ESRI ECONOMIC & SOCIAL RESEARCH INSTITUTE

ESRI HIPPOCRATES projection model of healthcare demand and expenditure

DATE
20th February 2019

VENUE
Department of Health, Block 1, Mesian Plaza, Lower Baggot Street, Dublin 2

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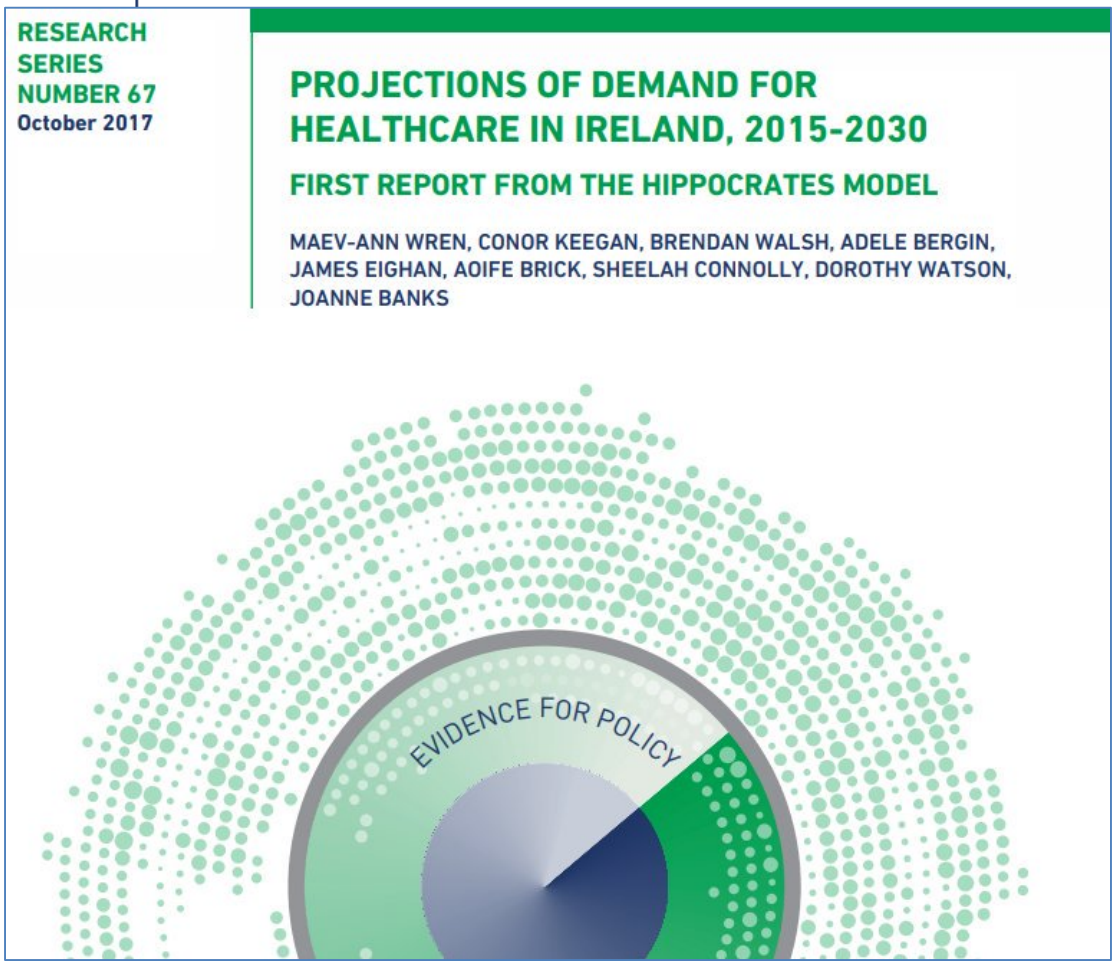
Outline

- Introduction
- Demographic methods and findings
- Healthy ageing evidence
- Methods
- Findings
- Policy implications

ESRI/Department of Health Programme

- ESRI Programme in Healthcare Reform began July 2014
- Department/ESRI steering group agrees research programme
- *An Examination of the Potential Costs of Universal Health Insurance in Ireland* (Wren, Connolly and Cunningham, 2015)
- Development of Hippocrates Model of healthcare demand and expenditure began 2015
- *Projections of Demand for Healthcare in Ireland, 2015-2030* (Wren, Keegan, Walsh et al., 2017)
- Currently scoping *Projections of Irish Healthcare Expenditure*



https://www.esri.ie/system/files/media/file-uploads/2018-02/RS67.pdf

Objectives of the HIPPOCRATES model

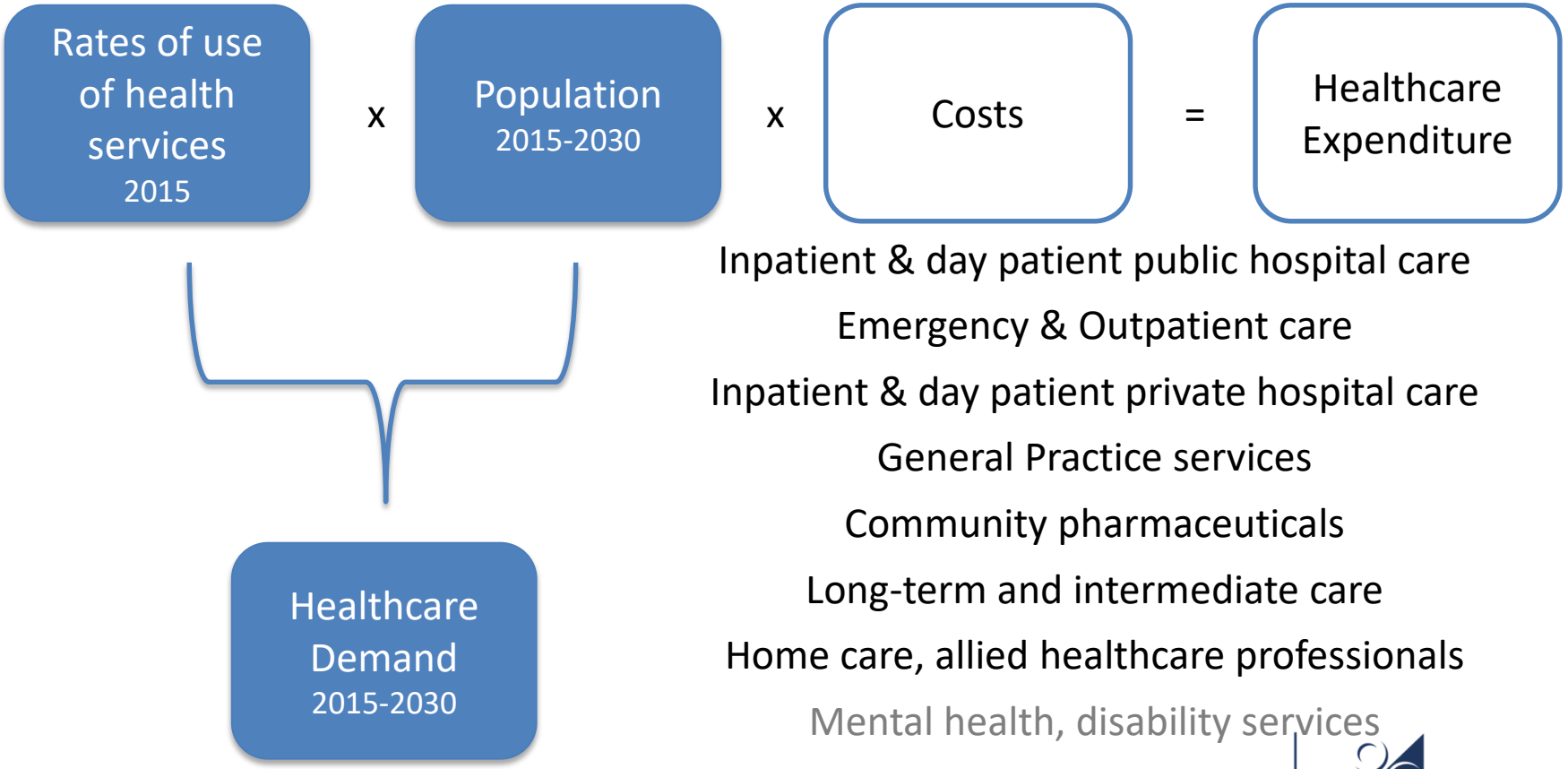
- *Published research*
  - How much care is used now?
  - How much unmet need is there?
  - How much projected demand for care?
  - How much projected hospital capacity to meet demand?
- *Future applications*
  - How much spending will be needed?
  - What are the drivers of spending?
  - Future workforce requirements?
  - Impacts of reform change (e.g. Sláintecare)

Filling knowledge gaps

- How much care is supplied?
  - Number of public health nurse visits? Dentist visits? Physio visits? Private hospital discharges?
- How much is purchased privately?
  - Number of private home help hours?
- How much does Ireland spend relative to other countries?
  - OECD System of Health Accounts a work in progress
- Age profile of healthcare expenditure?
  - EU Ageing Reports – Ireland, Greece and Romania only countries of 28 that did not supply age-related public healthcare expenditure profiles

The Hippocrates Model

Macro-simulation model, single year of age, M/F



Drivers of Demand

- Population Growth
- Population Ageing
- Healthy Ageing
- Unmet Need & Demand

- Drivers of costs to be included as model developed to project expenditure

DEMOGRAPHIC PROJECTIONS

Demographic Context

- Ireland's demographic profile is unusual in an EU context
  - Rapid population growth, 1996-2016: 31%; 6% in EU-28
  - Relative to the EU, have a favourable demographic structure (e.g. 2016: 13% of pop aged 65+; 19% in EU-28)
- However the population is ageing…
  - Between 1996-2016: 64% increase in pop aged 80+
  - And continued population ageing expected over the short to medium term

Demographic Modelling - Approach

- Modelling approach: Cohort Component
  - In-house demographic model
  - Combine assumptions on fertility, mortality and migration

- Migration is the key driver of total population change in Ireland
  - Migration flows are very sensitive to economic conditions
  - Link with COSMO

Demographic Modelling - Assumptions

Component	Assumptions - Central	Assumptions - High
Fertility: Total Fertility Rate	Unchanged at 1.94	Rises to 2.1 by 2021 and constant thereafter
Migration: Net Immigration	Averaging 9,000 p.a. to 2021 and 13,000 p.a. thereafter	Averaging 39,000 p.a. to 2021 and 28,000 thereafter
Mortality: LE at birth	LE at birth to increase from 78.4 to 82.9 years for males and 82.9 to 86.5 for females by 2030	Increase to 83.2 years for males and 86.8 years for females by 2030

Summary of Population Projections

- Population to increase to between **5.35m** to **5.79m** by 2030 in Central and High scenarios
  - This is an overall increase of between 14 to 23% on 2015
- The number of older persons is set to increase
  - Population aged 65+: 1 in 8 now. By 2030: 1 in 6
- Growth in numbers aged 65 and over: 60 to 63%
- Growth in numbers aged 80 and over: 89 to 94%

HEALTHY AGEING

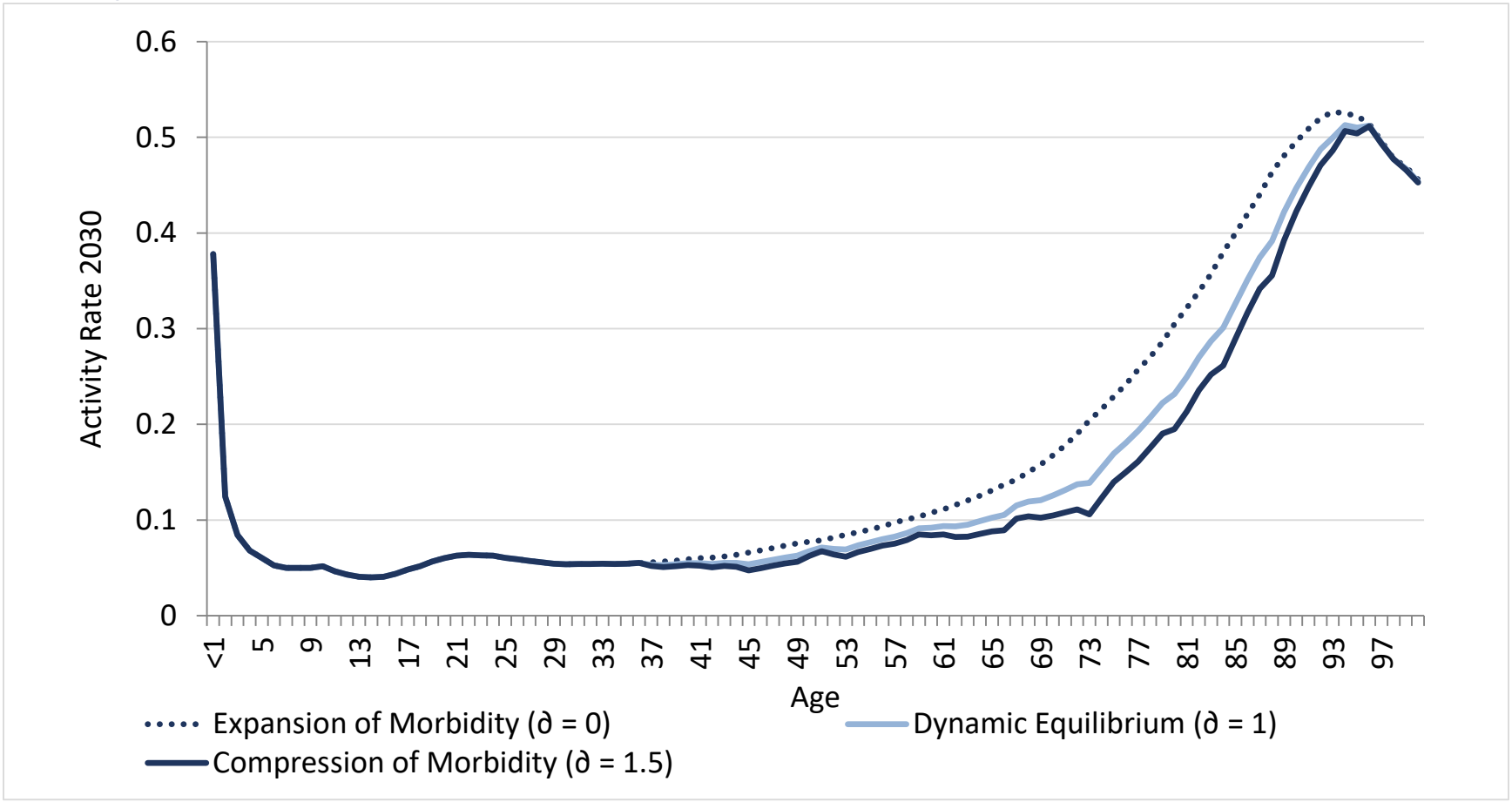
How healthy ageing assumptions impact demand

- **Expansion of Morbidity**
  - As life expectancy increases, additional years of life are spent in bad health (morbidity/disability)
- **Dynamic Equilibrium**
  - As life expectancy increases, the number of years in bad health remains fixed
- **Compression of Morbidity**
  - As life expectancy increases, the number of years in bad health reduces
- **Moderate Healthy Ageing**
  - Intermediate point, halfway between Expansion of Morbidity and Dynamic Equilibrium

Healthy ageing shifts

- The activity rate distribution acts as a proxy for morbidity
- Shift activity curve to the right to represent healthy ageing
- E.g. under dynamic equilibrium if the life expectancy of a 70 year-old is expected to increase by 2 years between 2015 and 2030, then the activity profile of a 70 year old in 2030 will reflect the activity profile of a 68 year old in 2015

Healthy ageing shifts – example



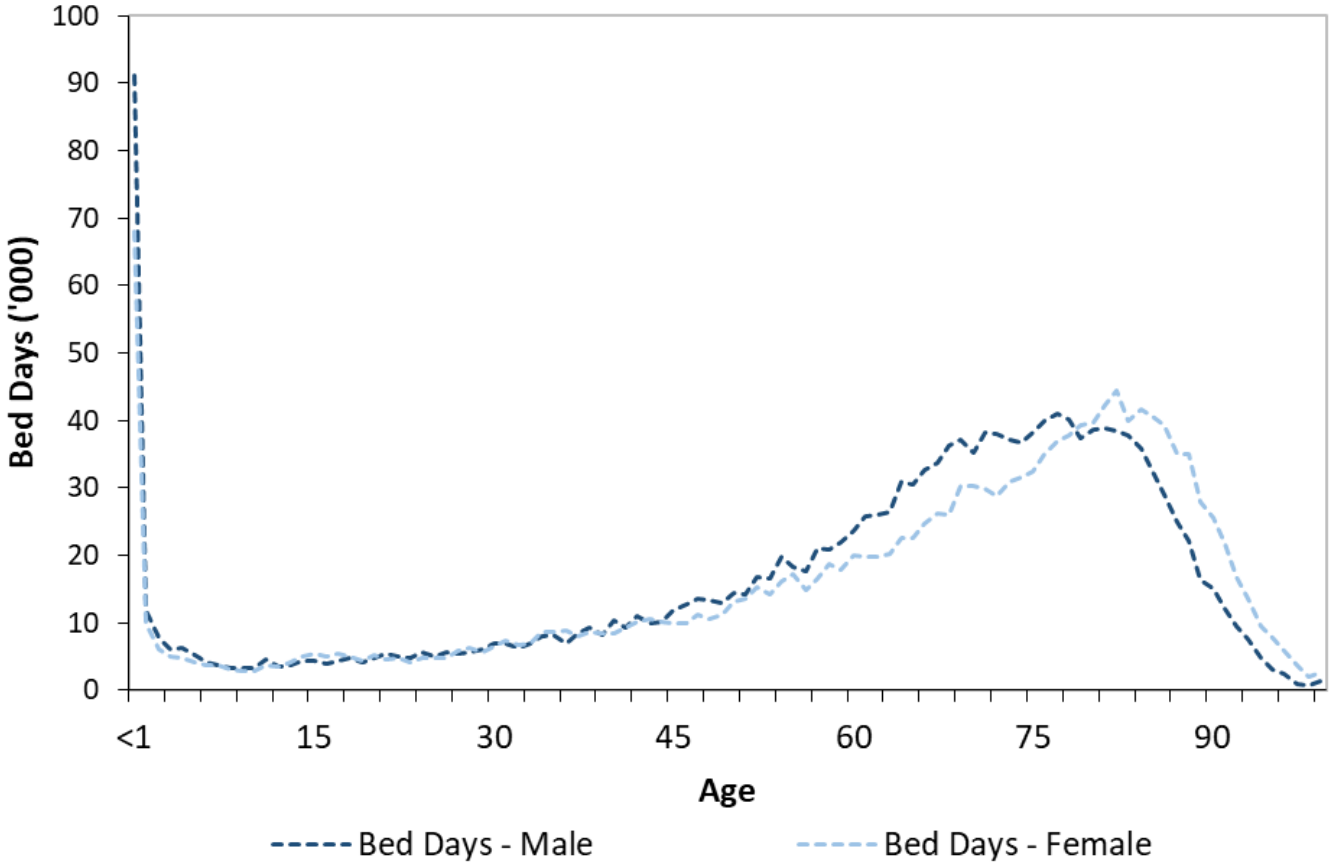
ANALYSIS OF HEALTH AND SOCIAL CARE USE, 2015 BASELINE

Findings, the healthcare system 2015

- Hospitals:
  - 1.5m day cases, 69% in public hospitals
  - 4.2m bed days, 85% in public hospitals
- General practice:
  - 17.6m GP visits, 5.9m practice nurse visits
- Allied Healthcare Professionals:
  - 1.32m PHN visits, 0.76m Public PT visits,
  - 0.35m Public OT visits, 0.15m SLT visits
- Long-term care:
  - 10.6m bed days
- Home help:
  - 14.3m home help hours, 27% privately paid

Baseline Analysis – by age

Public Hospital bed days, 2015



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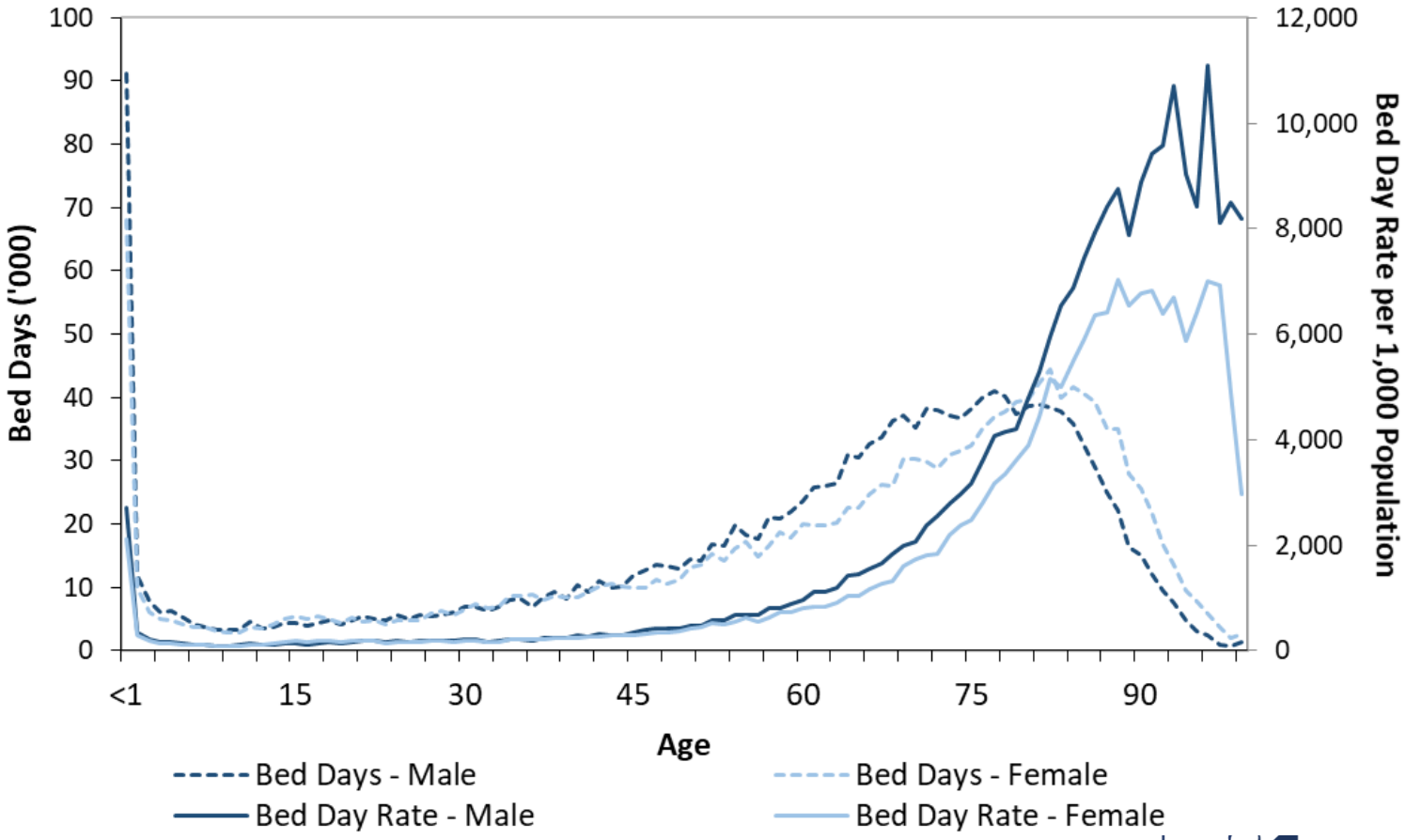
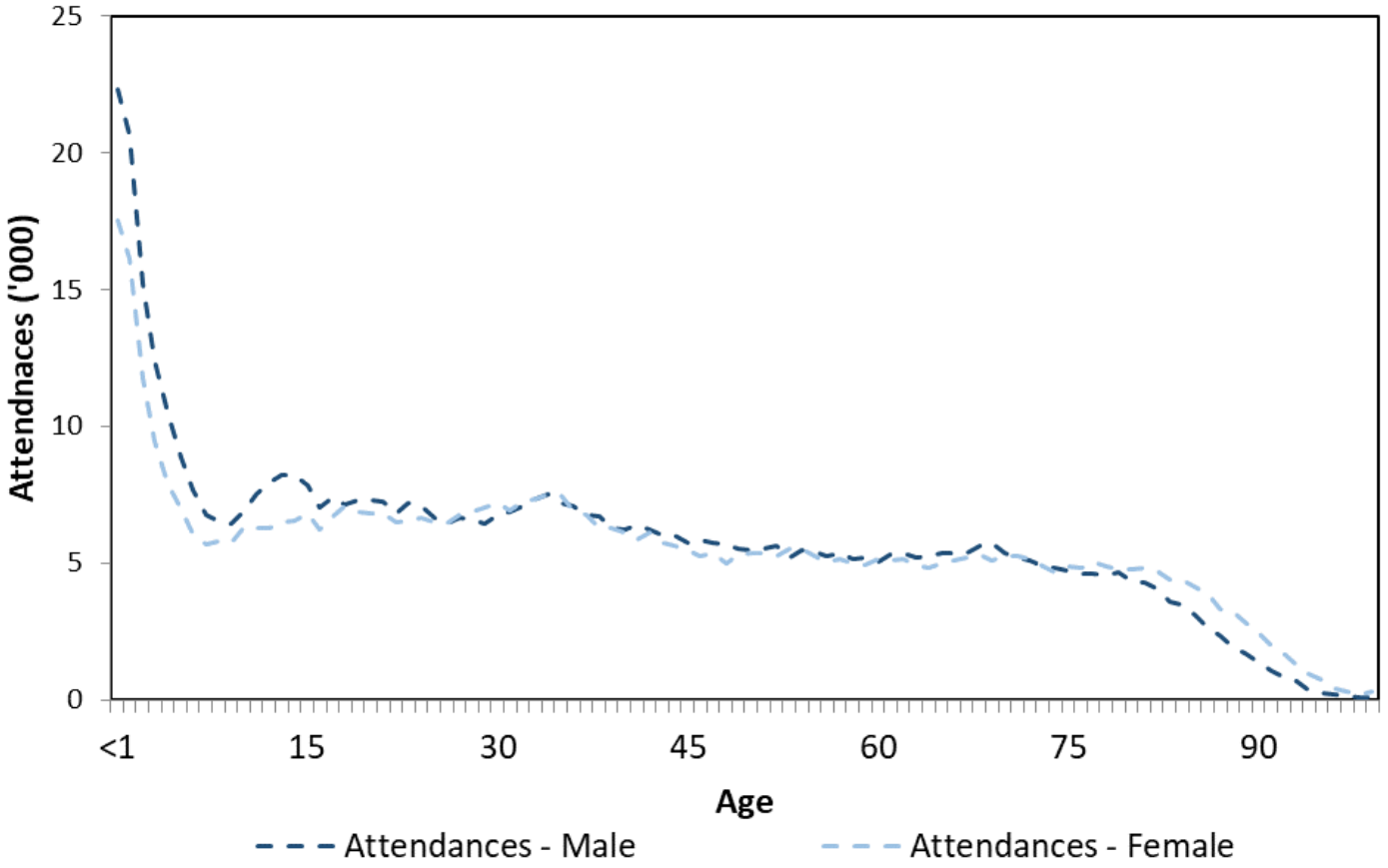


Baseline Analysis – by age

Public Hospital ED attendances, 2015



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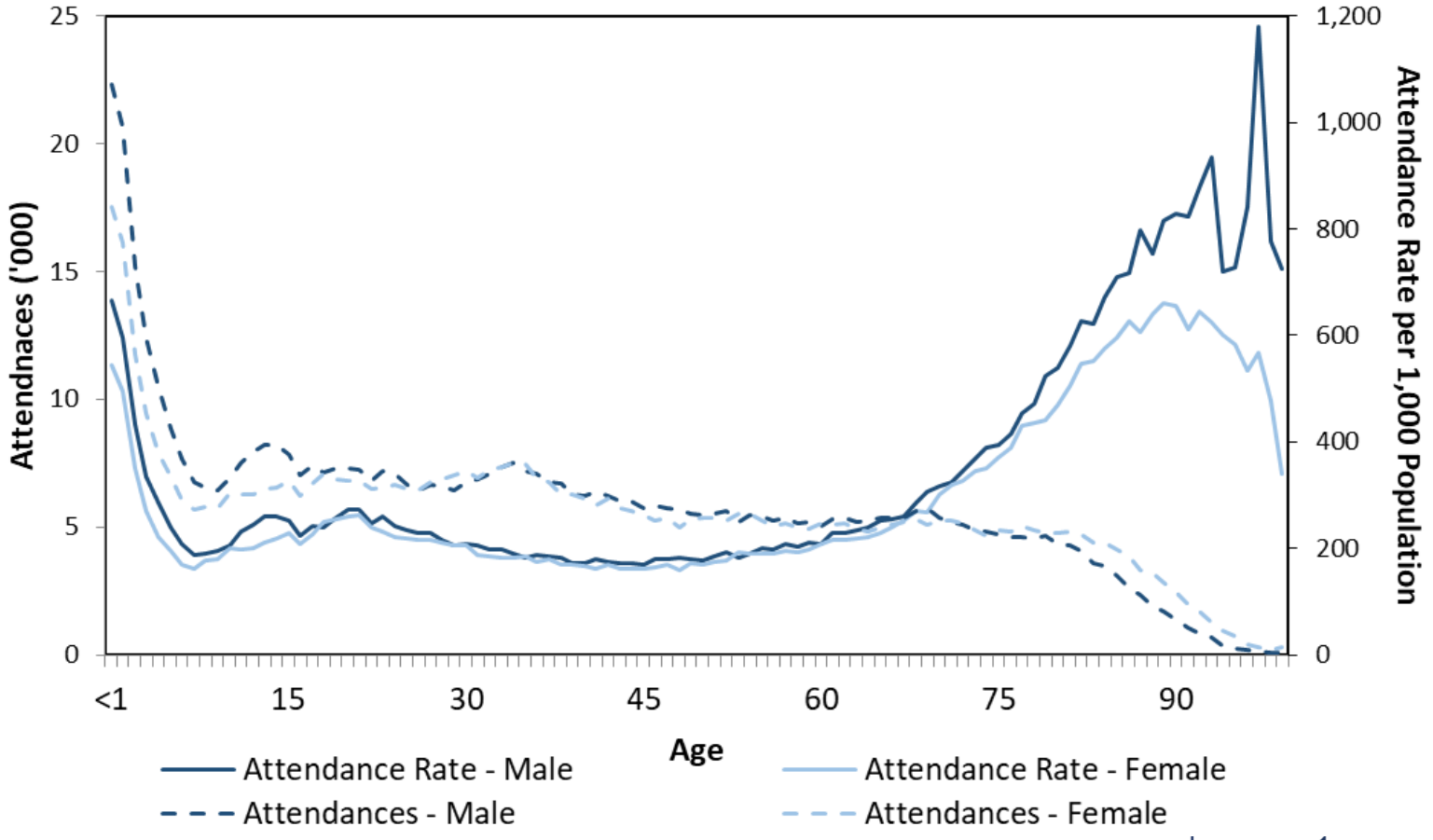

FINDINGS: DEMAND PROJECTIONS

Demand projections, 2015 to 2030

Sector	Measure of healthcare use	Projection Range % increase 2015 to 2030	
Public hospitals	Inpatient cases	24	30
	Day patient cases	23	29
	Inpatient bed days	32	37
	ED attendances	16	26
	Outpatient attendances	21	30
Private hospitals	Inpatient cases	20	25
	Day patient cases	24	28
	Inpatient bed days	28	32
General practice	GP visits	20	27
	Practice nurse visits	26	32

Demand projections, 2015 to 2030

Sector	Measure of healthcare use	Projection Range % increase 2015 to 2030	
Long-term care	Residents/places	40	54
	LTC bed days	40	54
Home care	Home help service	44	57
	HCP recipients	44	66
	Home help hours	38	54
Community Nursing and Public Community Therapy	Public health nurse visits	26	35
	Public physiotherapist visits	24	30
	Public occupational therapist visits	33	38

FROM DEMAND TO CAPACITY

Hospital Capacity Projections, 2015-2030

- Model has been further developed to examine bed capacity implications of projected demand
  - Demographic drivers
  - Bed occupancy
  - Introduce models of care change

- By 2030:
  - Project demand for at least 3,200 additional public hospital beds
  - Project demand for at least 780 additional private hospital beds

FROM DEMAND TO WORKFORCE?

Developing Workforce Projections

- The model could be further applied to inform workforce planning in Ireland
- At a fundament level
  - Develop ratios of staff to activity (e.g. staff nursing WTE/hospital inpatient bed day)
  - Project range in line with demand growth
- Consider impact of optimal staff levels & skill mix
  - Informed by evidence base and expert input
- Sectoral analyses contingent on data availability

FROM DEMAND TO EXPENDITURE

Developing Expenditure Projections

- Projected expenditure = volume x price
- Requires unit cost analysis by service and components
- What drives components of cost?
- Allows decomposition of price and volume drivers

Summary

- Demographic change will lead to significant increases in demand for care
  - Particularly services used predominantly by the older pop
- Implications for capacity, staffing and capital investment
- Annual average increases 1-3%;
- Backdrop of growing pop and labour force
- But also need to factor in price pressures to understand expenditure implications

THANK YOU

Sensitivity Analysis

Sector		Public acute hospitals		Long-term care	Home Help
Activity		Inpatient bed days	ED attendances	Residents	Home care packages
Population Growth	Low	-2%	-4%	-2%	-2%
	High	4%	8%	3%	3%
Healthy Ageing	Low	-5%	-1%	-7%	-7%
	Medium	-10%	-3%	-14%	-15%
	High	-15%	-4%	-22%	-22%
Unmet Demand	Low	1%		2%	15%
	Medium	2%			
	High	3%			