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## **Why Nosokinetics?**

If the random forces of wind and tide can make such a beautiful statue, how much better could mankind do if a new science was developed which explains the complex processes of health and social care.

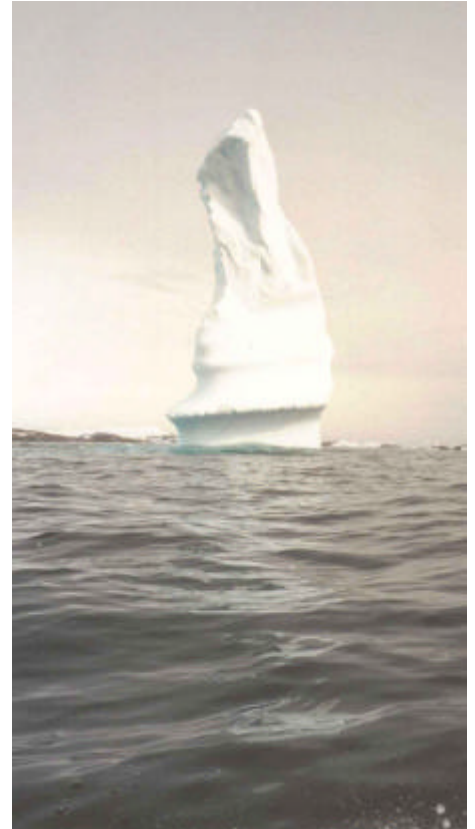
Until new methods of planning health and social care services to meet the needs of an ageing population are introduced, service delivery will stumble on from crisis to crisis:

- Any system should be capable of being monitored and conclusions drawn;
- Any system must be a whole system;
- Health and social care is no exception to this rule.

Paradigms need to change when problems resist solutions, instruments perform poorly and anomalies in theories appear (Harper 2003). Constant managerial change is a sign that politicians are failing to grasp the reality of health and social care.

Analogous to the vast improvement in prescribing, which followed the development of pharmacokinetics and pharmacodynamics, the development of nosokinetics and nosodynamics would transform the planning of health and social care.

Harper CM. Philosophy for physicians. *Journal of the Royal Society of Medicine* 2003;96:40-45.



Madonna and child iceberg seen in the Antarctic in 2000 cruise  
Copyright: nosokinetics.uk

## **Keeping in touch: First the newsletter then a website.**

My new year's resolution is to get the word "Nosokinetics" into Google during 1993. Noso (from the Greek word for illness / disease). The Shorter Oxford English Dictionary contains:

- *Nosocome*: a hospital;
- *Nosocomial*: a hospital acquired infection;
- *Nosography*: the systematic description of disease;
- *Nosopoietic*: producing or causing disease;
- *Nosology*: the classification or arrangement of disease (1721); the list of known diseases (1839); the special character of a disease or the views current with regard to this (1825)

Hence: **Nosokinetics**: how health and social care systems manage sick people and **Nosodynamics**: how the different parts of the total system interact.

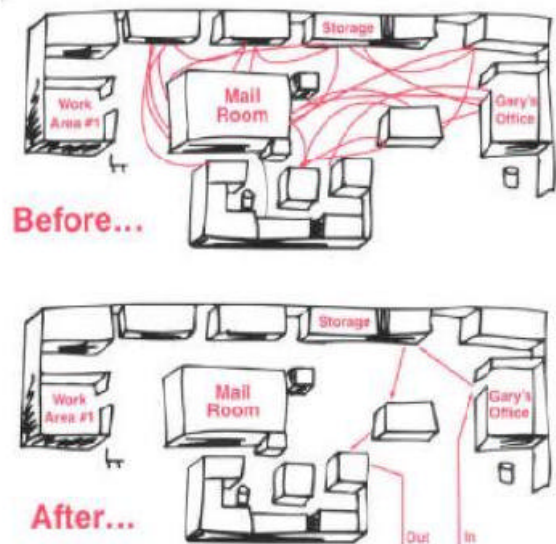
## Lean Manufacturing and Health Care – the next trend?

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The defence and manufacturing sectors have provided many of the tools now used routinely in the maintenance of health care systems and health service research. Forecasting, simulation and quality improvement are but a few of the business tools or processes to have diffused into health care. Lean thinking or manufacturing may be the next.

Womack and Jones are credited with developing lean thinking, with Toyota in the 1950s (Young et al, 2004). Essentially, lean manufacturing creates value for the customer by eliminating waste in an efficient and timely manner (op.cit 2004 & Figure reference) A key concept is the definition of value: defined from the customer's viewpoint. Visually lean thinking delivers more efficient work practice.

How may it be applied in healthcare? Looking at processes to identify how events may flow in a more co-ordinated and efficient manner is one area that may benefit from the application of lean manufacturing thinking principles. Such work may reduce the impact or enable the movement of bottlenecks to a more preferred position in the service delivery chain (op.cit.2004).



Source: North America's Largest Lean Manufacturing Conference, 2003

Communication is key in achieving success. The use of modelling and graphical output to pre-test decisions can be of great benefit (op.cit.2004).

Can it remove all the wastage? No doubt wastage can be reduced, however real time material management will not be achievable in the healthcare sector, as stocks must be held at all times to meet emergency contingencies.

Can it achieve continuous quality management? It may improve it, but unlike a car production line, a hospital is only part of the "production environment" for disease, illness and wellness management. The hospital is a division within the factory, and key parts of the "production environment" are outside the control of the hospital – for example patient behaviour, post hospital accommodation, etc. Thus variation in performance will continue, but at an improved level.

Given the problems predicted around increased demand and costs for services, with a declining work force in many OECD countries due to population ageing, the application of lean thinking principles may provide some pressure relief – but it won't be the panacea.

Young T, Brailsford S, Connell C, Davies R, Harper P, and Klein JH (2004). Using industrial processes to improve patient care. *BMJ* vol 328 pg 162-164.

North America's Largest Lean Manufacturing Conference – [www.measureupforsuccess.com](http://www.measureupforsuccess.com)

Lean Thinking Resource list – Manitoba Quality Network (QNET) Resource Centre <http://www.qnet.mb.ca/lean.htm>

# Nosokinetics News

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## Congratulations: Sally McClean: Senior Research Fellow

The University of Ulster recognition of Sally's contribution to research in the University is a great feather in her cap. Sally is a tower of strength in the quest for a scientifically valid approach to measuring and modelling health and social care services; however, this is only a small part of her immense contribution to research, for eight referees wrote strong recommendations to the Vice Chancellor.

Her prize will help fund a 2004 trip to see Malcolm Faddy in Australia, a conference in New Zealand, and a visit to Brendon Rae in Dunedin.



## Congratulations: Christos Vasilakis: PhD.



In "Simulating the flow of patients: an OLAP enabled decision support framework" Chris integrates discrete event simulation modelling and data warehousing techniques to develop a decision support framework for modelling the flow of patients through hospitals and health care systems. The methodology can be easily adapted to model different levels of health care operations. The framework is unique in its kind.

Chris is a wizard. His simulation model explained Christmas bed crises. Now, this methodology can easily add means and standard deviations to discharge destination to explain why English hospitals treat stroke patients at different speeds. Congratulations also go to Elia El-Darzi his supervisor. email: [C.M.Vas@westminster.ac.uk](mailto:C.M.Vas@westminster.ac.uk)

## Congratulations: Gary and Donna Harrison

In 1989, during a mini-sabbatical, I walked into Gary's office in Charleston with an idea for a two-stream model of flow through geriatric medical beds and a report showing that exponential equations fit midnight bed states. The rest is history. During Hurricane Hugo, Gary and Andrea sheltered us in their home, with their five children. Andrea died several years ago and now he has remarried. What better excuse could Gill and I have to return to Charleston than to thank Gary for his support and friendship over the years and to wish him and his new wife, Donna, every happiness in their future life together.



## Forthcoming conferences

### University of Salford, Manchester, England: 31<sup>st</sup> March – 2<sup>nd</sup> April 2004

#### Fourth IMA Conference on Quantitative Modelling in the Management of Health Care

Registration details from Lucy Nye, Conference Conference Officer, The Institute of Mathematics and its Applications: direct line: 01702 356104; email: [lucy.nye@ima.org.uk](mailto:lucy.nye@ima.org.uk) web: [www.ima.org.uk](http://www.ima.org.uk).

Late registration date 8 March.

### The European Conference on Combinatorial Optimization,

#### ECCO 2004, June 24-26, 2004, Beirut, Lebanon. Venue: American University, Beirut

Theme: New Opportunities for Management Sciences and Information Technologies.

Elia El-Darzi is organising a session on Health Care Modelling [eldarze@westminster.ac.uk](mailto:eldarze@westminster.ac.uk)

Deadline for submission of Abstract: 28<sup>th</sup> February: Details from <http://www.ecco2004.org/>

Conference organiser: Ibrahim H. Osman, PhD: ECCO 2004 [Ibrahim.Osman@aub.edu.lb](mailto:Ibrahim.Osman@aub.edu.lb)

## Recent OR Society Talks in London

### Examples of Successful Simulation in Practice: The Bed Capacity Implications Model

David Bensley and Inderpreet Grewal from the OR section of the DoH described a user-friendly Discrete Event Simulation model with an EXCEL interface. Exemplar data for small, medium and large hospitals is provided. Used for planning military casualties, stroke units etc. Disc available. [dbensley@doh.gov.uk](mailto:dbensley@doh.gov.uk)

### How Geography and Population Distribution Affect Costs and Service Delivery for public Services: The SMOSS Research Programme at Lancaster University

Simplified Modelling of Spatial Systems (SMOSS) uses EXCEL and MS MapPoint to integrate census population data and travel times. Zoom down capacity enables travel times in urban and rural areas to be compared. Uses include: cost of travel per pupil; winter gritting per head; day care per client; refuse collection per household; district nursing per visit; elderly people domiciliary care, and emergency ambulance response times. Further information email: [ahindle@globalnet.com](mailto:ahindle@globalnet.com)

### In Memoriam: Qingcheng Wang: Born Beijing 24/12/76 : Died London 10/11/2003

Qingcheng was one of the best students at Beijing University Mathematics Department. His Masters degree was in probability and statistics. He wanted to be a professor of mathematics, and he came to England in September 2002 to further that end.

The culture shock was enormous. In Beijing he had a room on campus, meals in a refectory and a ten-minute bicycle ride to work. Here he had a room on his own, a one-hour bus ride to Westminster and had to learn to cook. Two days after he arrived Kevin taught him how to cook spaghetti otherwise he might have starved. Also his spoken English was poor.



His enthusiasm was contagious; he brought a buzz into our lives. Mathematically, a perfectionist, a model of industry, scholarship and order. Socially, like an absent minded professor, he got on trains and buses going the wrong way and often came rushing back into the department looking for his keys, only to find them in his pocket.

During 2003, he developed a mathematical solution to forecasting the impact of change in a department of geriatric medicine with a constrained bed stock, using phase-type renewal model and closed queuing networks. The week before he died his first paper was nearly completed, the University had accepted his PhD proposal, and I had told Thierry that I no longer needed to see him once or twice a week. Now he is no longer with us, but we still keep expecting him to rush in again.

I recall the puzzlement on his face when he realised that I knew nothing about mathematics, and the pleasure that I had in helping him understand English and teaching him about the social and medical aspects of our modelling work. His time with us inspired us. That he should die, after taking his own discharge from an intensive care unit, without telling his family, or us, that he was sick, shocked us all. Each of us keeps asking Why?

Speaking at his funeral, when his father, mother and sister were present, Thierry said, "This is his graduation day". Our thoughts are with his mother, father and sister in Beijing. May he rest in peace.

His research effort is being submitted for publication.

Peter Millard: Feb 2004