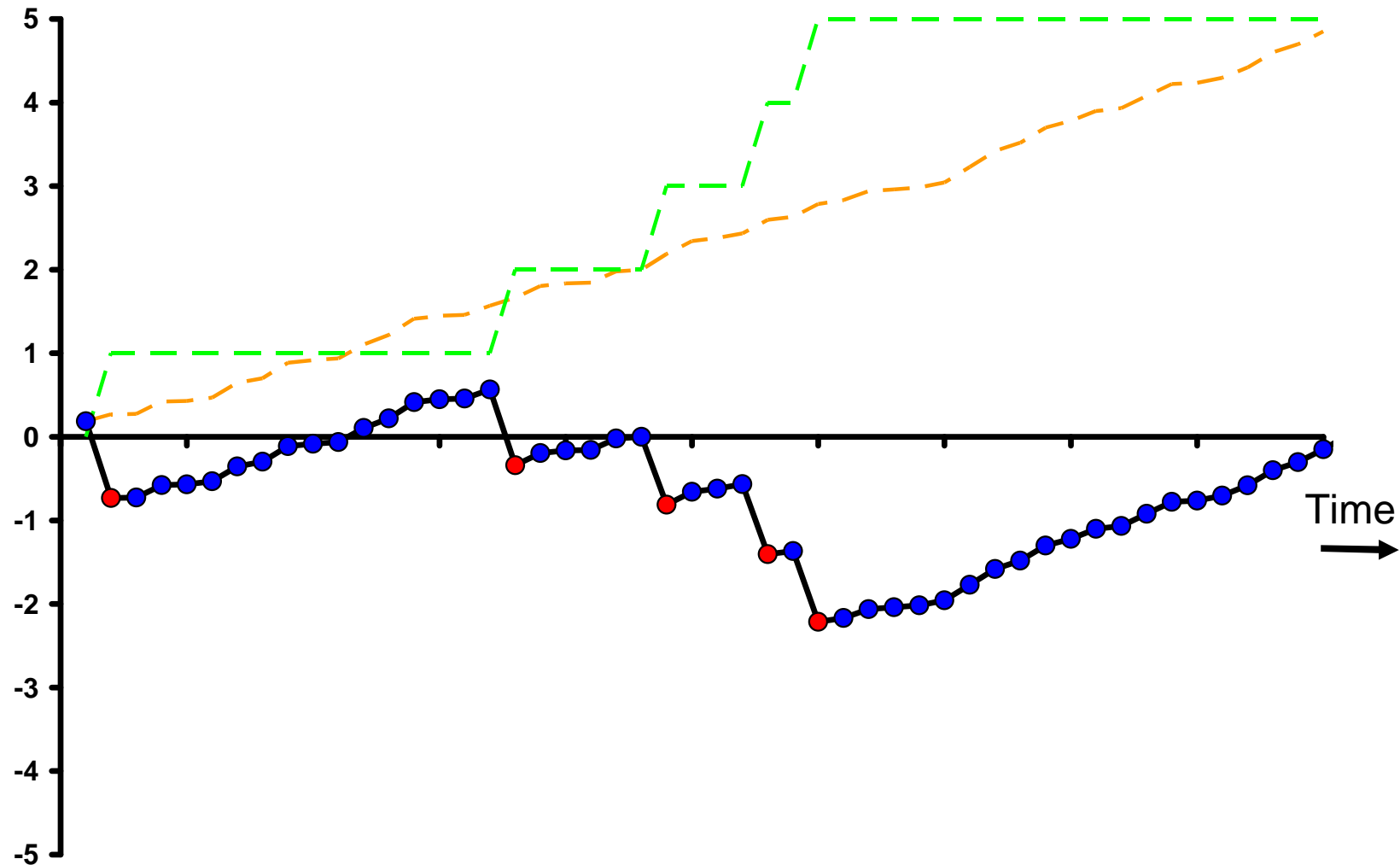
Case Study 2: VLAD



Cumulative expected – observed deaths



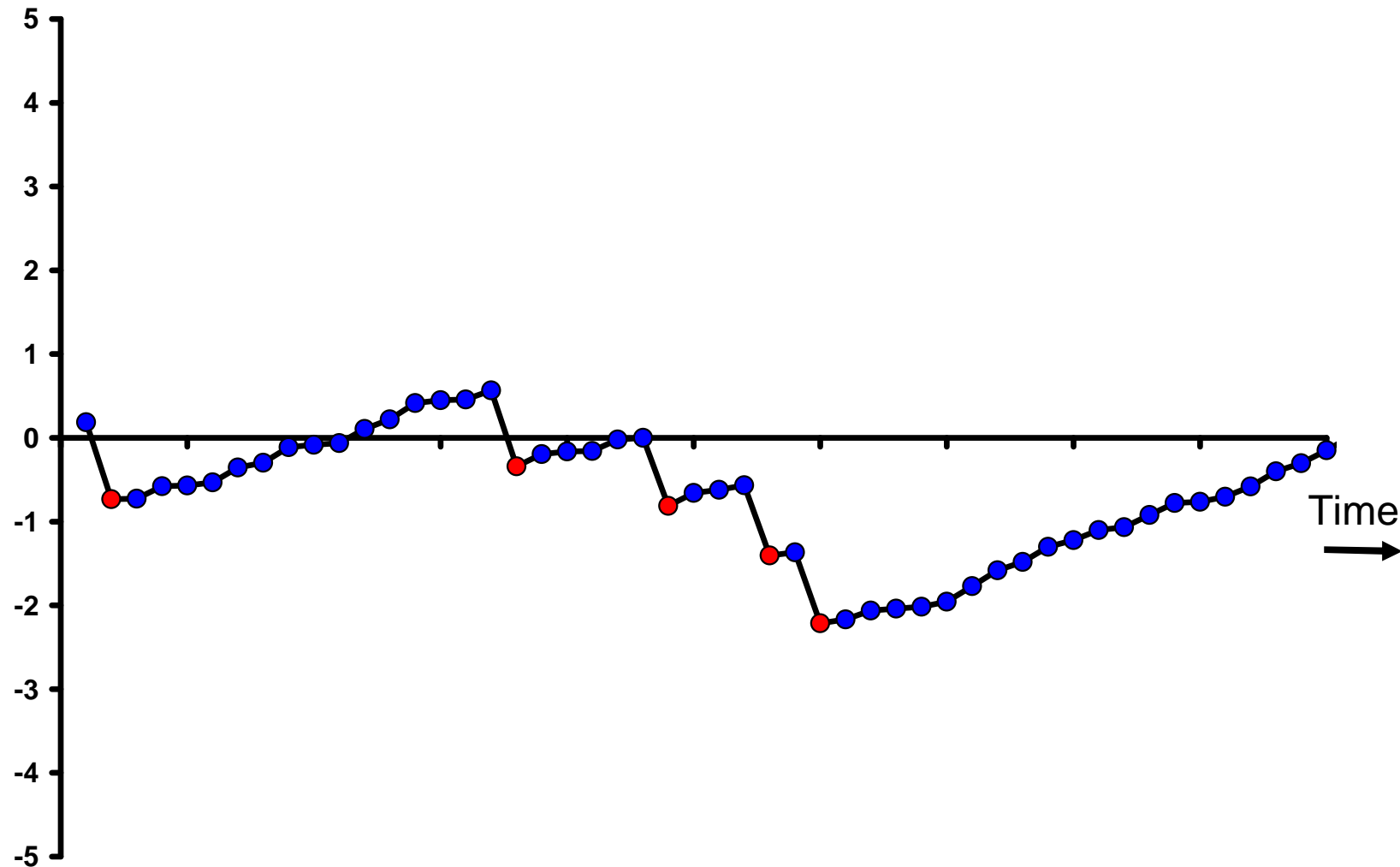
Cumulative expected – observed deaths



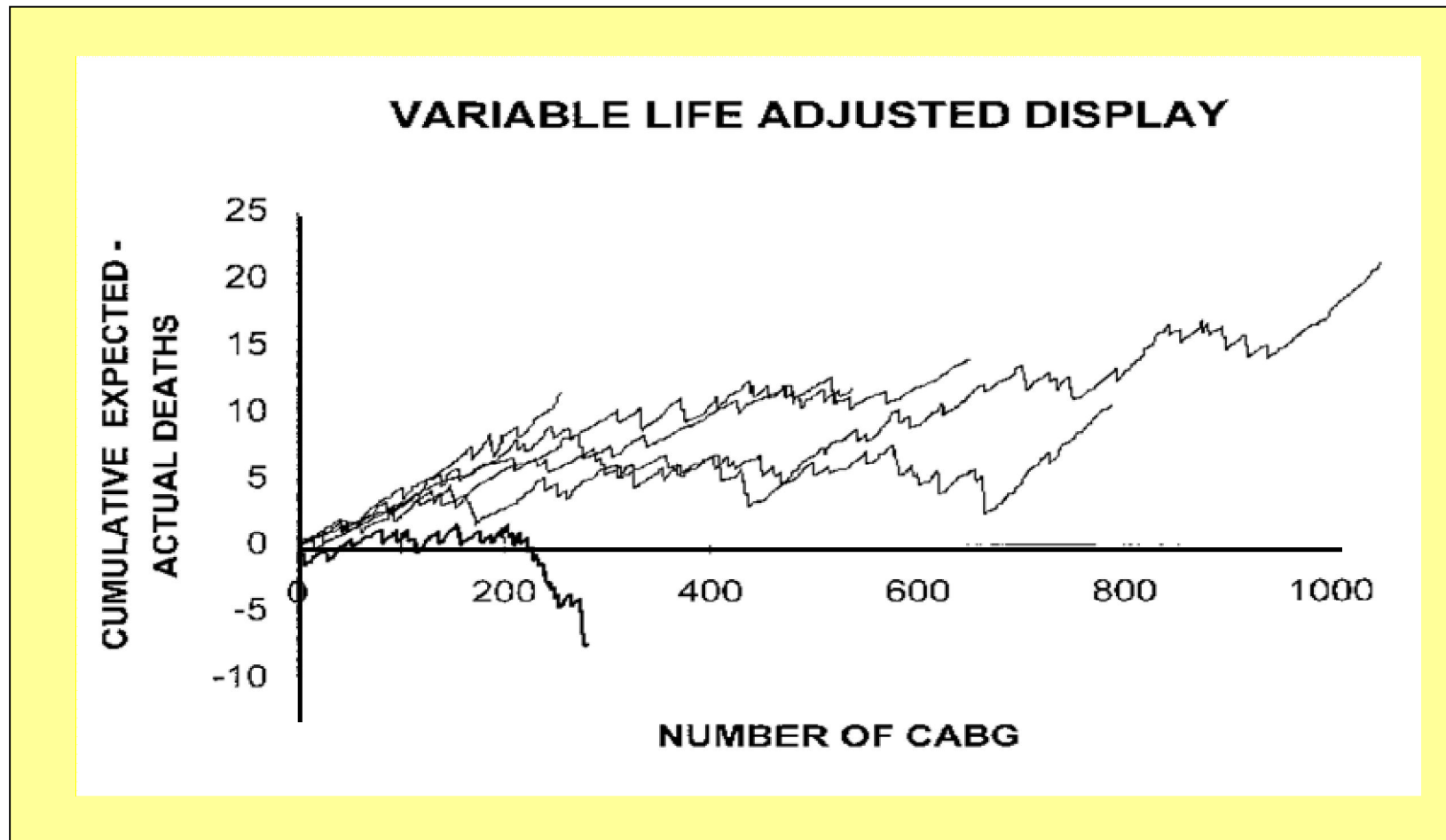
Case Study 2: VLAD



Cumulative expected – observed deaths



Case Study 2: VLAD

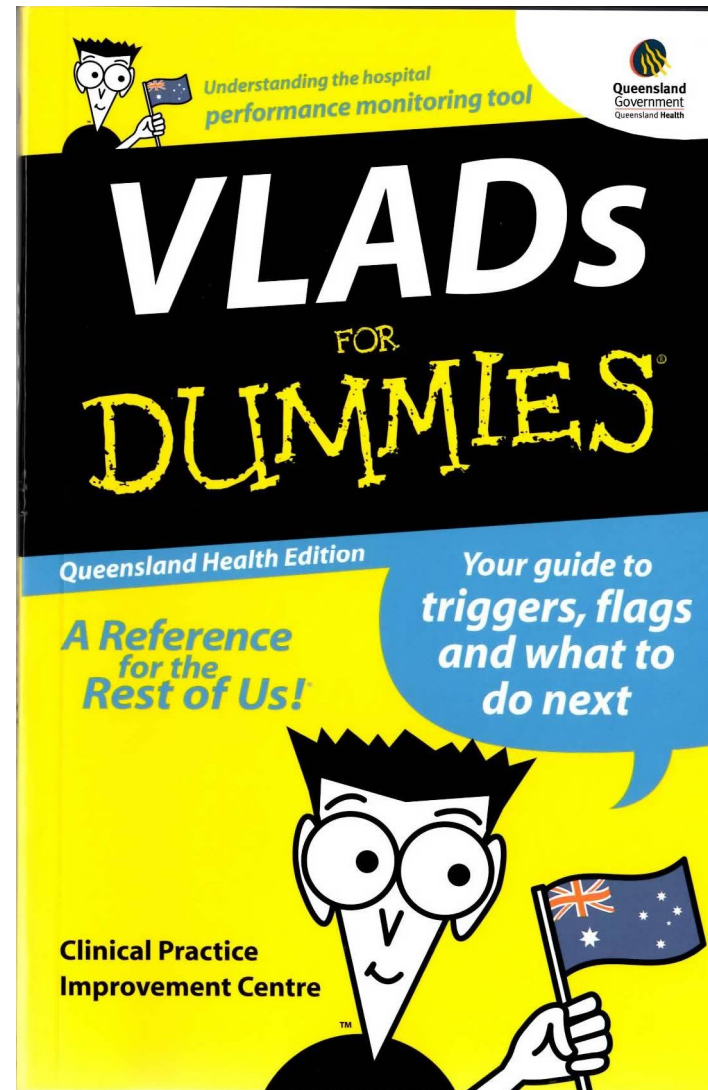


Comparing several surgeons at a single hospital

Case Study 2: VLAD



VLADs now used
worldwide



Case Study 2: VLAD



Case Study 2: VLAD



Articles

Effect of a participatory intervention with women's groups on birth outcomes and maternal depression in Jharkhand and Orissa, India: a cluster-randomised controlled trial



Prasanta Tripathy, Nirmala Nair, Sarah Barnett, Rajendra Mahapatra, Josephine Borghi, Shibanand Rath, Suchitra Rath, Rajkumar Gope, Dipnath Mahto, Rajesh Sinha, Rashmi Lakshminarayana, Vikram Patel, Christina Pagel, Audrey Prost, Anthony Costello

Summary

Background Community mobilisation through participatory women's groups might improve birth outcomes in poor rural communities. We therefore assessed this approach in a largely tribal and rural population in three districts in eastern India.

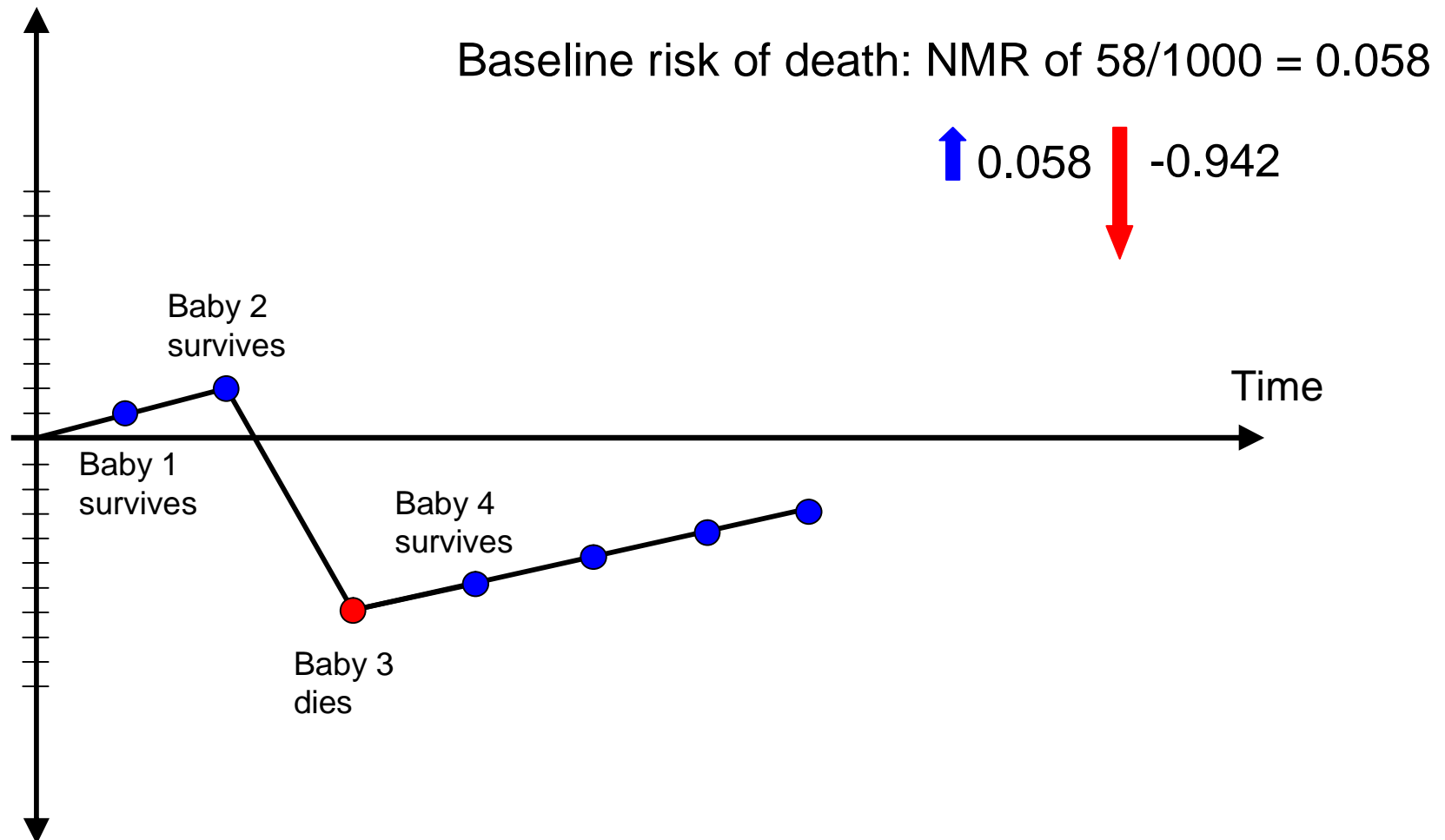
Published Online
March 8, 2010
DOI:10.1016/S0140-
6736(09)62042-0

30% reduction Neonatal Mortality Rate (NMR) over 3 years.
42% over the last 2 years.

Case Study 2: VLAD



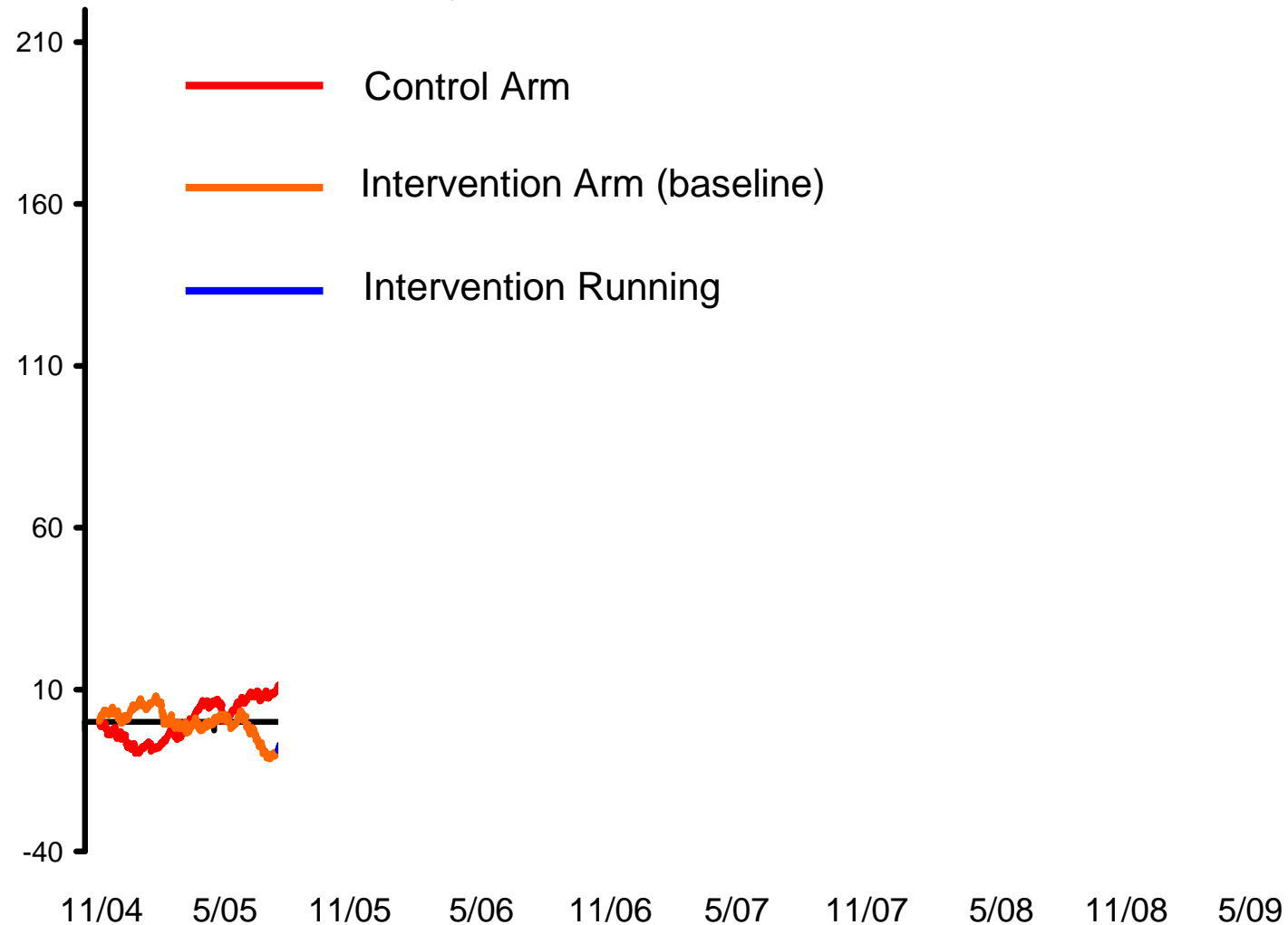
Cumulative expected – observed deaths



Case Study 2: VLAD



Cumulative number of lives saved compared to baseline Neonatal Mortality Rate (58/1000)



Case Study 2: VLAD



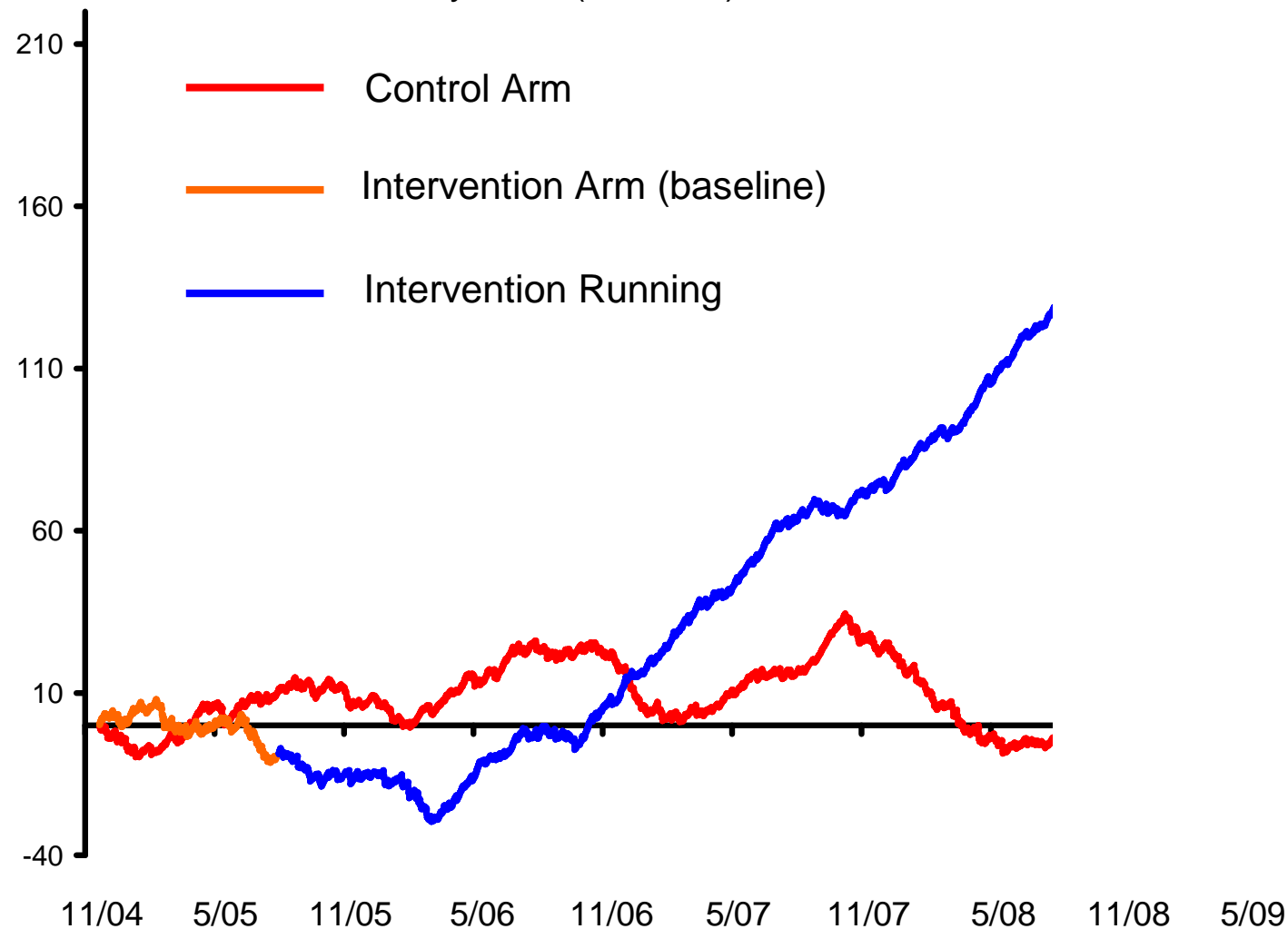
Cumulative number of lives saved compared to baseline Neonatal Mortality Rate (58/1000)



Case Study 2: VLAD



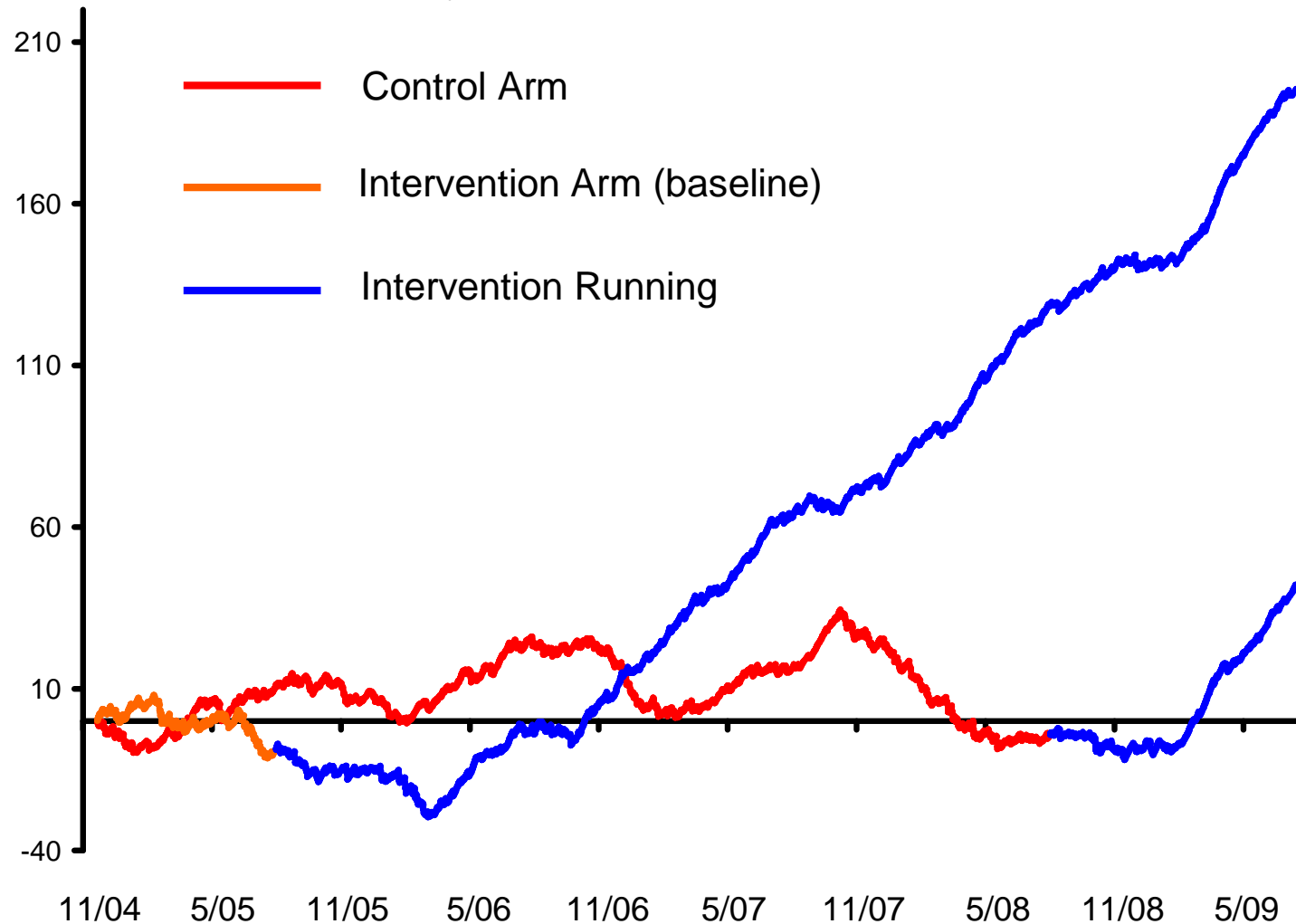
Cumulative number of lives saved compared to baseline Neonatal Mortality Rate (58/1000)



Case Study 2: VLAD



Cumulative number of lives saved compared to baseline Neonatal Mortality Rate (58/1000)



Summary



Operational research is about:

Thinking carefully about what the 'problem' is

Thinking about what it is you actually want to know the answer to

Exploring what drives the relevant processes

Helping people make better (informed) decisions