HEALTH WORKFORCE PLANNING AND INNOVATIONS IN SERVICE DELIVERY

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HEALTH WORKFORCE PLANNING

Traditional models:

simple projections of current provider to population ratios applied to future population

$$L^t = [L / P]^y \times P^t$$

Implication: Health care systems frozen in time

size and demographic mix of the population are the only determinants of workforce requirements

ASSUMPTIONS UNDERLYING TRADITIONAL MODELS

- *Epidemiology:* Morbidity by age and gender constant
- *Service levels/mix*: Services provided in response to needs constant
- *Service delivery:* Way services are delivered constant
- *Service productivity*: Quantity of services per FTE constant

Health care production and delivery remain fixed in time over long future planning periods

NEW MODELS OF WORKFORCE PLANNING (Birch et al. 2007)

Requirements for health workforce derived from the requirements for health care

Requirements for health care, Q^r , determined by needs of the population and policies on what services to fund/provide in response to needs

$$Q^r = [Q/H]^t \times [H/P]^t \times P^t$$

Increasing frequency of screening increases Q/H. . .

Increasing prevalence of risk factors increases H/P . . .

. . .and so workforce requirements Q^r go up

WORKFORCE PLANNING AND PRODUCTION OF HEALTH CARE

Health care production function:

relationship between the quantity of services produced and the quantity and mix of health care resources used(providers L, equipment K and technology T)

$$Q = f(L,K,T)$$

Workforce requirements depend on the particular methods of production used

Innovation: Changing methods of production changes requirements for quantity and mix of workforce

INTEGRATING WORKFORCE PLANNING WITH SERVICE PLANNING

For a given future service requirement, Q^r , the required quantity of providers L^r is given by

$$L^r = f(K, T; Q^r)$$

$$L^r / Q^r = f(K,T)$$

Substituting for future service requirements

$$L^r = [L/Q] \times [Q/H] \times [H/P] \times P$$

Workforce requirements depend on future population, morbidity, health care policies, availability of other inputs and methods of service delivery to be used.

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OFFICIAL OVER-50s ARE GETTING YOUNGER

They're fitter, richer, happier and live their lives to the full

BRITAIN'S over-50s are living longer, working longer – and staying younger longer.

They are healthier and wealthier and determined to live life to the full in a way their parents never did. Far from considering retirement, the over-50s are pursuing their careers as they enjoy the lifestyle of a younger generation. According to figures from the Office of National Statistics, they see age as no bar to travel, exercise or mastering new technology.

More than 80 per cent are buying their own homes and half have paid off their mortgages.

By **Sarah O'Grady**
Social Affairs Correspondent

FULL STORY: PAGES 4&5

EXAMPLE: PRIMARY CARE DENTISTS
(Birch and Maynard 1985)

Developments in oral health care in 1970s

- *Needs:* Improved diet, oral hygiene and fluoride in water and toothpastes - morbidity (H/P) fell

- *Innovation:* new methods of service delivery
  - reclining patient chair – technology changed
  - team based service delivery – dentists, assistants, hygenists
  - productivity of dentists (Q/L) increased

No effects on traditional planning model

$$L^r = [L/P] \times P$$

Reduces workforce requirements in new model

$$L^r = [L/Q] \times [Q/H] \times [H/P] \times P$$

EXAMPLE: PRIMARY CARE DENTISTS
(Birch and Maynard 1985)

DoH used traditional model

- overestimated workforce requirements
- benefits from innovation and improved oral health status not realised by NHS

Why no apparent surplus of dentists?

- Excess supply of dentists 'absorbed' by
- increasing services per need (Q/H): supplier induced demand
- increasing training (creeping credentialism) (L/Q)
- Example – expansion of orthodontics

  not planned by government, not demanded by parents

EXAMPLE: HHRP FOR PHYSICIANS IN CANADA

1964 Royal Commission – Maintain pop-phys ratio(PPR) at 850

Increase med. school intake for expected population growth

1991 Barer-Stoddart report - PPR fallen rapidly – population growth less than projected

Stabilise PPR at 500-550 through package of measures including reductions in med school intake

1998 Canadian Medical Association (CMA) population growth exceeded physician over post 91 period – 5 less docs per 100,000 (PPR increased 2.6% ; < 0.5% per year)

CMA estimated physician-population ratio to fall by 31% over 25 years - med school intake increased

EXAMPLE: HHRP FOR PHYSICIANS IN CANADA

Applying 1% annual reduction in needs and 1% annual increase in productivity to CMA estimates produces reduction of 27% in 'effective' PPR over same period (Birch et al. 2007)

2004 PPR = 471 much less than previous targets

CMA acknowledge overestimated population growth and physician retirements so potential shortages inflated

increased training/reduced productivity

Between 1961 and 2003 63% increase in physicians after allowing for population growth

The increase is far larger if we also include changes in needs and changes in productivity associated with innovations in service delivery

IMPLICATIONS OF TRADITIONAL MODEL PEADIATRICIANS IN US

2004 Shipman et al.

Numbers of pediatricians and children in US increase by 64% and 9% respectively by 2020

To maintain workloads need to 'expand services and expand patient populations beyond current age groups'

2008 American Academy of Pediatrics:

Recommendations for cholesterol screening and treatment for children age 2 and over

AN EARLY DIAGNOSIS?

"Progress in medicine does not focus on doing existing things more cheaply and simply, but on discovering complex and difficult things to do that previously could not be done at all . . .

. . .the NHS was a miscalculation of sublime dimensions"

Enoch Powell, UK Minister for Health, (1962)

MODELLING PROVIDER SUBSTITUTION

Health care production function: different providers

$$L_1^r = f(L_2, K, T; Q^r)$$

Required number of physicians, L_1^r, depends on

- required numbers of services (Q^r)
- number of other providers (L_2)
- Other (non human resource) inputs (K)
- methods of service delivery (T)

Simply licensing alternative providers does not mean provider substitution will occur.

New methods of service delivery required for new providers to use full scope of practice

NURSE PRACTITIONERS IN PRIMARY CARE

NPs licensed as independent practitioners

How many required in over next 10 years?

Direction for planning:

- How many NPs required . . . to do what, . . . and how?

- NPs have 75% of FP scope of practice - intention
  - Deliver care in underserviced areas
  - Part of primary care ‘family health teams’ (FHTs)

NURSE PRACTITIONERS IN ONTARIO

- Estimate the required level of primary care service

  $Q^r = [Q/H] \times [H/P] \times P$

  What proportion of service, Q^r, to be delivered by NPs

  Remote : NPs to provide 80% of primary care

  Urban : 50% of primary care delivered by FHTs

  NPs deliver 50% of care within FHTs
- Generates increasing proportion, k, of service requirements Q^r used for planning for NPs
- Leaves decreasing proportion(1-k) to be delivered by other providers (FPs)
- Under these plans shortage increases over next 10 years

NURSE PRACTITIONERS

What if NPs restricted by professional interests of FPs?

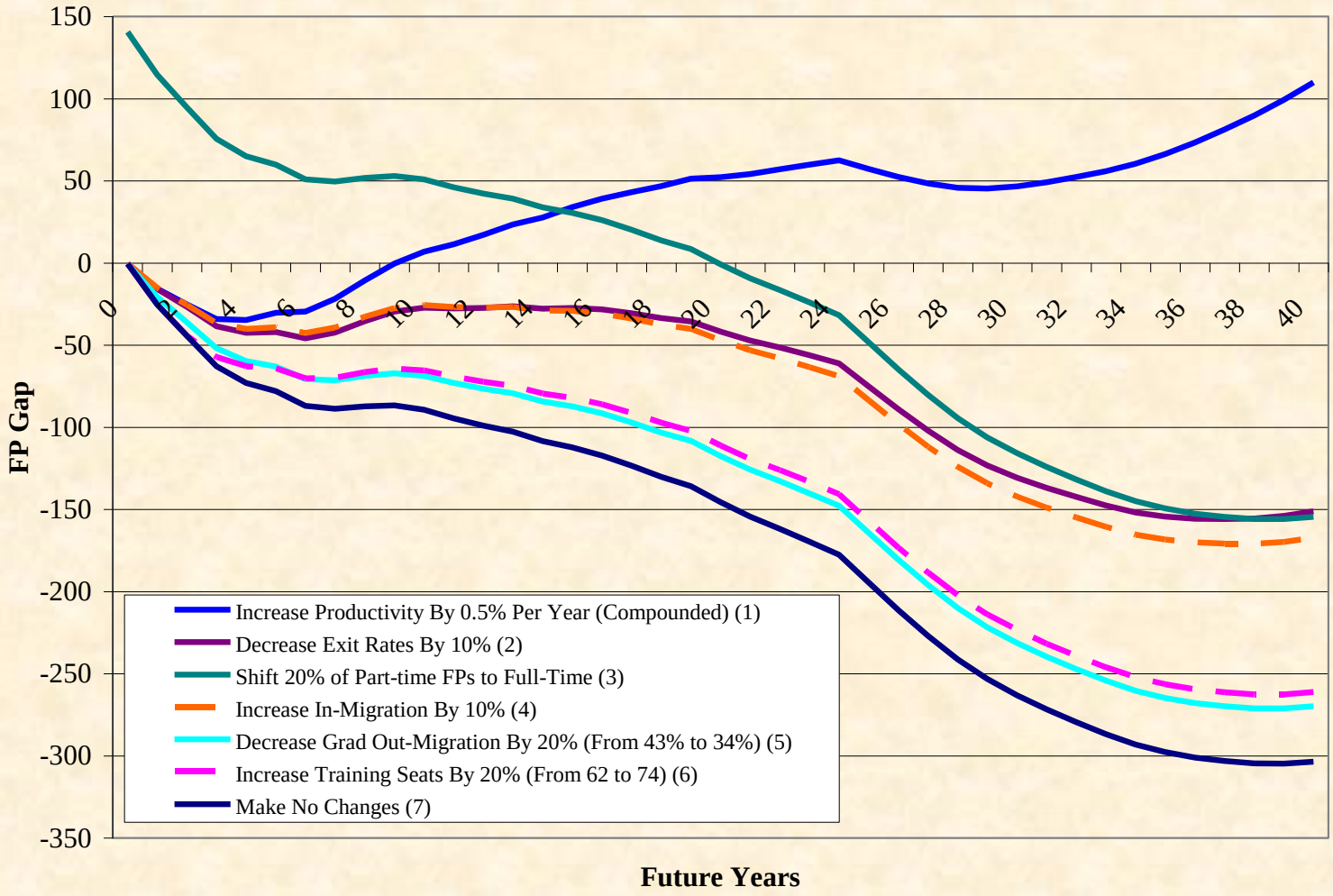
How many NPs required . . . to do what, . . . how?

If NP activity confined to present deployment patterns (i.e., k constant) . . .

Increasing surplus of NPs over next decade

- NPs not being used to full scope of practice
- FP resistance to NPs in primary care – competitors

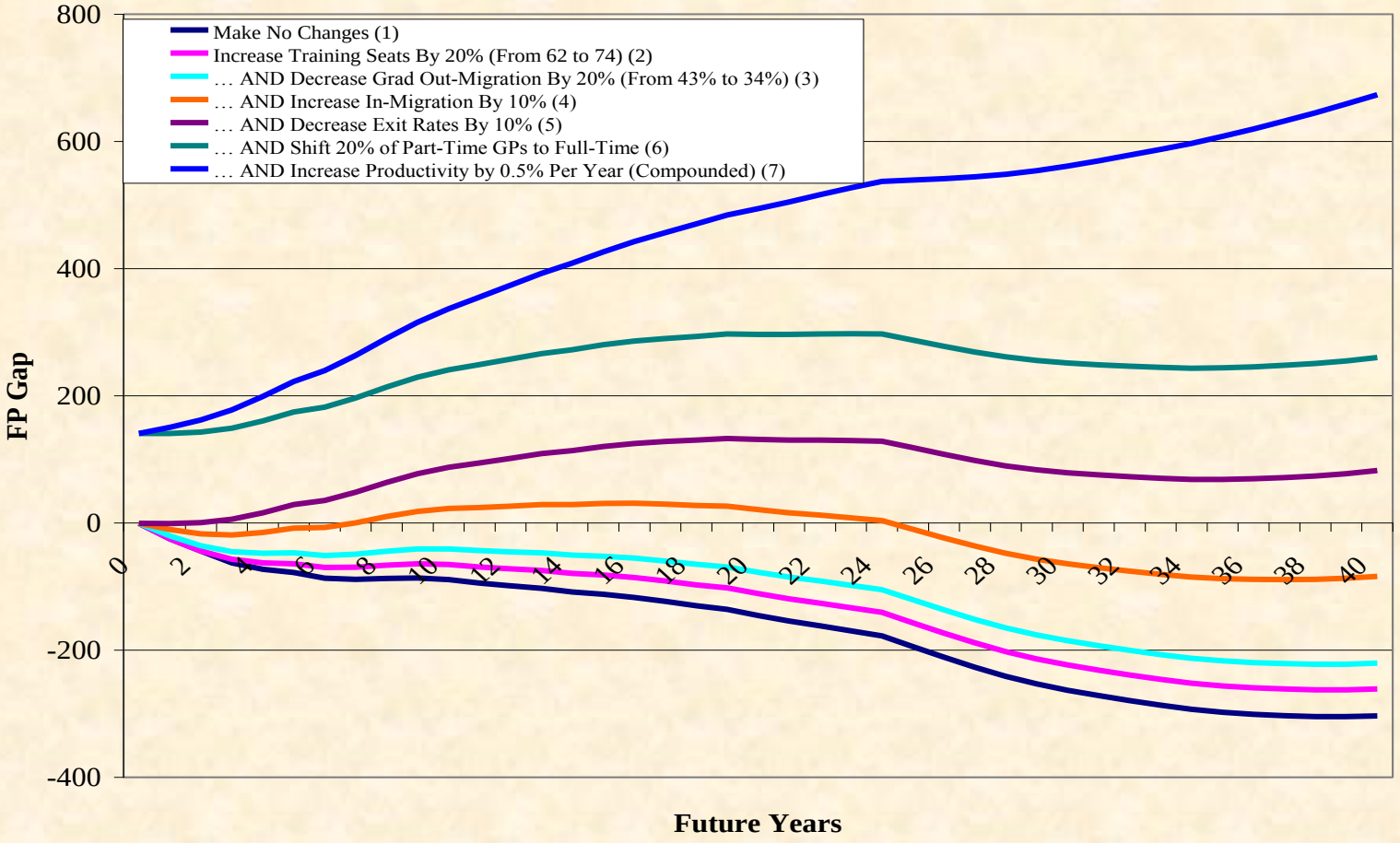
COMPARISON OF POLICY SCENARIOS



ADDITIONAL TRAINING SEATS REQUIRED TO ELIMINATE PROVIDER GAP IN 15 YEARS

	Needs Scenario		
Potential Policy Scenario	Remains Constant	Observed Trends	Canadian Levels
Increase training seats only	130	123	101
Decrease grad out-migration By 20% (from 50% to 40%)	97	90	73
Increase in-migration by 10%	93	85	63
Decrease exit rates by 10%	88	79	59
Shift 20% of 'part-time' to 'full-time'	-ve	-ve	-ve
Increase productivity by 0.5% per year (compounded)	73	68	48

CUMULATIVE EFFECTS OF POLICY SCENARIOS ON PROVIDER GAP



ADDITIONAL TRAINING SEATS PER ANNUM REQUIRED TO ELIMINATE PROVIDER GAP IN 15 YEARS UNDER COMBINIATION OF POLICIES

Potential Policy Scenario	Need Remains Constant		Need Follows Observed Trends		Need Conforms to Canadian Levels	
Make no other changes (baseline)	130	*Diff*	123	*Diff*	101	*Diff*
Decrease grad out-migration By 20% (from 50% to 40%)	97	33	90	33	73	28
… AND increase in-migration by 10%	65	32	59	31	42	31
… AND decrease exit rates by 10%	29	36	23	36	7	35
… AND shift 20% of 'part-time' to 'full-time‘	-ve		-ve		-ve	
… AND increase productivity by 0.5% per year (compounded)	-ve		-ve		-ve	

FEATURES OF MODEL (AND MODELLING)

- Integrated model supports planning for provider substitution

- Models can be used to estimate range of options for service developments and provider imbalances

- Managing change

  Plans for changes unlikely to occur spontaneously – need careful management

  impact of change on requirements for all provider groups must be considered

  attention paid to avoiding unplanned (undesirable) compensating changes by providers

SUMMARY

Separates the roles of changes in population demographics, levels of health, levels of service and productivity on the determination of HHR requirements

Avoids ‘illusions of necessity’ (or Roemer’s Law) in planning HHR and hence perpetuating imbalances in HHR

Provides a basis for considering the impact of health care policies, innovations and technological change on HHR