Nursing, workforce and health outcomes: historical reflections and research

Presented by Professor Anne Marie Rafferty
Florence Nightingale School of Nursing and Midwifery
Oct 2009
Aims

• to provide a brief historical overview of outcomes research in nursing

• to reflect upon the current state of the research in this domain

• to propose a new model of engagement to build change into research
Winifred Raphael
Florence Nightingale
Calculus of Care

‘I want everyone to understand – no hiding behind the supposed incomprehensibility of statistics. The figures must be as clear as a picture – they must tell a story as clearly as does a picture of the Crucifixion.’

Open University (1995)
Florence Nightingale, ‘A Contribution to the Sanitary History of the British Army during the late war with Russia’ (London, Harrison, 1859)

Thank you to Hugh Cahill at the Foyle Special Collections, King’s College London, for photographing this image for use in this presentation
Case Mix Adjustment

‘The proportion of recoveries, the proportion of deaths, and the average time in hospital, must all be taken into account in discussions of this nature, as well as the character of the cases and the proportion of different ages among the sick. For me, this experience emphasised the great importance of correct hospital statistics as an essential element in hospital administration.’

Nightingale, 1863, p. 5
Royal Commission Report, February 1858

Report of the Commission Appointed to Inquire into the Sanitary Condition of the Army, the Organization of Military Hospitals, and the Treatment of the Sick and Wounded
From Florence Nightingale, *Hospital Statistics and Hospital Plans*, reprinted from the *Transactions of the National Association for the Promotion of Social Science*, Dublin Meeting, August 1861 (London, Emily Faithful & Co., 1862).
‘In comparing the deaths of one hospital with those of another, any statistics are justly considered absolutely valueless which do not give the ages, the sexes and the diseases of all the cases. …There can be no comparison between old men with dropsies and young women with consumptions.’

Nightingale, 1859, p. 97
Mathematics and Mysticism

‘The true foundation of theology is to ascertain the character of God. It is by the aid of such diagrams in particular, and Statistics in general ‘that law in the social sphere can be ascertained and codified, and certain aspects of the character of God thereby revealed. The study of statistics is thus a religious service.’

David (1962, p. 103)
Adolphe Quetelet (1796-1874)

Observatoire Royale de Belgique, Brussels
Uplifting Spirits

‘However exhausted I might be, the sight of long columns of numbers was perfectly reviving to me.’

Woodham-Smith, 1952, p. 268
Governing Principles

On comparing death rates between hospitals:

‘I collected my figures with a purpose in mind, with the idea that they could be used to argue for change. Of what use are statistics if we do not know what to make of them? What we wanted at that time was not so much an accumulation of facts, as to teach the men who are to govern the country the use of statistical facts.’

Historiography of research

• Classical period

• Mediaeval period

• Renaissance period

• Enlightenment
Athlone Committee, 1937-9

- modernising methods of work organisation and training
- analogy with teachers
- paying for education
War is a searchlight which exposes the flaws in the body ‘politic’

• preparations for war… revealed defective planning and provoked crisis in nurse staffing

• quantifying reserves of nurses

• Civil Nursing Reserve
Horder Committee, 1943

• “nursing as one of the great national educational movements for woman”

• legitimised status of assistant nurse

• best scholars did not make the best nurses

• grants-in-aid to hospitals for training
Nationalising nursing

• “important national resource”, Bevan, 1948

• failure to translate into representation on policy-making bodies

• no direction of labour in NHS
MINISTRY OF HEALTH
DEPARTMENT OF HEALTH FOR SCOTLAND
MINISTRY OF LABOUR AND NATIONAL SERVICE

Report of
the Working Party on
THE RECRUITMENT
AND TRAINING
OF NURSES

LONDON
HIS MAJESTY’S STATIONERY OFFICE

PRICE 2s. 6d. NET
Wood Committee, 1947

- assess the nursing workforce required for the future service and how such a force could best be recruited, trained and deployed

- job analysis, ‘efficiency movement’, psychometric testing of recruits

- social relationships scrutinised, conditions under which nurses could lead a ‘normal’ life explored
Recommendations for reform

• ‘streamline’ nursing work, redefine division of labour and skill mix

• reduce training from 3 to 2 years

• common core curriculum followed by specialisation

• strengthen educational representation of GNC
Majority to minority

- Cohen and controversy

- Health Service planning ‘pre-scientific’

- investigative methods ‘scholastic disputation’

- statistical resources ‘lamentably defective’
Engineering effectiveness

- industrial psychology
- improving human relations
- length of stay and skill mix
Research recommendations

• Social and Psychological Research Unit in MoH

• scientific analysis of nursing

• patient outcomes related to calibre of nursing staff
Summary

• nursing exposed the weaknesses in NHS planning apparatus

• Cohen first to analyse the relationship between nurse staffing skill mix and patient outcome

• advocated more systematic approach to policy-making and research resources to inform policy
‘Investment in developing and maintaining effective HRM policy and practice can make a measurable positive contribution to organisational performance’

(Buchan et al, 2004)
More Health Workers - Fewer Deaths

Mortality per 1,000

Health workers per 1,000 population

Maternal mortality

Infant mortality

Under-five mortality
### Volume/Outcomes

<table>
<thead>
<tr>
<th>Reference</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiken, L. H., et al (2003) ‘Educational Levels of Hospital Nurses and Surgical Patient Mortality’ <em>JAMA</em> 290(12): pp 1617-23</td>
<td>An increase in the proportion of nurses holding a bachelor's degree was associated with a decrease in the likelihood of patients dying within 30 days of admission and in the odds of failure to rescue.</td>
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<td>Person, S. D. et al (2004) ‘Nurse Staffing and Mortality for Medicare Patients with Acute Myocardial Infarction’ <em>Medical Care</em> 42(1): pp 4-12</td>
<td>Higher levels of staffing by RNs was associated with lower levels of mortality</td>
</tr>
<tr>
<td>Needleman, J. et al (2002) ‘Nurse Staffing Levels and the Quality of Care in Hospitals’ <em>New England Journal of Medicine</em> 346(22): pp 1715-22</td>
<td>Increased hours of nursing care was associated with lower rates of adverse events, shorter LOS and, in surgical patients, lower rates of failure to rescue</td>
</tr>
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</table>
The Multinational Study

- USA, Canada, Germany, England and Scotland participating in study examining links between nurse staffing characteristics and outcomes

- Results of effects of nurse staffing on nurse and patient outcomes published in JAMA 2002 and 2003
Study Design

• Staffing survey

• Outcomes data

• Organisational attributes
Nurse Survey in England

- 32 Hospitals
- 4 (of 8) regions
- 10,022 Staff Nurses
- 5,006 responses (50%)
Observed Mortality Among 118,752 Surgical Patients by Average Patient:Nurse Ratio in 30 U.K. Hospital Trusts
Observed Mortality Rates Among Patients with Complications (Failure to Rescue) by Average Patient:Nurse Ratio in 30 U.K. Hospital Trusts
% of Nurses Somewhat or Very Dissatisfied with their Jobs by Average Patient:Nurse Ratio in 30 U.K. Hospital Trusts
% of Nurses with Elevated Burnout Scores by Average Patient:Nurse Ratios in 30 UK Hospital Trusts
% of Nurses Rating of Quality of Care on Hospital Unit as Poor/Fair (vs. Good/Excellent) by Average Patient:Nurse Ratio in 30 UK Hospital Trusts
% of Nurses Reporting Deteriorating Quality of Care in Trust Past Year by Average Patient:Nurse Ratio in 30 UK Hospital Trusts
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RN4CAST-consortium

Europe
- Belgium
- Greece
- Ireland
- Poland
- Spain
- Sweden
- Switzerland
- Netherlands
- UK
- The USA
- Botswana
- China
- South Africa

Map of Europe and surrounding regions.
The nursing workforce, international context

- Nurse density & educational levels
- Evidence on relationship between aspects of the nursing work environment and nurse & patient outcomes:
  - North-American
  - International
- RN4CAST: FP7-funded research on the nursing workforce
NORWAY
The hospitals will be organised as five regional enterprises
Hospital nurses on strike

Spanish Nurses Suffering from BURNOUT
Nurses seriously injured as patient attacks

Hospital restructuring in Sweden

Portugal:
Public sector reforms contested

French Nurses Communicate Their Frustration

La CNL appelle à une grève générale du personnel infirmier le 4 décembre

Nursing BURNOUT

Depuis l'été 2001, quelque 250 infirmiers et infirmières espagnoles ont franchi les Pyrénées pour venir exercer dans des cliniques et hôpitaux français

Pledge on NHS overseas recruits

Healthcare reform in Germany Strike in perspective

The government says it wants to ease NHS staff shortages with 2,000 nurses from abroad over the next four years.
NURSES AND GDP
OECD Countries, 2000

Active Nurses per 1,000 of Population

GDP per Capita (US $ ppp)
THE NURSING WORKFORCE, INTERNATIONAL CONTEXT

- High variability in nurse density (nurses/1000 inhabitants)
- Ratio between highest & lowest density
  - Nurses: factor 1:3.8 (Greece – Ireland)
- Is there a Nursing Shortage?
  - Shortages reported in most EU countries
  - Independent from the current nurse density

(Simoens et al., 2005)
## Nursing education in 19 European countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Undergraduate</th>
<th>(post)graduate</th>
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<tbody>
<tr>
<td>Iceland</td>
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<td>Italy</td>
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<td>Norway</td>
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<tr>
<td>Spain</td>
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<tr>
<td>Sweden</td>
<td></td>
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<tr>
<td>UK (England)</td>
<td>Diploma-3yr</td>
<td>Bachelor – 3y</td>
</tr>
<tr>
<td>Malta</td>
<td>Bachelor – 4y</td>
<td>MA, PhD</td>
</tr>
<tr>
<td>Greece</td>
<td>Bachelor – 4y</td>
<td>MA, PhD</td>
</tr>
<tr>
<td>Portugal</td>
<td>Bachelor – 4y</td>
<td>MA, PhD</td>
</tr>
<tr>
<td>Finland</td>
<td>Bachelor – 3,5y</td>
<td>MA, PhD</td>
</tr>
<tr>
<td>Denmark</td>
<td>Bachelor – 3,5y</td>
<td>MA, PhD</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Diploma – 3y</td>
<td>Bachelor – 4y</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Diploma – 3y (MBOV)</td>
<td>Bachelor – 3y(HBOV)</td>
</tr>
<tr>
<td>Belgium</td>
<td>Diploma - 3jy</td>
<td>Bachelor – 3y</td>
</tr>
<tr>
<td>Germany</td>
<td>Diploma - 3jy</td>
<td>MA, PhD</td>
</tr>
<tr>
<td>France</td>
<td>Diploma – 3y</td>
<td>MA, PhD</td>
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<tr>
<td>Austria</td>
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<td>MA, PhD</td>
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<tr>
<td>Luxemburg</td>
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Source: Spitzer and Perrenoud, 2006
The nursing workforce, international context
  Nurse density & educational levels
  Evidence on relationship between aspects of the nursing work environment and nurse/patient outcomes:
    North-American
    International
  RN4CAST: FP7-funded research on the nursing workforce
Nurse staffing and patient safety: Recent meta-analysis

96 studies examining associations of nurse staffing levels and patients outcomes in hospital practice from US and Canada, 1990-2006
Evidence for a relationship between nurse staffing levels, mortality, failure-to-rescue and adverse events
Most consistent results for surgical and intensive care

As workloads in hospitals increase, so does mortality ...

But as nurse education increases, mortality decreases ...

Staffing (Patients per nurse)

Education (% of nurses with degrees)
Nurse staffing, education, & work environment are important individually and together in determining hospital mortality

Surgical patients in hospitals with better nurse work environments have 13% lower odds on dying;

Patients in hospitals with better staffing (two fewer patients per nurse) have 11% lower odds on dying;

Patients in hospitals with better educated nurses (20% more BSNs) have 8% lower odds on dying.

Surgical patients in hospitals that are better on all three have roughly 30% lower odds on dying.

Source: Aiken et al., JONA, 2008
Is this evidence relevant outside North-America?
% Nurses Dissatisfied with Job

- US: 41%
- Canada: 33%
- UK: 37%
- New Zealand: 30%
- Germany: 17%
- Thailand: 27%
- Japan: 60%
- South Korea: 36%
- China: 54%
$\%$ Nurses with High Job-related Burnout

- US: 43
- Canada: 35
- UK: 33
- New Zealand: 34
- Germany: 15
- Thailand: 42
- Japan: 58
- South Korea: 60
- China: 37

Chart showing the percentage of nurses with high job-related burnout in various countries.
Nurse-rated Unit Quality of Care: Fair/Poor

Percent

- US: 13
- Canada: 11
- UK: 14
- New Zealand: 13
- Germany: 20
- Thailand: 19
- Japan: 60
- South Korea: 68
- China: 40
Nurses Not Confident That Patients Are Ready for Discharge

![Bar chart showing the percentage of nurses who feel patients are ready for discharge in various countries. The countries listed are the US, Canada, UK, New Zealand, Germany, Thailand, Japan, South Korea, and China. The percentage ranges from 19% in Germany to 85% in Japan.](chart.png)
Decreases in Nurse Burnout in Better vs. Poor Hospital Working Environment

-43  -44  -46
-50

-40  -30  -20  -10  0

US  Canada  UK  New Zealand  Germany  Japan  South Korea  China
Decreases in Low Job Satisfaction in Better vs. Poor Hospital Working Environment

-44  -40  -35  -25  -53  -67  -41

Percent

US  Canada  UK  New Zealand  Germany  Japan  South Korea  China
Decreases in Low Unit Quality in Better vs. Poor Hospital Working Environment

-58
-55
-45
-39
-48
-42
-75
-37
Nursing is a Global Community

Challenges nurses face are very similar across countries despite differences in resources and national system design.

Are the solutions to nursing shortages and poor quality of care are also common across countries?
Shortcomings current forecasting models

- Despite this evidence, current forecasting models for human resource planning in nursing does not include:
  - Impact of numbers & educational levels on quality & patient safety
  - Impact nursing practice environment
  - Adequate staffing, support of management, relations between physicians & nurses, …
The nursing workforce, international context
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- RN4CAST: FP7-funded research on the nursing workforce
RN4CAST: FP7-FUNDED RESEARCH ON THE NURSING WORKFORCE CALL

- FP7-Health
  - Health theme 3: Optimising the delivery of health care
    - 3.2. Quality, Efficiency and solidarity of health care systems, including transnational health systems
  - 3.2.4. Health care human resources planning in nursing
- 2009-2011
- Co-ordination
  - Co-ordinator: Walter Sermeus (CZV, Katholieke Universiteit Leuven)
  - Vice-coordinator: Linda Aiken (CHOPR, University of Pennsylvania)
- 15 partners
OBJECTIVE

To refine current forecasting models for planning the nursing workforce with new elements:

1. (perception of) various aspects of the nursing work environment
2. Impact of nurse deployment on recruitment, retention and productivity of nurses and on patient outcomes

And to present mid-term and long-term projections on a European and national level
Project structure

WP1: Management & Coordination
   WP Leader: K.U.Leuven (a)

WP3: Workforce Planning/Forecasting
    WP Leader: UKU

WP4: Protocol Finalization/ Harmonization
    WP Leader: PENN

WP5: Nurse Survey Data Collection
    WP Leader: ISCI

WP6: Patient Outcomes Data Collection
    WP Leader: KCL

WP7: Data Integration & Analysis
    WP Leader: K.U.Leuven (b)

WP8: Human Resource Policy Synthesis
    WP Leader: DCU

WP2: Dissemination & Stakeholders engagement
    WP Leader: KCL

Figure 2. Flow diagram illustrating interdependencies between work packages.
RN4CAST: FP7-FUNDED RESEARCH ON THE NURSING WORKFORCE METHODOLOGY

- **Hospitals**
  - Acute hospitals
  - At least 30 hospitals/country
  - Approximately 330 hospitals will participate

- **Nursing units**
  - General medicine and surgery (cf. Kane et al., 2007)
  - At least 2 units/hospital

- **Nurses**
  - All nurses in direct patient care
  - Approximately 16,500 nurses will participate

- **Patients**
  - All adult patients on the selected nursing units
  - Approximately 9,000 patients
RN4CAST: FP7-FUNDED RESEARCH ON THE NURSING WORKFORCE METHODOLOGY

- Nurse questionnaire
- Patient questionnaire
- Hospital discharge data
- Hospital characteristics
Hospital characteristics

- Type
- Patient activity
- Personnel deployment (nurses, physicians): number and qualification
- Personnel inflow and outflow
- Organisation and management of the nursing workforce
The nursing work environment
- PES-NWI (Lake et al., 2007)
Level of Burn-out (MBI), job satisfaction, intention to leave
Quality and safety
- Incidents, quality nursing unit and hospital
Most recent shift
- Number of patients cared for, non-nursing tasks,…
Characteristics of nurses
- Age, gender, migration, experience
Patient questionnaire

- On one day
- Based on the Consumer Assessment of Hospital Personnel & Systems Experiences
  - Care from nurses (respect, …)
  - Care from physicians (respect, …)
  - Hospital environment (cleanliness, calmness)
  - Pain management, information

(Kutney-Lee et al., 2007)
Hospital discharge data

- Routinely collected hospital discharge data (i.e. hospital discharge datasets containing information about patient demographics, medical diagnoses & interventions
  - ICD-9, ICD-10
  - length-of-stay
  - discharge status (e.g. in-hospital mortality)
- Selection of adult medical/surgical patients
- Outcomes will include mortality, failure-to-rescue and adverse events (e.g. pressure ulcers, nosocomial infections)
RN4CAST: FP7-FUNDED RESEARCH ON THE NURSING WORKFORCE METHODOLOGY

Traditional forecasting models

RN4CAST data

Other European and national research (e.g. prometheus(FP7))

Patient safety

Image of nursing

Nursing work environment

(ethical aspects of) migration

Nurse deployment

Nursing education

Competences, retention, recruitment, management

Accurate idea of the required personnel deployment in terms of number of qualification for safe patient care and a healthy work environment for nurses

October 09

Presented by Anne Marie Rafferty
RN4CAST: FP7-FUNDED RESEARCH ON THE NURSING WORKFORCE DISSEMINATION

- Publications, website, conferences,…
- National and international stakeholder committees
  - International stakeholders:
    - EHMA, ENDA, EFN, HOPE, TUNING, OECD, European Observatory on Health Systems and Policies, FINE, EANS, European Council of Nursing Regulators, European Forum of National Nursing and Midwifery, Workgroup of European Nurse Researchers, WHO European Centre for Health Policy
  - National: representants of nursing unions, hospitals, schools of nursing, government
- Strong basis and support for translation of results to European and national policy
- Follow-up, monitoring of outcomes
RN4CAST: FP7-FUNDED RESEARCH ON THE NURSING WORKFORCE POLICY IMPLICATIONS

- Patients
  - Improved outcomes
  - Active, well-informed role in care-process

- Nurses
  - Involvement in policy-making
  - Recognition of contribution to patient care
  - Improved nurse outcomes

- Hospital administrators
  - Better understand the implications of staffing decisions
  - Better understand how organizational models affect care

- Governments
  - Educational restructuring
  - Increased pressure to improve quality of patient care
Winifred Raphael

- National Institute for Industrial Research
- Vocational guidance, aptitude tests, 1920s
- Improving conditions for women and girls in factory and shop work
- Pioneered attitude surveys, labour turnover, employee relations and communication, stress focus on health in 1970s
Adoption of research

• Psychology of user-values of policy makers

• Primal drives-rewards and punishments, pleasure or pain?

• Reinforce what user wants to do or not?
Models of engagement

• User involvement

• Decision maker involvement

• Multi-stakeholder involvement
Character of research

- Content?
- Clarity?
- Quality?
Targets

• Quality accounts
• Regulator
• Qipp
A new model?

• Climate change

• Changing the climate of the healthcare environment

• Burning platform
Global warming
conclusions

• outcomes research in nursing part of proud tradition of multidisciplinary, multicentre research

• Winifred Raphael reminds us of relevance of history for workforce policy today-history is the tugboat that pulls policy along

• maximising impact demands new methodologies as much as methods of engagement