

Emerging Trends in Mortality and Longevity Symposium 2011

Hande Love



Disease-based incidence and mortality rates

13 September 2011

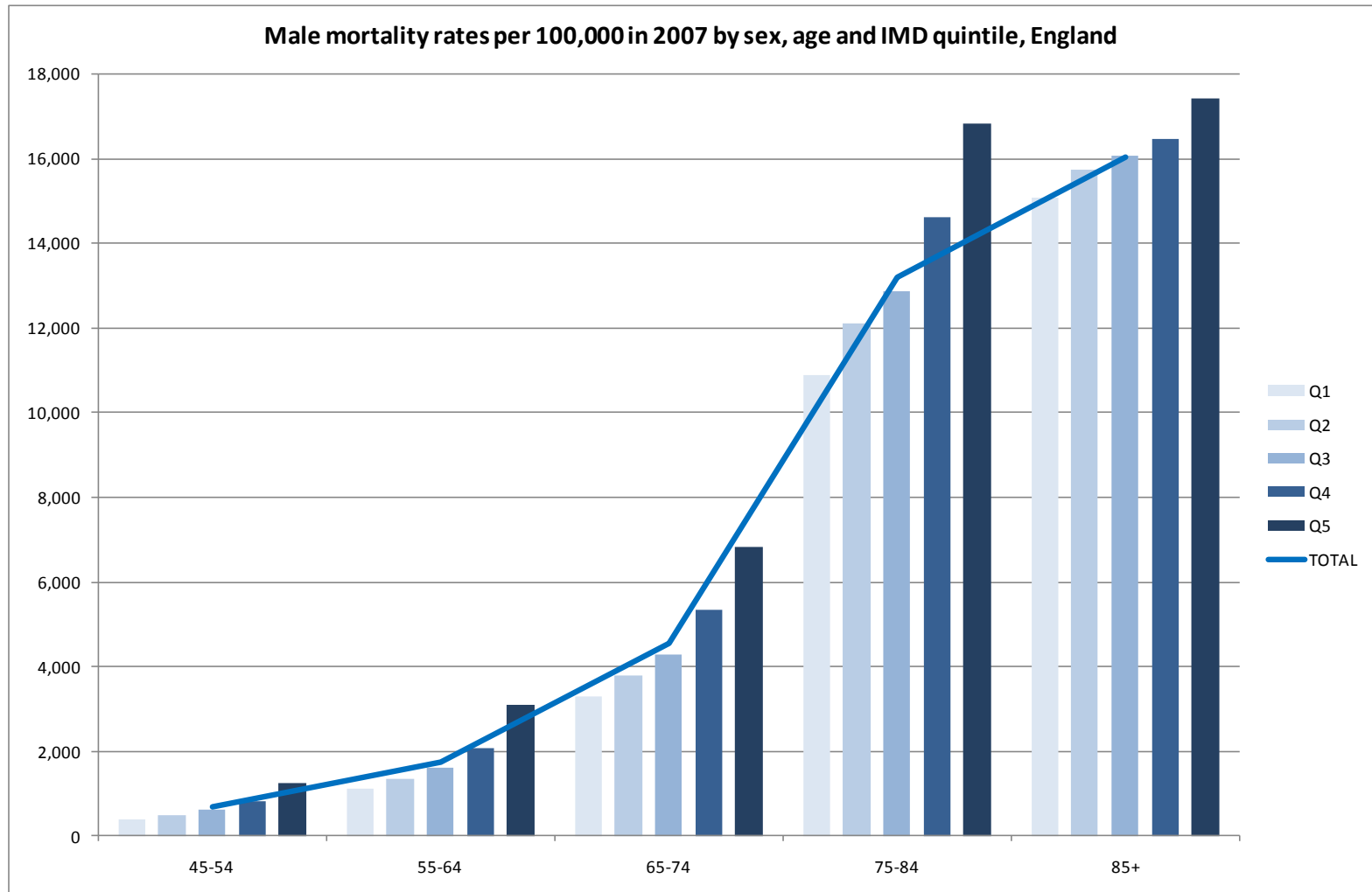
Agenda

- Mortality differentiation by socio-economic status
- Mortality differentiation by smoking status
- General Practice Research Database (GPRD)
- Disease-based mortality model
- Incidence rates by socio-economic and by smoker status
- Mortality rates by socio-economic and by smoker status
- Mortality improvements
- Life expectancies
- Implications
- Acknowledgements

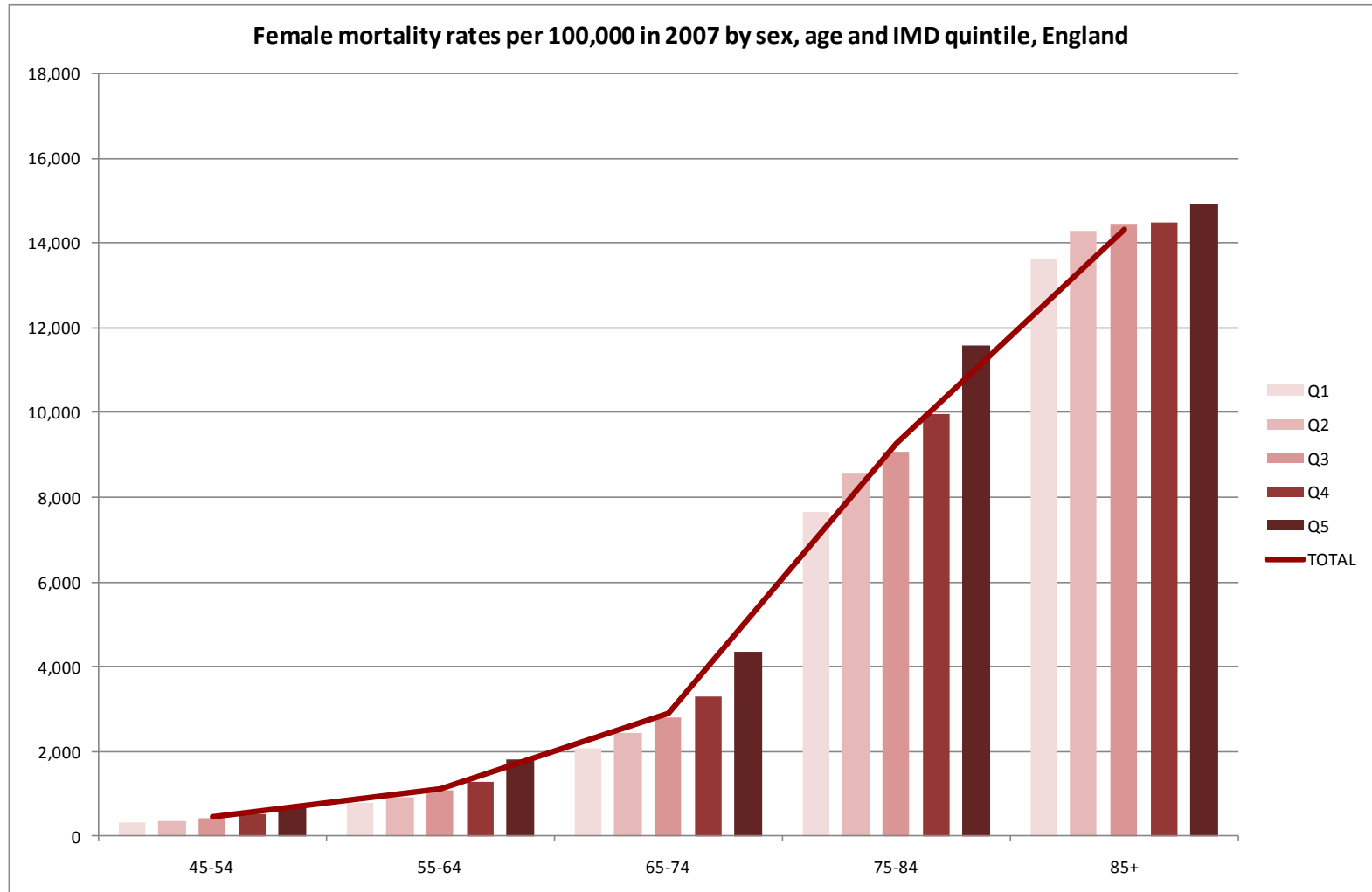
Index of Multiple Deprivation 2007

Domain	Weight
Income Deprivation	22.50%
Employment Deprivation	22.50%
Health Deprivation and Disability	13.50%
Education, Skills and Training Deprivation	13.50%
Barriers to Housing and Services	9.30%
Crime	9.30%
Living Environment Deprivation	9.30%

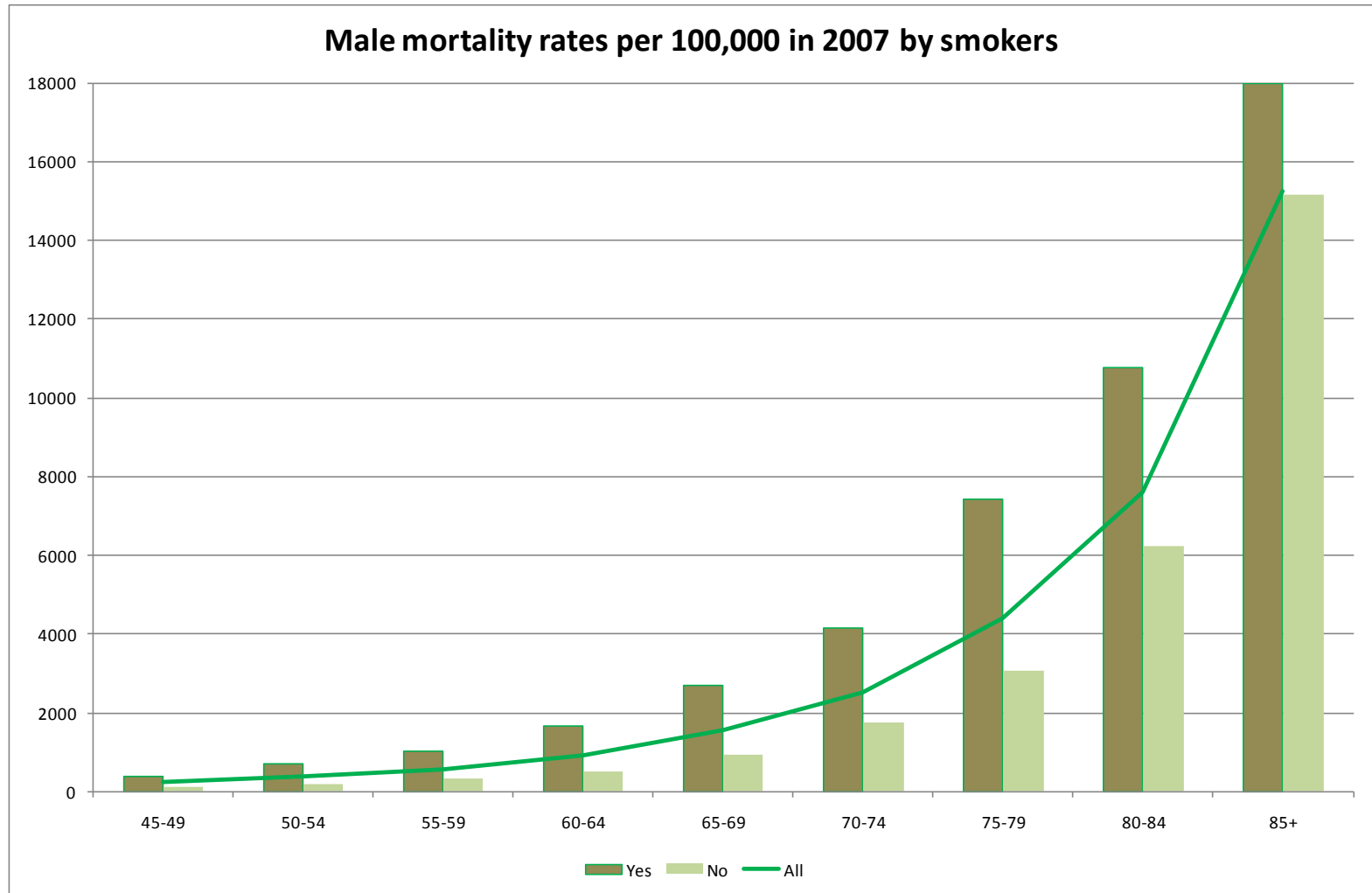
Mortality differentiation by socio-economic status – males (ONS data – England)



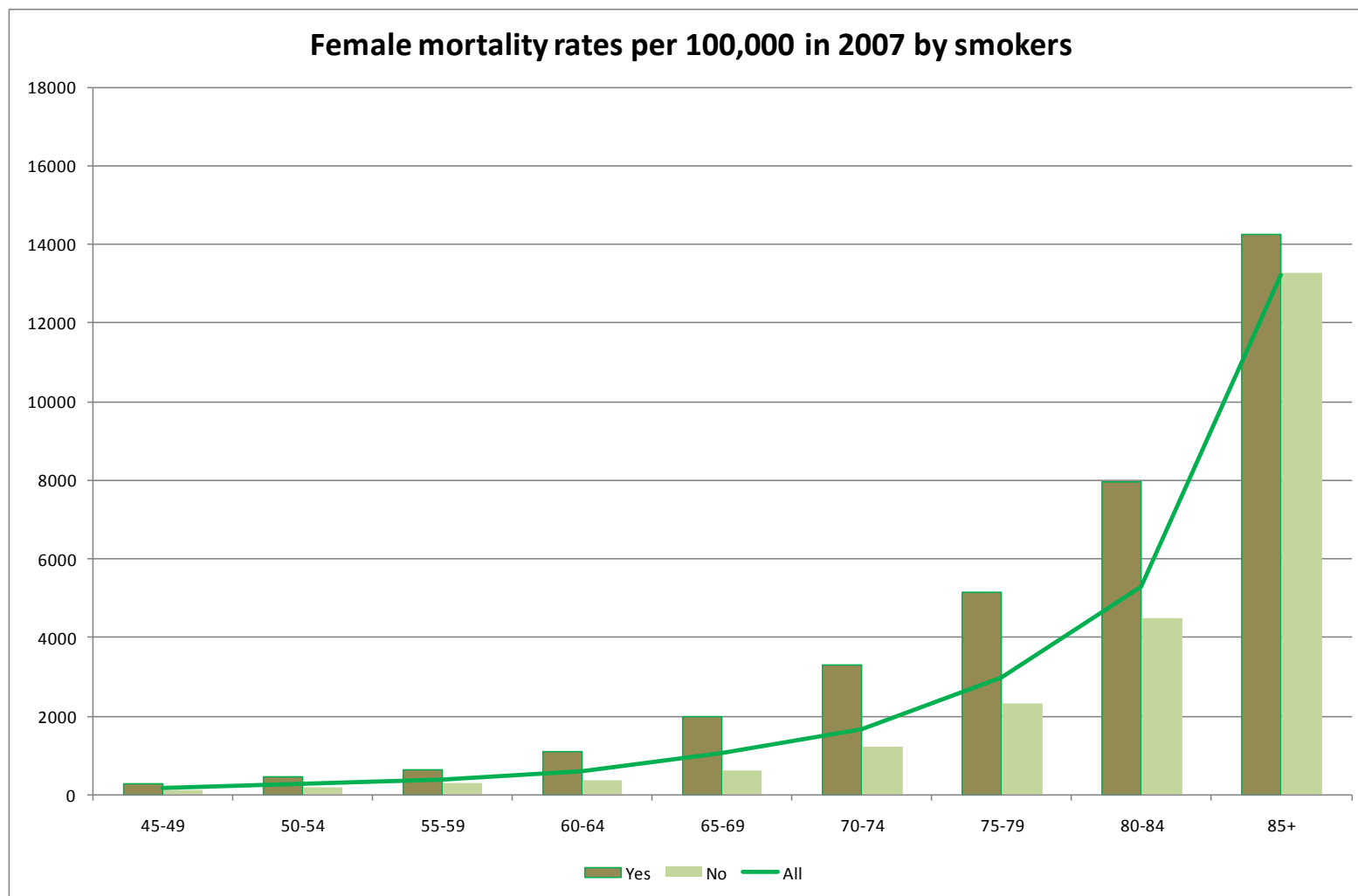
Mortality differentiation by socio-economic status – females (ONS data – England)



Mortality differentiation by smoker status – males (GPRD data – UK)



Mortality differentiation by smoker status – females (GPRD data – UK)



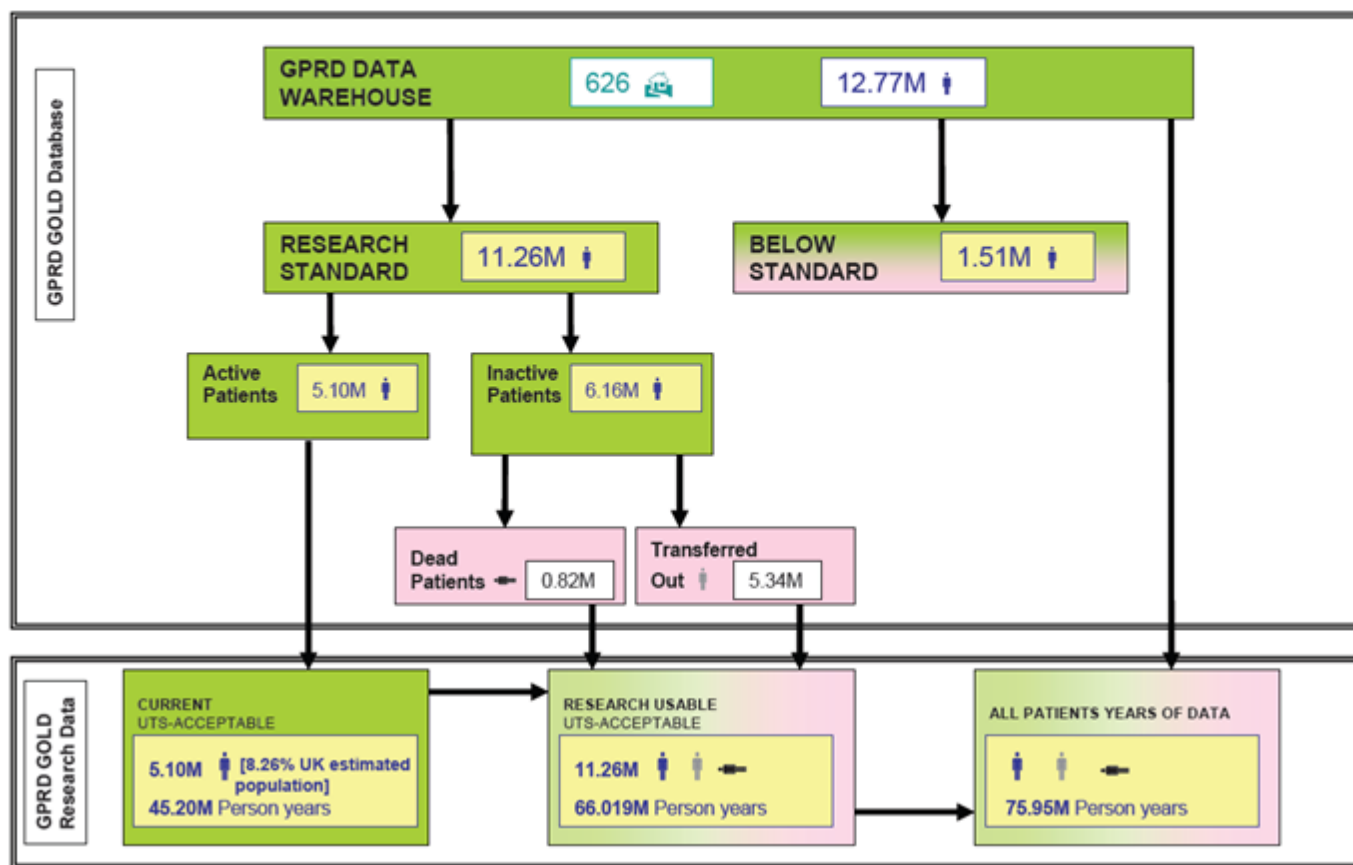
General Practice Research Database

- One the largest databases of computerised and anonymised patient records
- Established as The Value Added Medical Products Research (“VAMP”) Databank in 1987
- Changed name to GPRD in 1994
- Managed by the Medicines and Healthcare products Regulatory Agency (“MHRA”) since 2003
- Only quality checked data is available => Up-To-Standard

General Practice Research Database

Based upon GPRD GOLD:
Apr 11 Release

The GPRD Practice & Patient Populations



General Practice Research Database – available data

- Demographics, including age and sex
- Medical symptoms, signs and diagnoses, including comments
- Therapy (medicines, vaccines, devices)
- Treatment outcomes
- Events leading to withdrawal of a drug or treatment
- Referrals to hospitals or specialists
- Laboratory tests, pathology results
- Lifestyle factors (height, weight, BMI, smoking and alcohol consumption)
- Patient registration, practice and consultation details

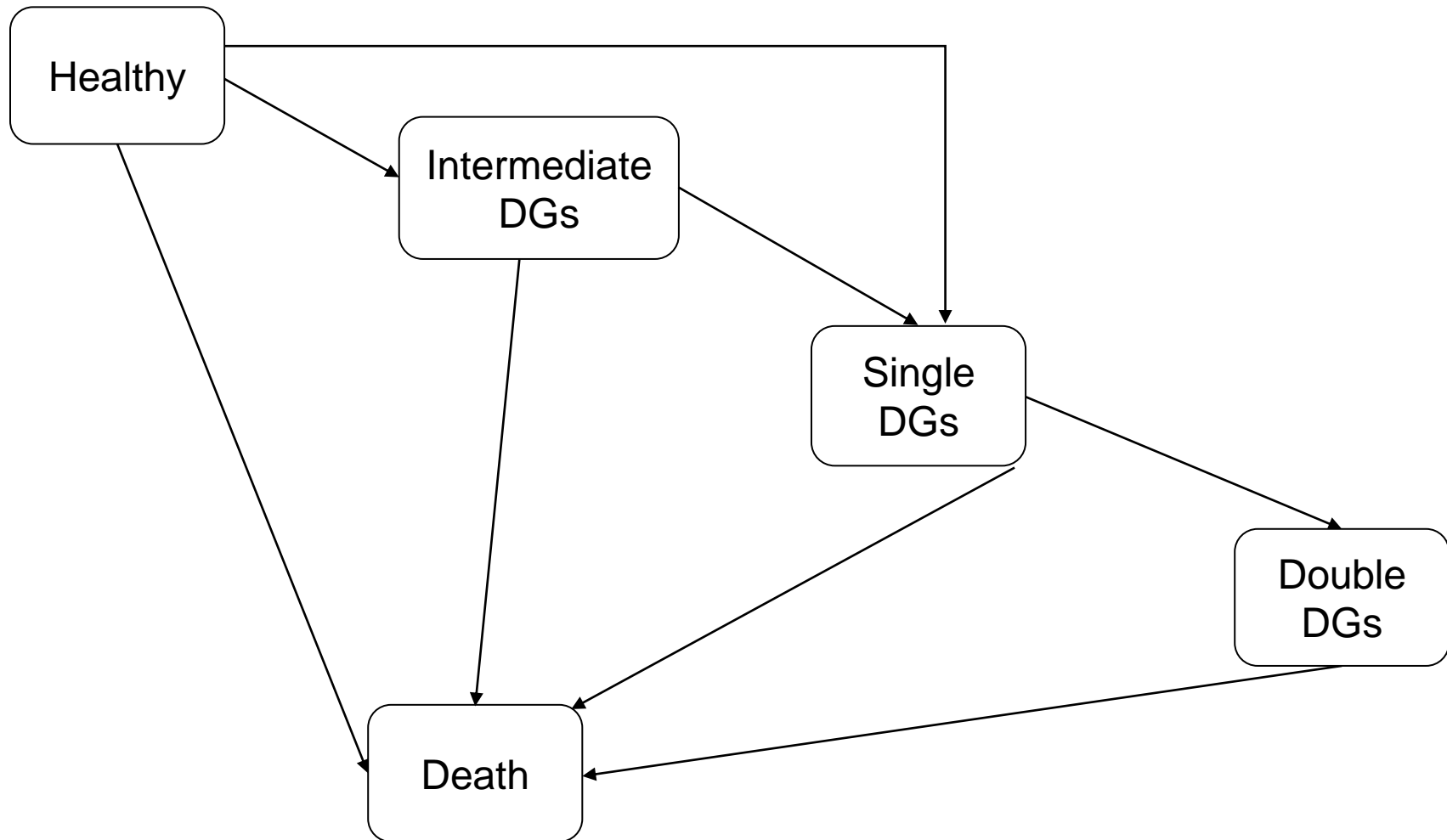
General Practice Research Database – stratification

- Access to database via an interrogation tool
- Stratification:
 - Age groups
 - Gender
 - Smoking status
 - Socio-economic class as measured by IMD2007 for England only
 - Query period

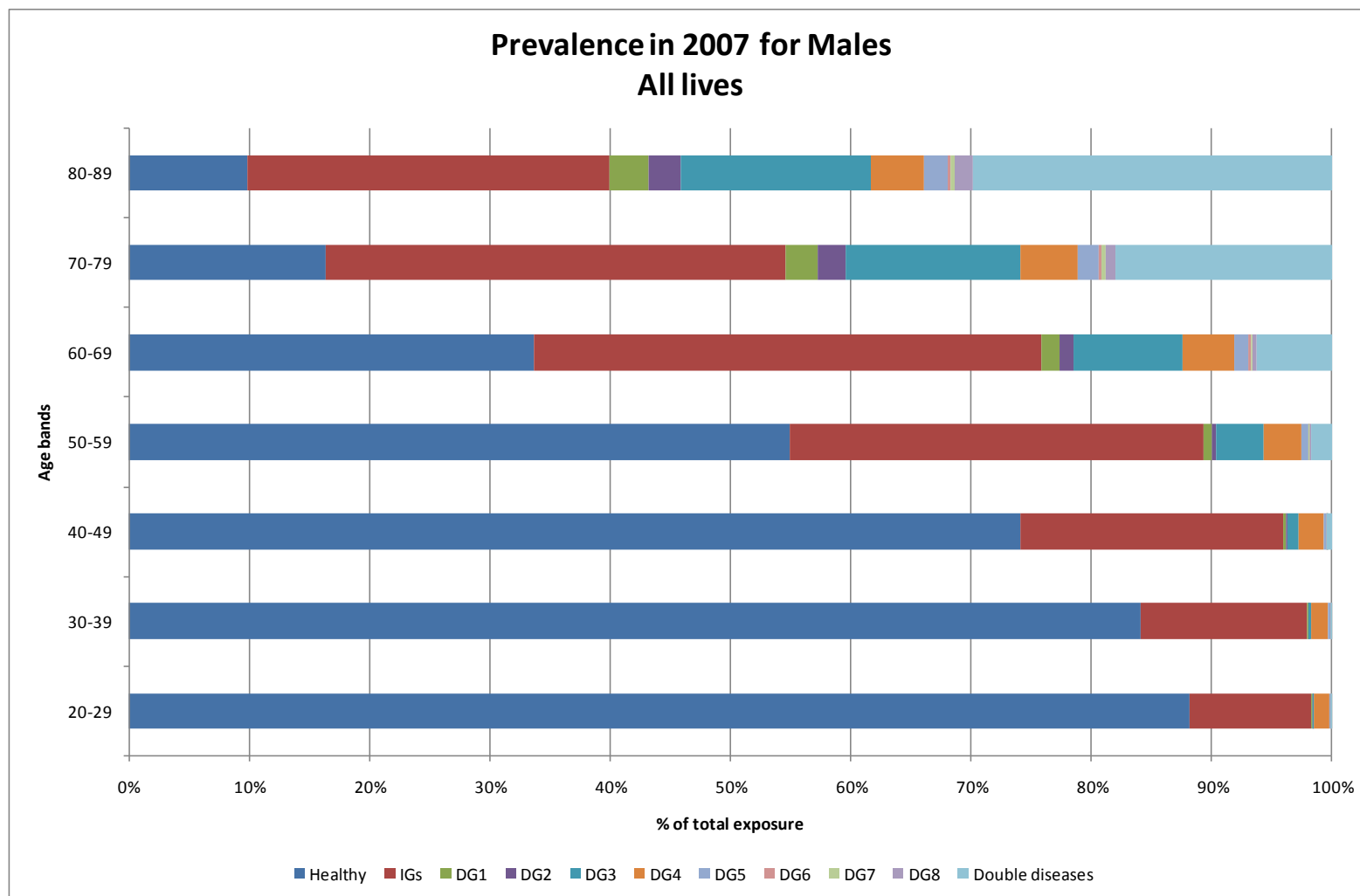
Disease-based mortality model (DBMM)

Disease groups	Diseases considered
Disease Group 1 (DG1)	stroke
Disease Group 2 (DG2)	cancers of breast, cervix, larynx, prostate and uterus plus malignant melanoma
Disease Group 3 (DG3)	aneurysms, ischaemic heart disease, heart failure
Disease Group 4 (DG4)	chronic obstructive pulmonary disease, pneumonia and tuberculosis
Disease Group 5 (DG5)	cancers of colon, ovary, rectum and urinary system, plus oral cancers, leukaemias and lymphomas
Disease Group 6 (DG6)	Crohn's disease, gastric and duodenal ulcers, clostridium difficile infection, ulcerative colitis, and kidney and liver disease
Disease Group 7 (DG7)	cancers of brain, lung, oesophagus, pancreas and stomach and multiple myeloma
Disease Group 8 (DG8)	Alzheimer's disease, dementia, Parkinson's disease
Intermediate Disease Group 1 (IG1)	atherosclerosis, cardiac arrhythmias, cardiomyopathy, diabetes, hypercholesterolaemia, hypertension, transient ischaemic attacks, valvular disease
Intermediate Disease Group 2 (IG2)	benign neoplasms, malignant skin cancers other than malignant melanoma
Intermediate Disease Group 3 (IG3)	epilepsy, motor neurone disease, MRSA, multiple sclerosis, osteoporosis, osteoarthritis, rheumatoid arthritis

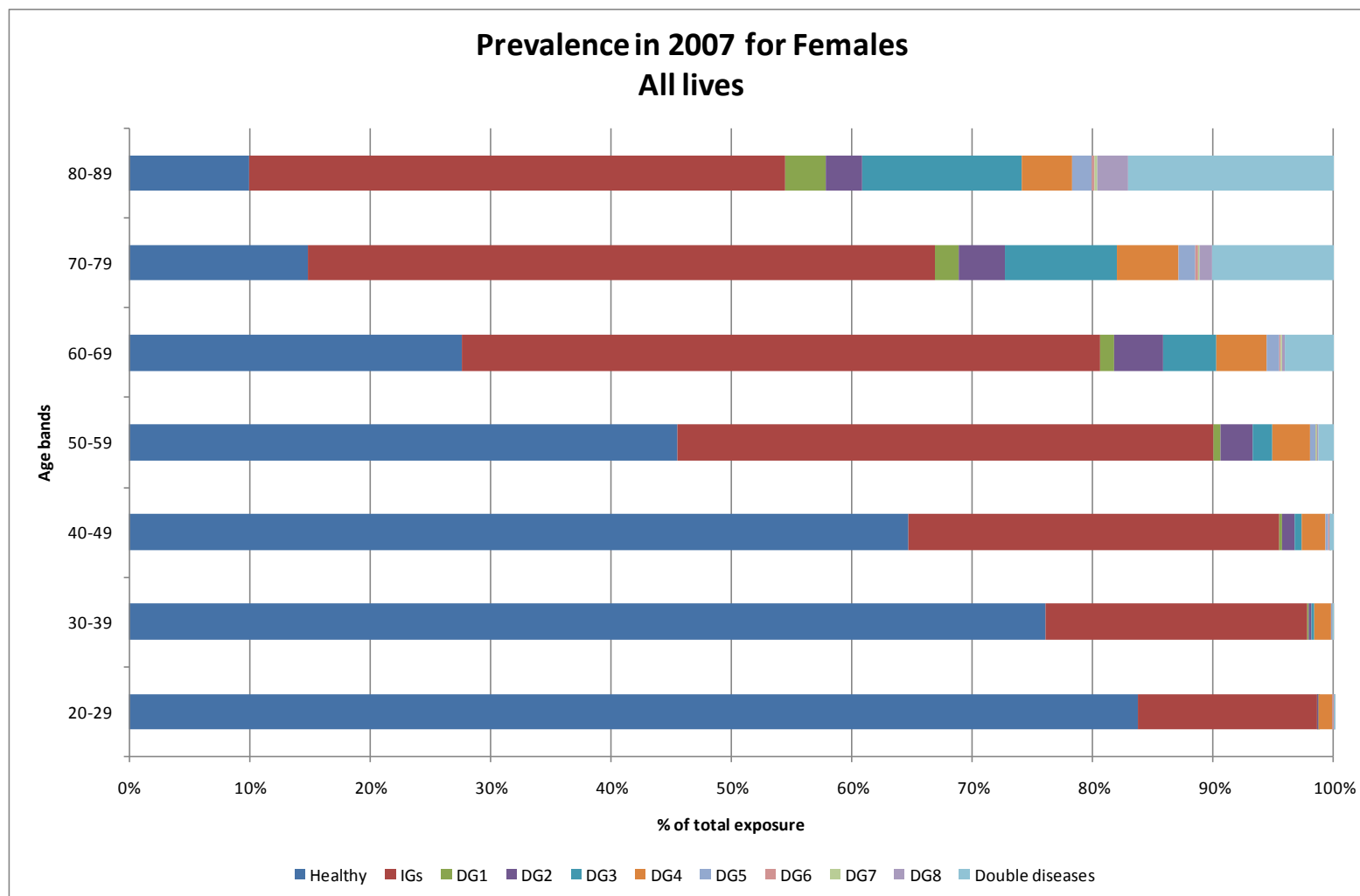
DBMM – simplified figure



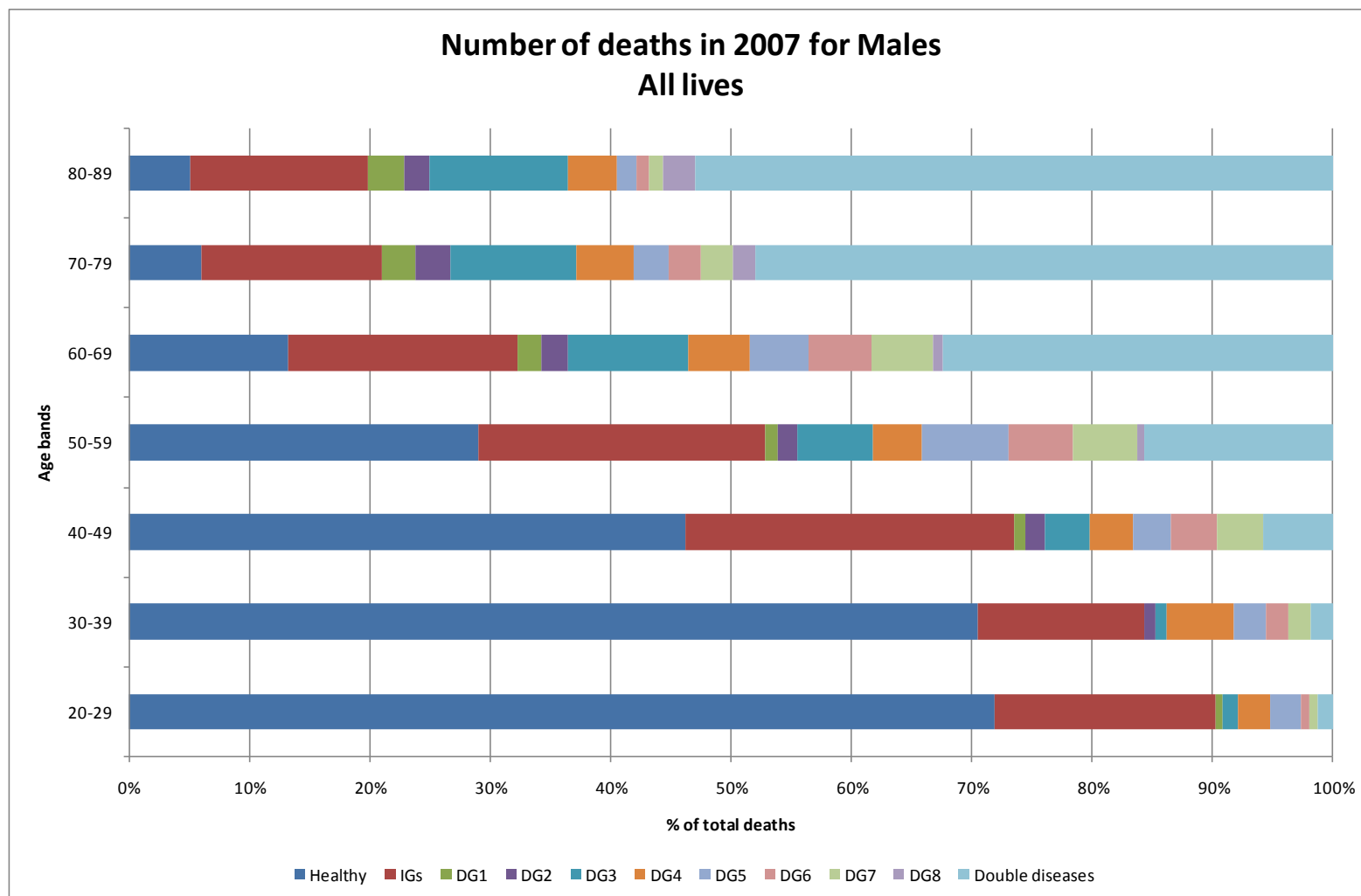
DBMM – male prevalence (GPRD data – UK)



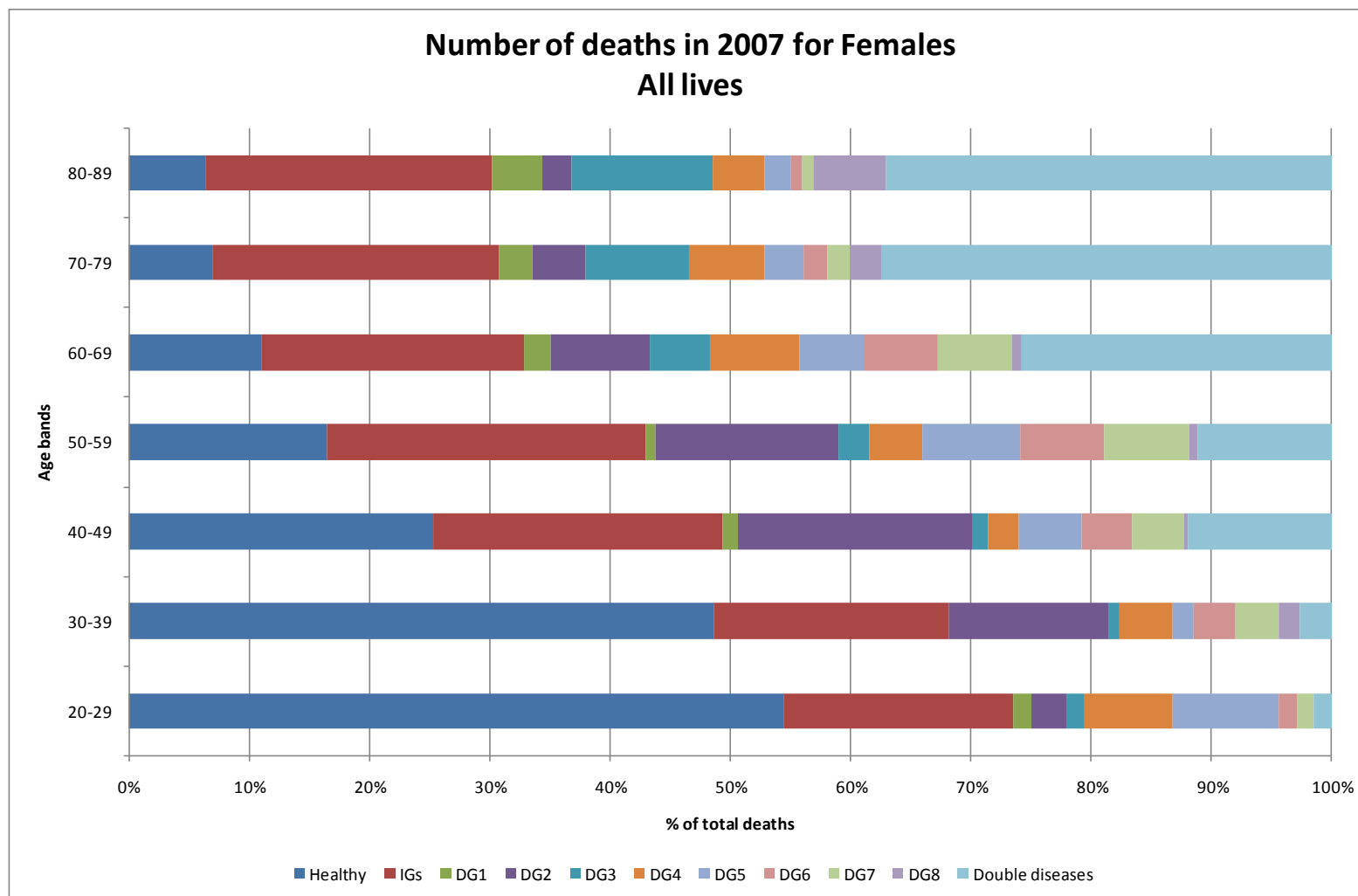
DBMM – female prevalence (GPRD data – UK)



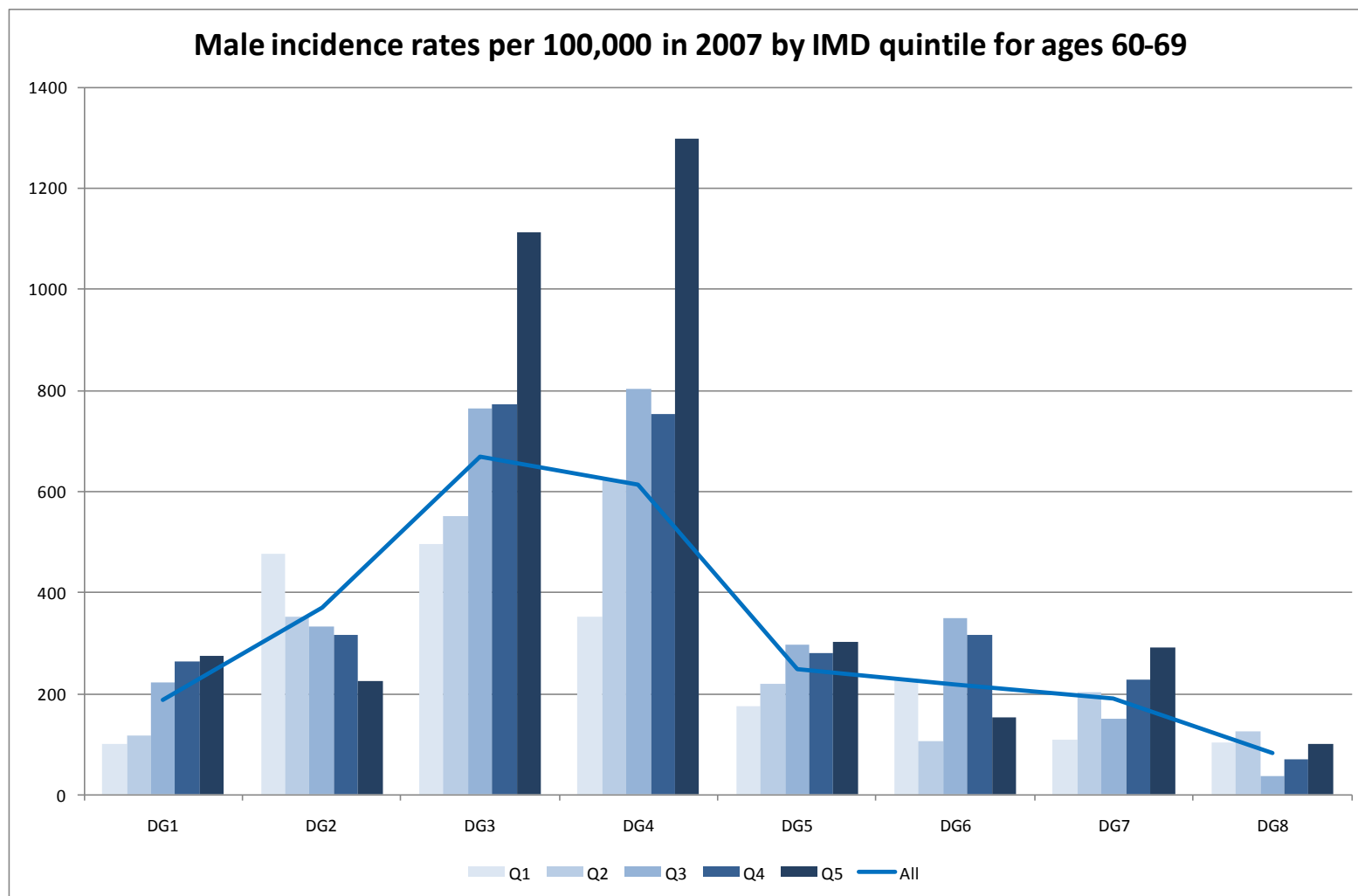
DBMM – male deaths (GPRD data – UK)



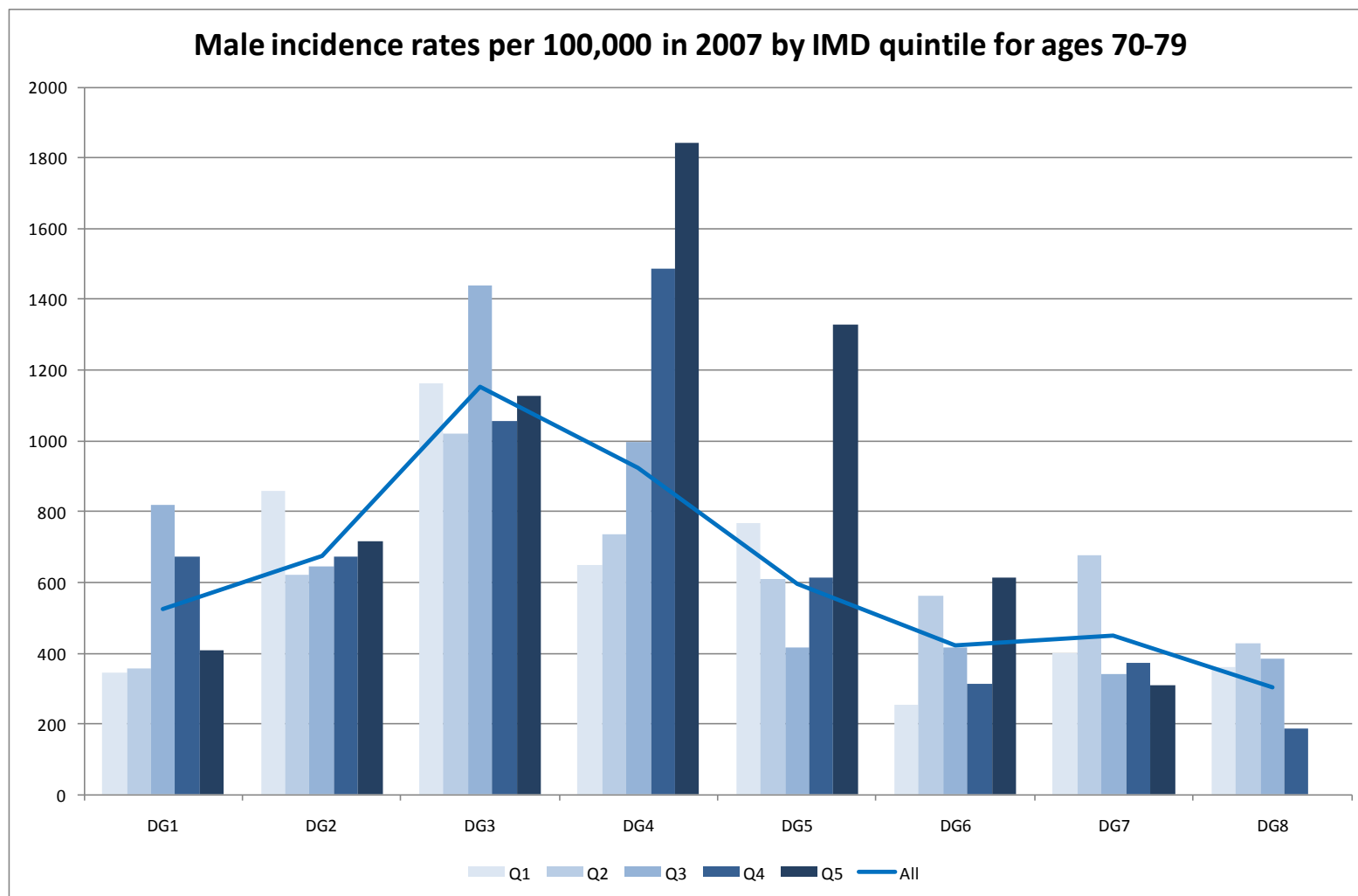
DBMM – female deaths (GPRD data – UK)



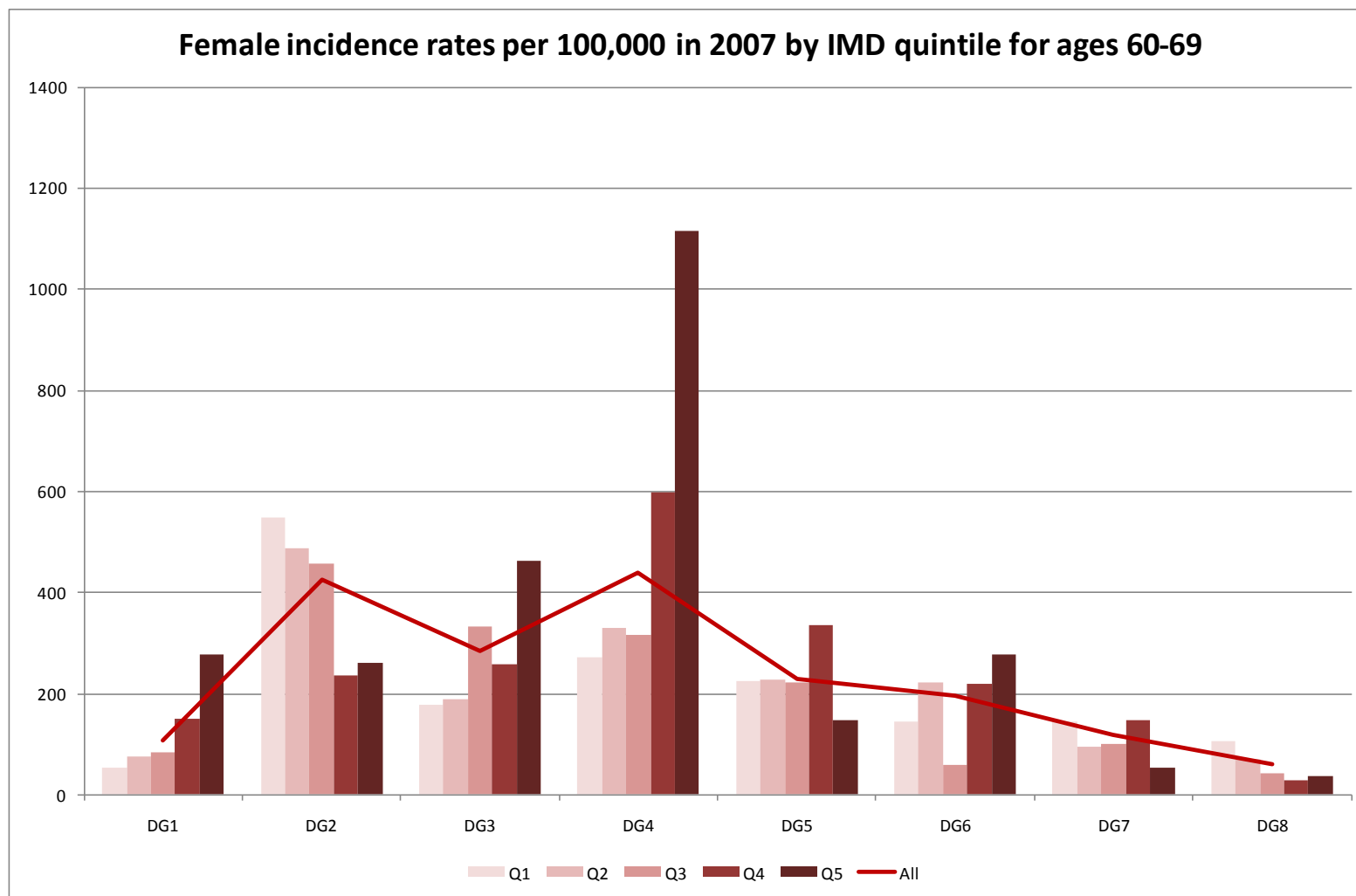
Male incidence rates for ages 60-69 by IMD2007 (GPRD data – England)



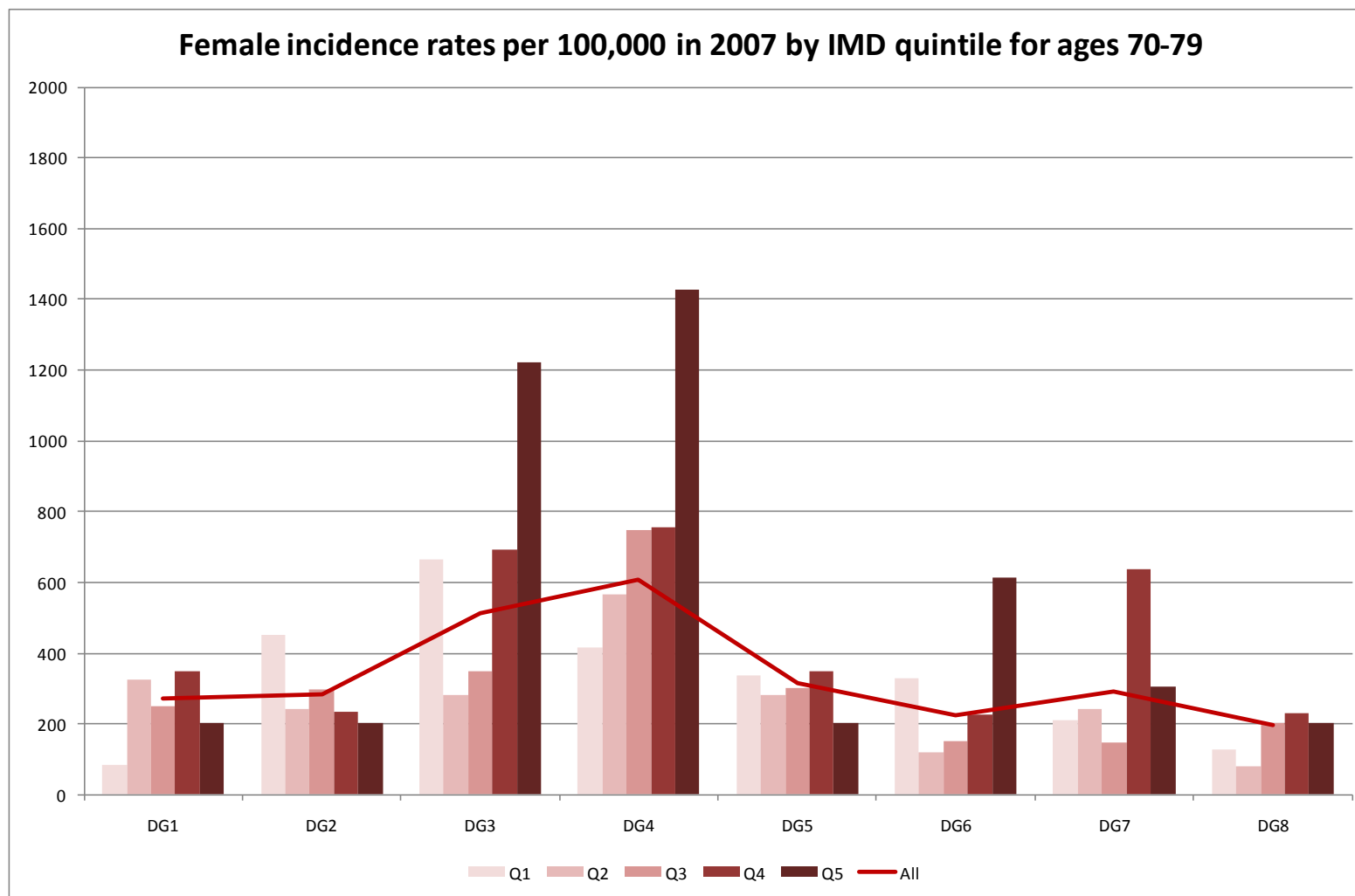
Male incidence rates for ages 70-79 by IMD2007 (GPRD data – England)



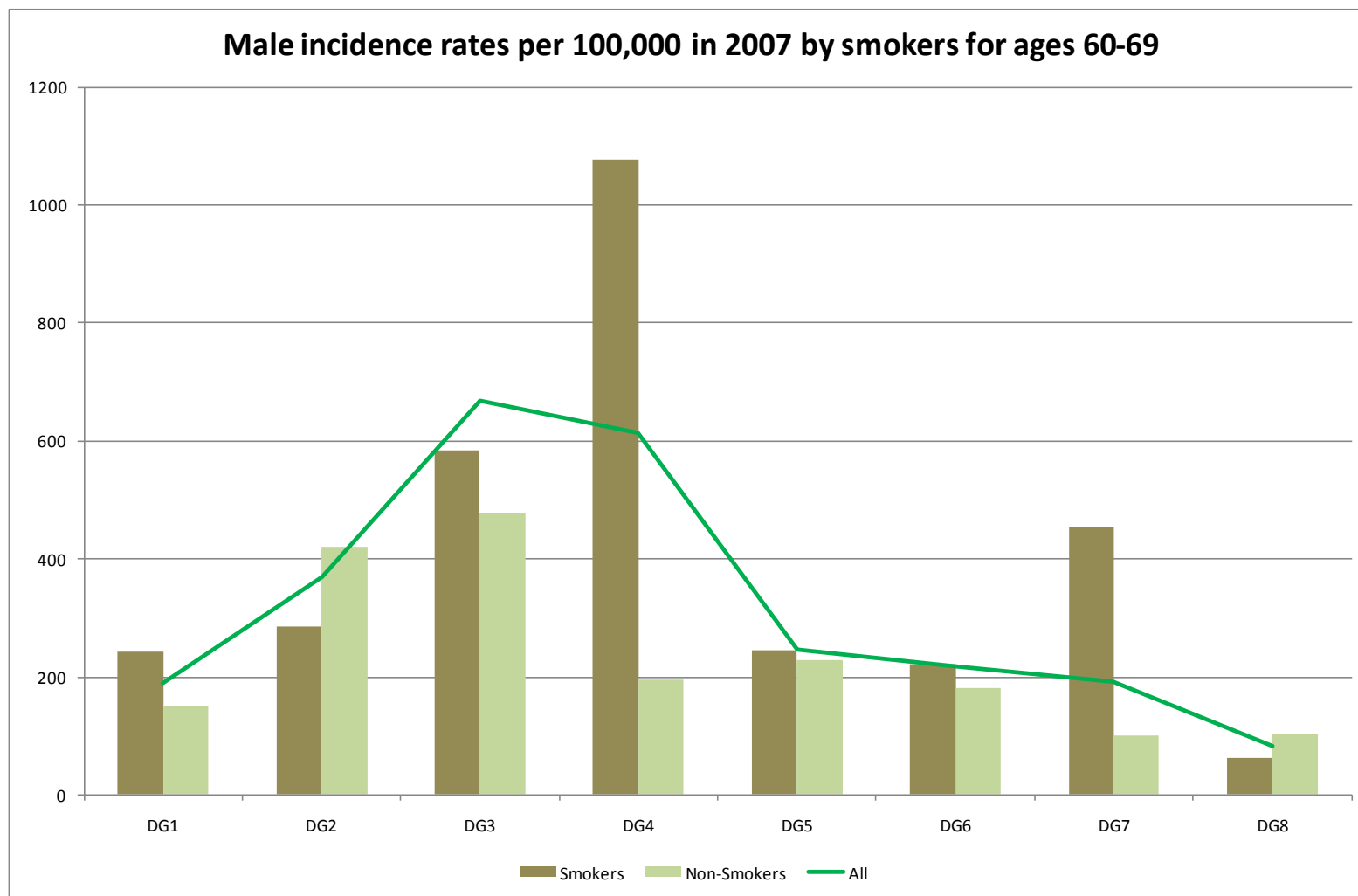
Female incidence rates for ages 60-69 by IMD2007 (GPRD data – England)



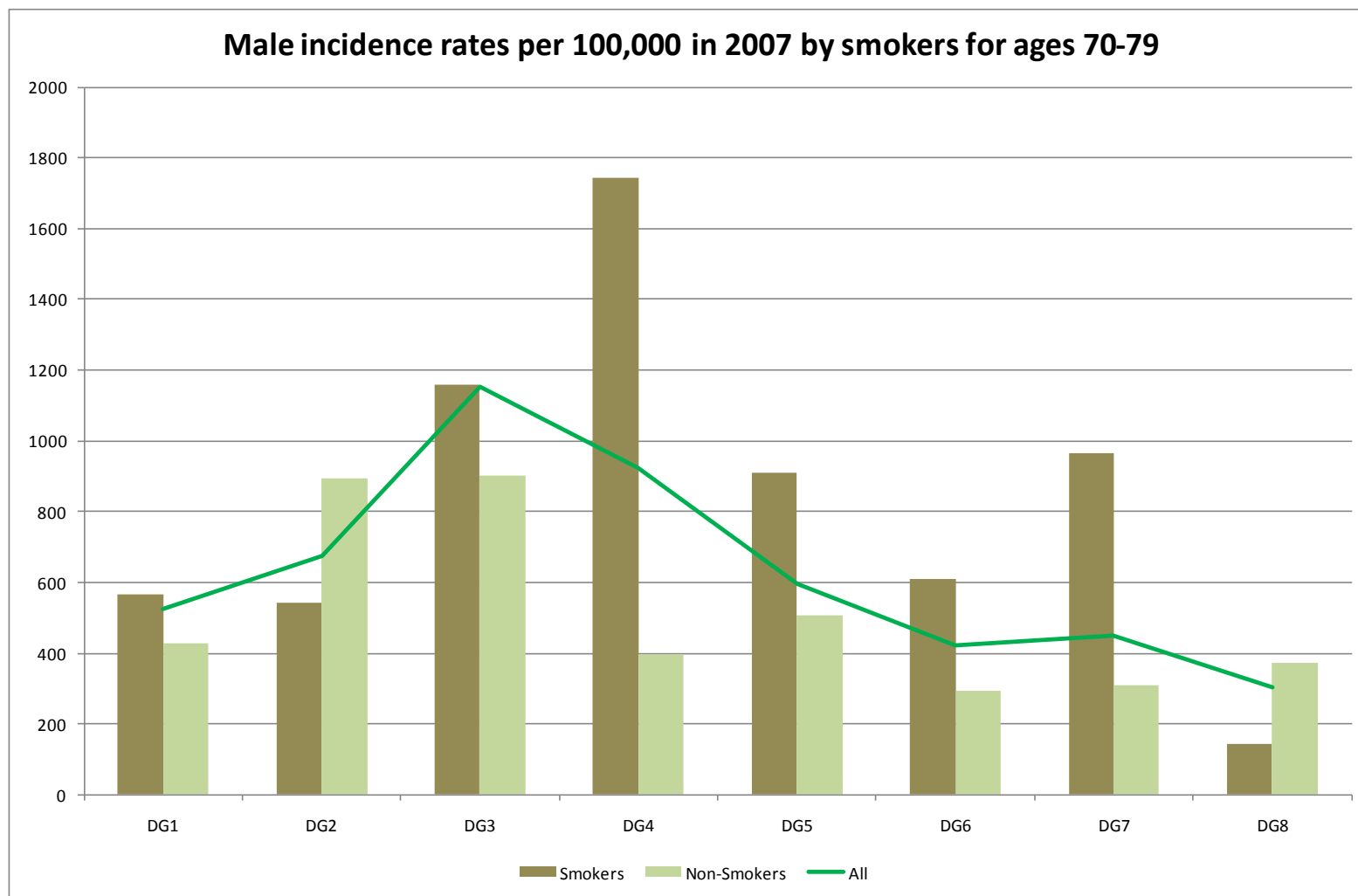
Female incidence rates for ages 70-79 by IMD2007 (GPRD data – England)



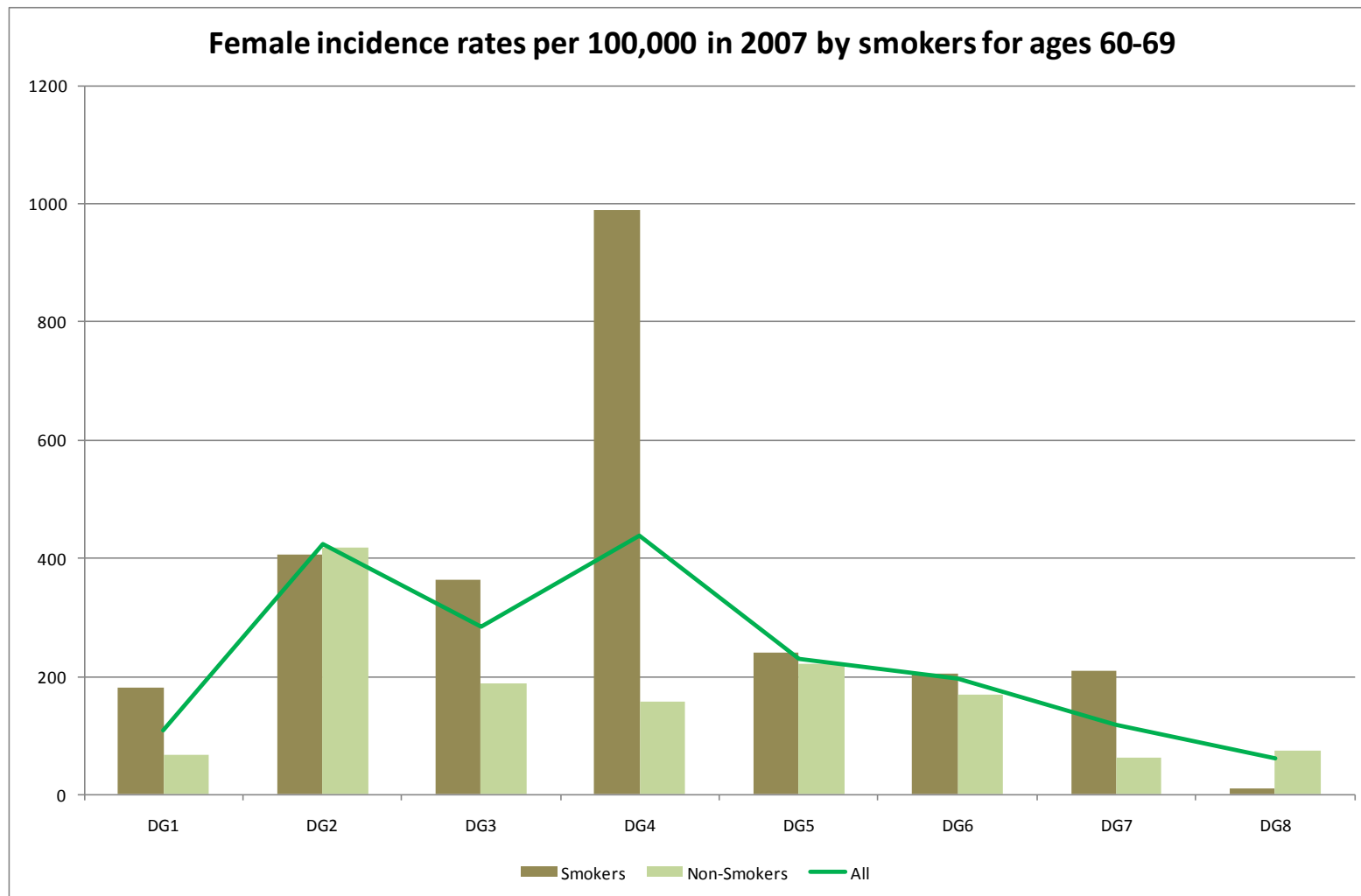
Male incidence rates for ages 60-69 by smoking status (GPRD data – UK)



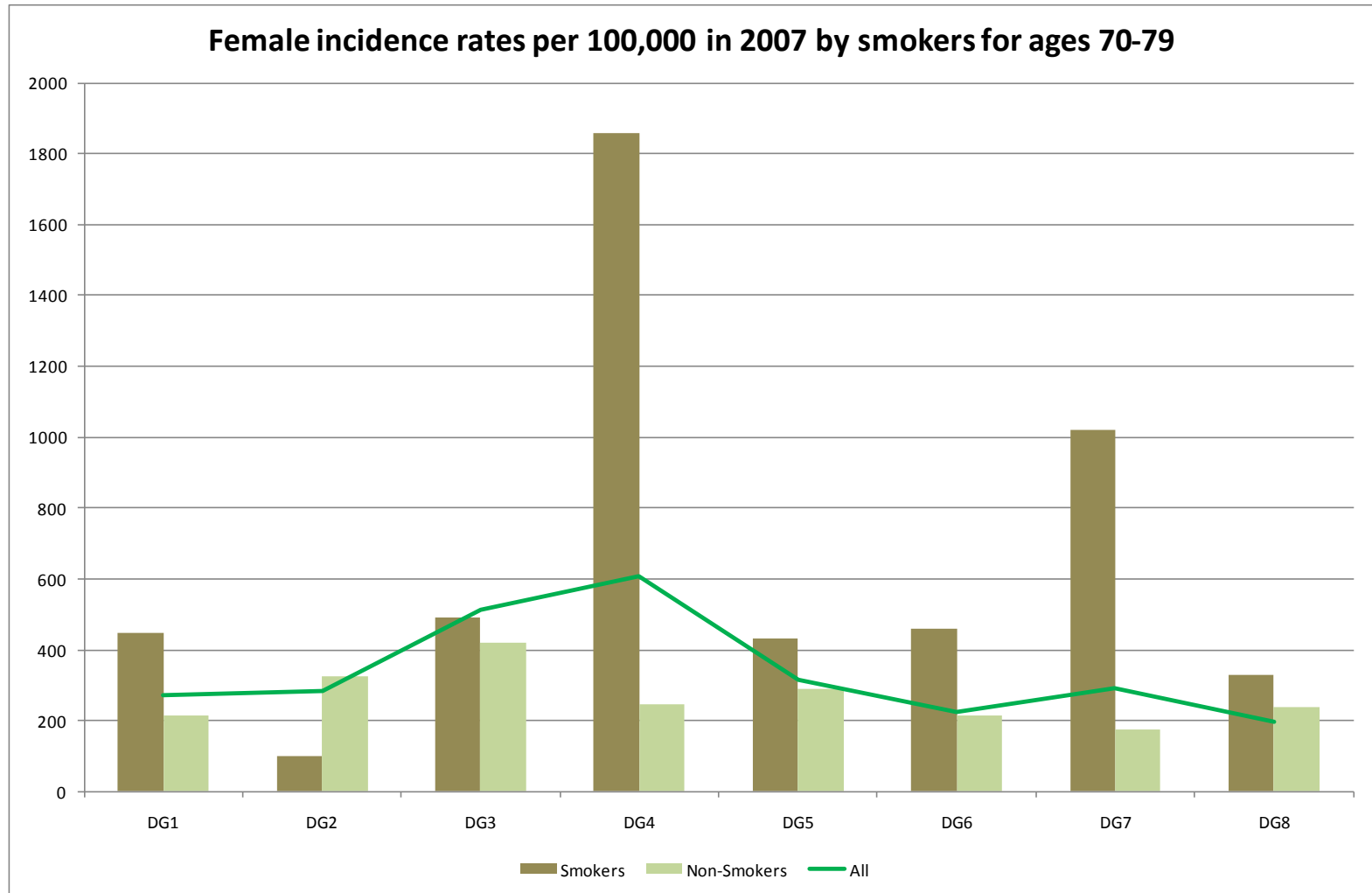
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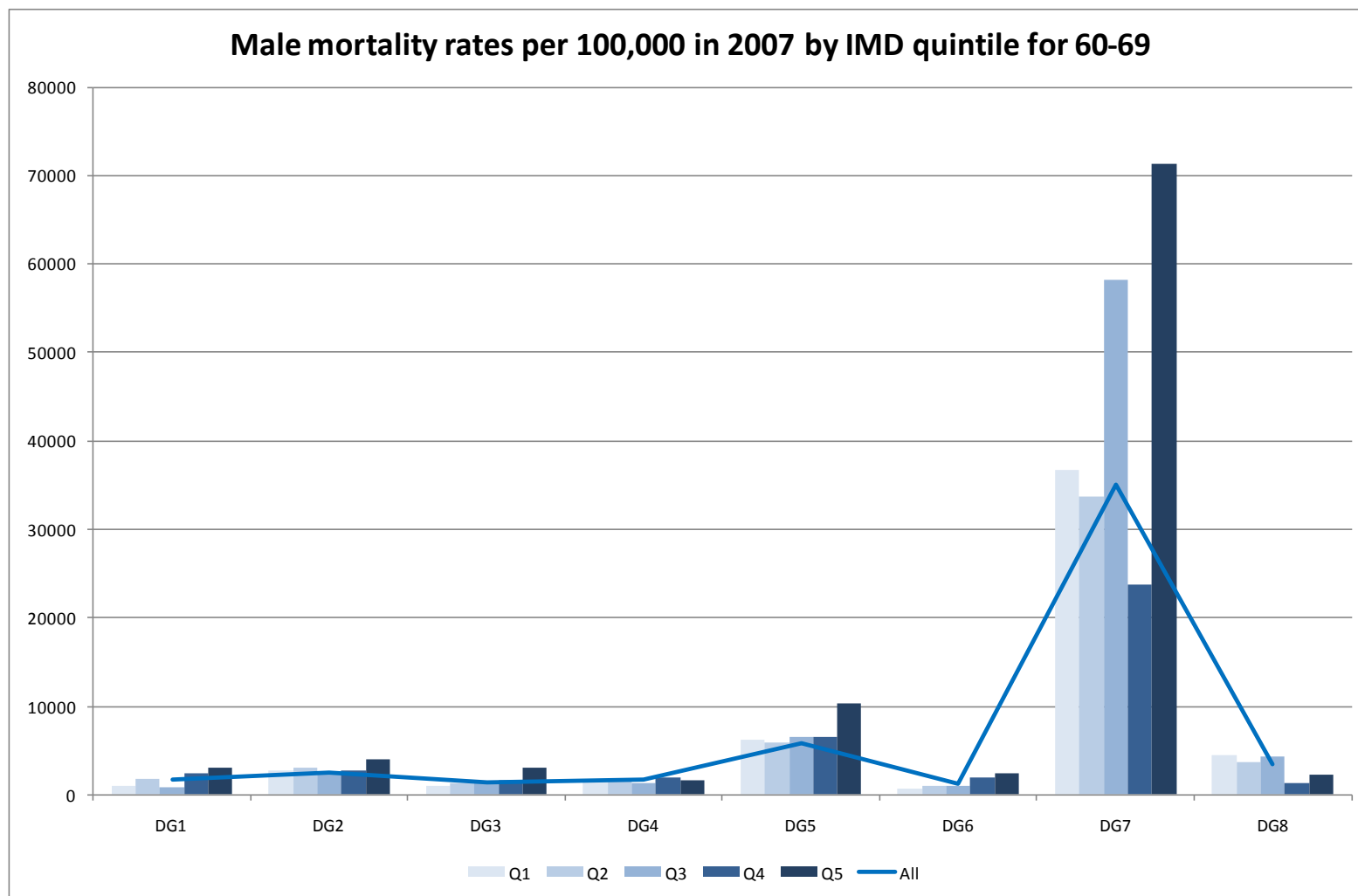
Female incidence rates for ages 60-69 by smoking status (GPRD data – UK)



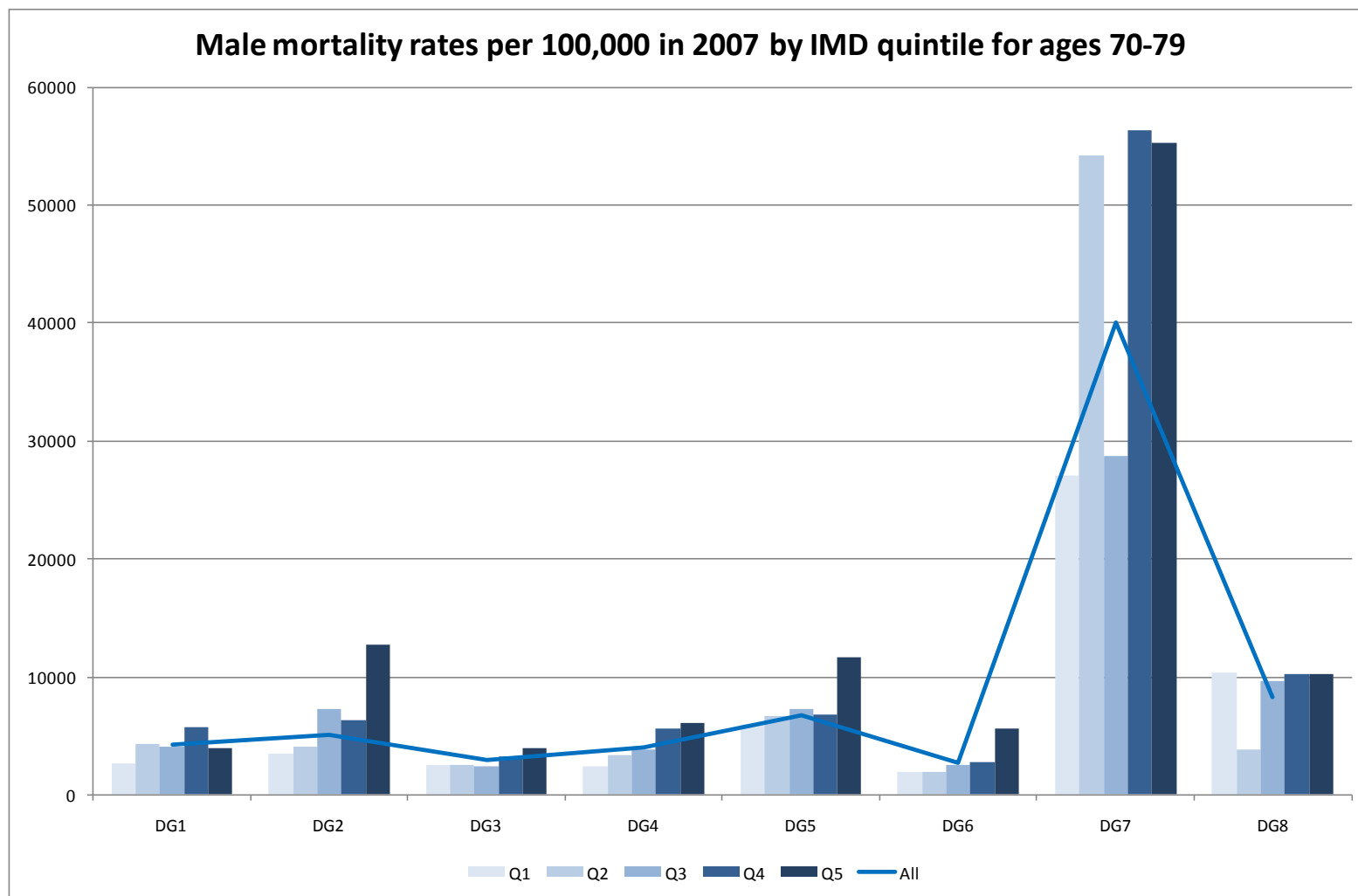
Female incidence rates for ages 70-79 by smoking status (GPRD data – UK)



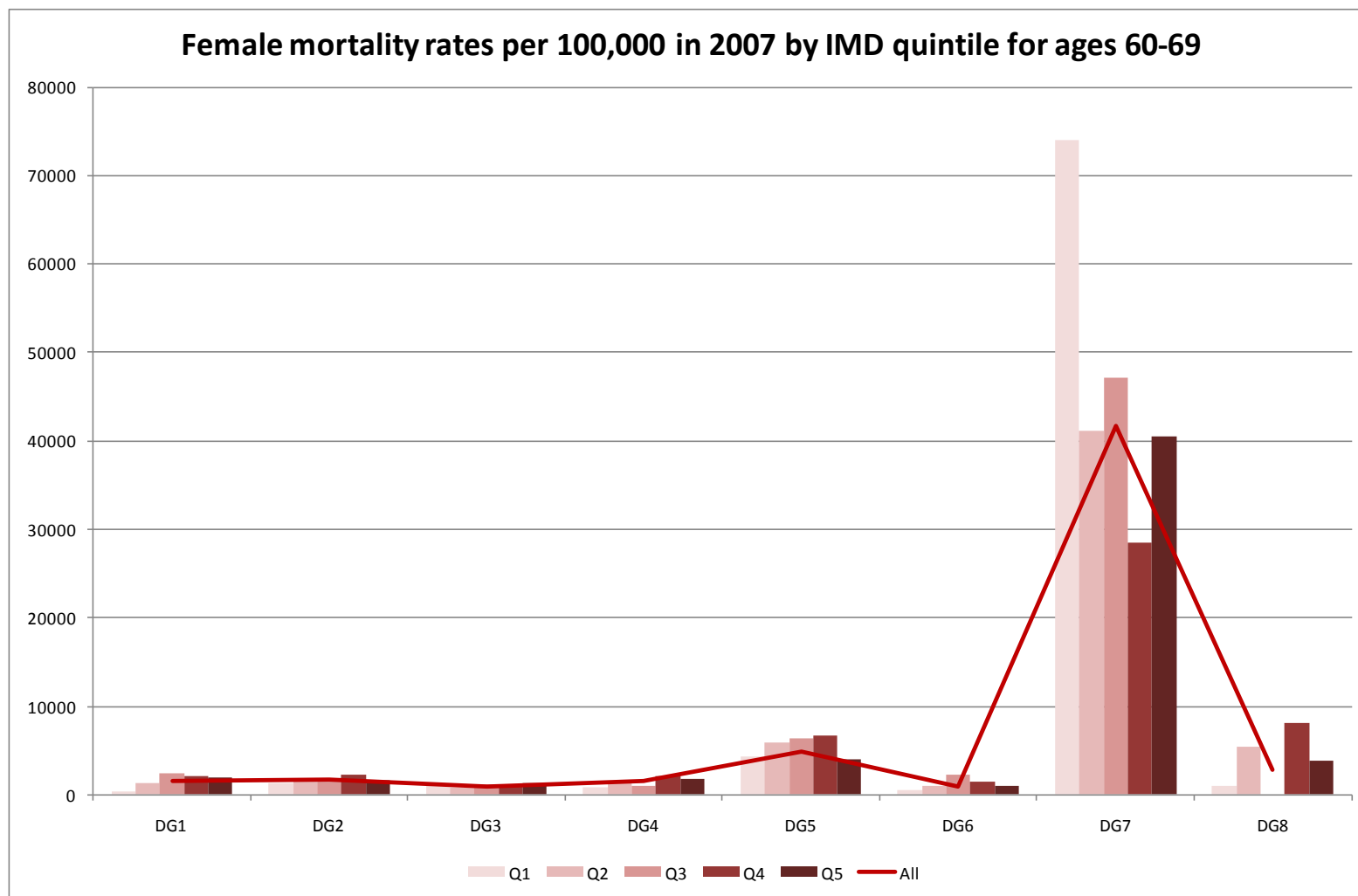
Male mortality rates for ages 60-69 by IMD2007 (GPRD data – England)



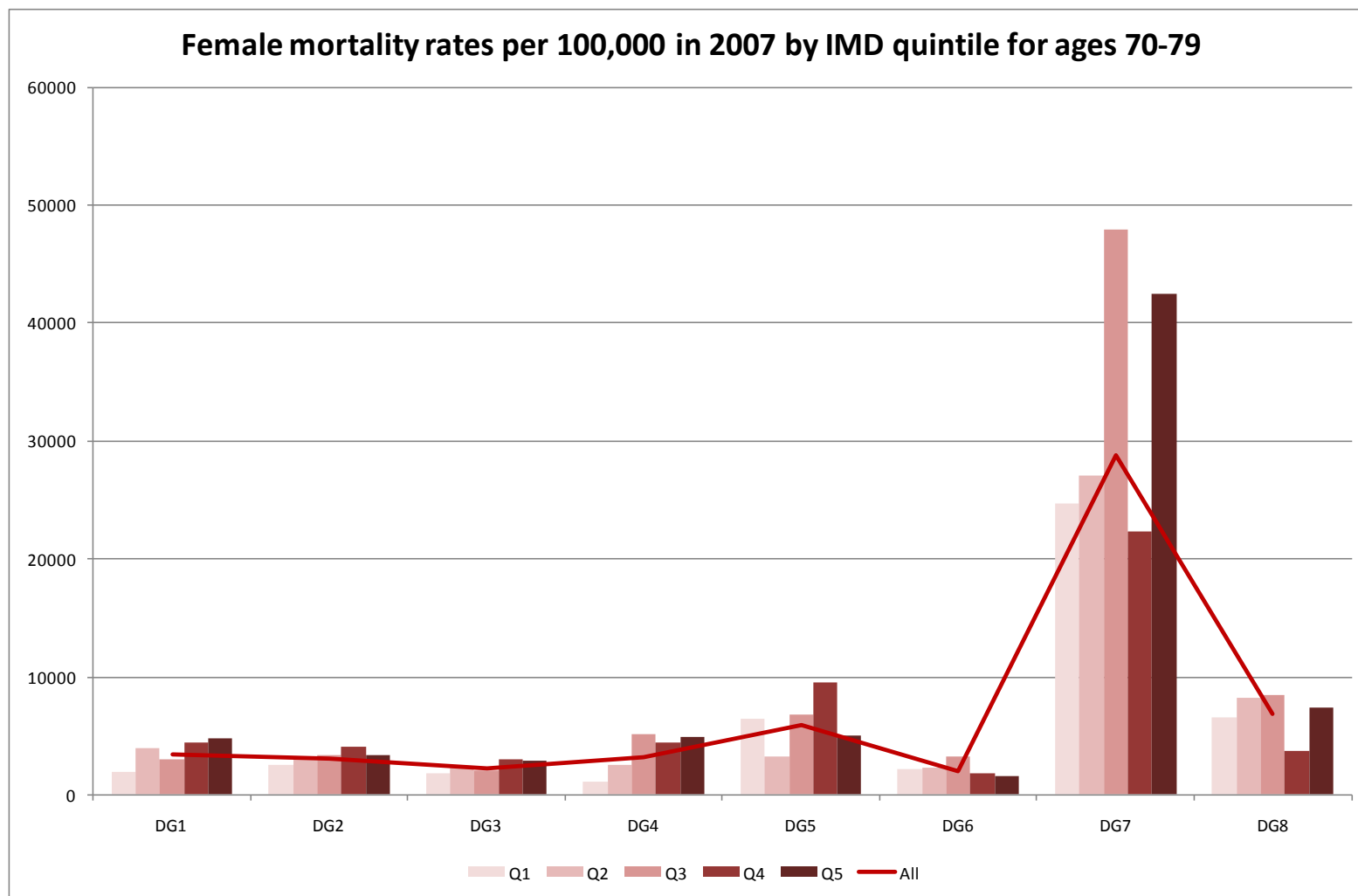
Male mortality rates for ages 70-79 by IMD2007 (GPRD data – England)



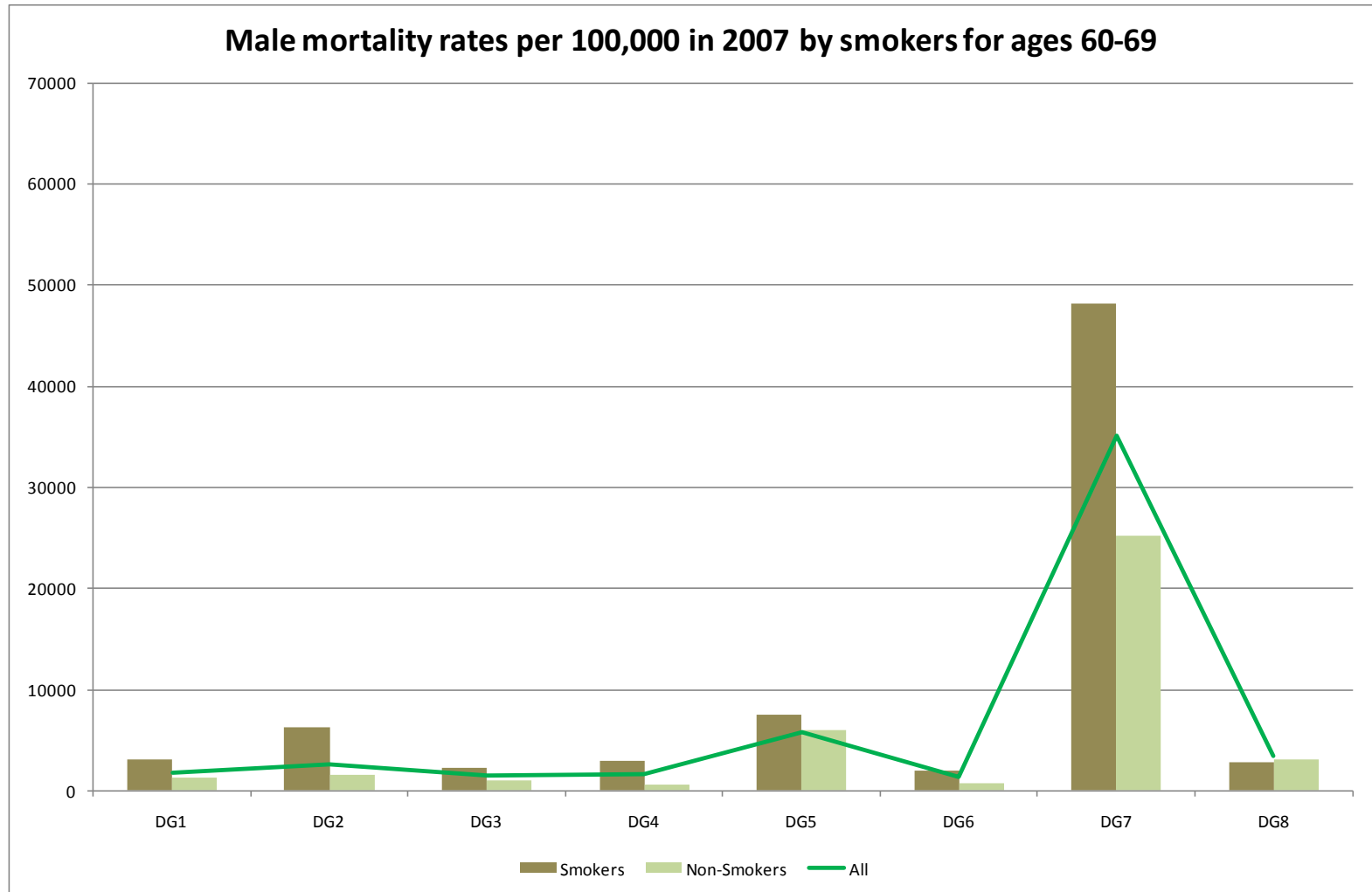
Female mortality rates for ages 60-69 by IMD2007 (GPRD data – England)



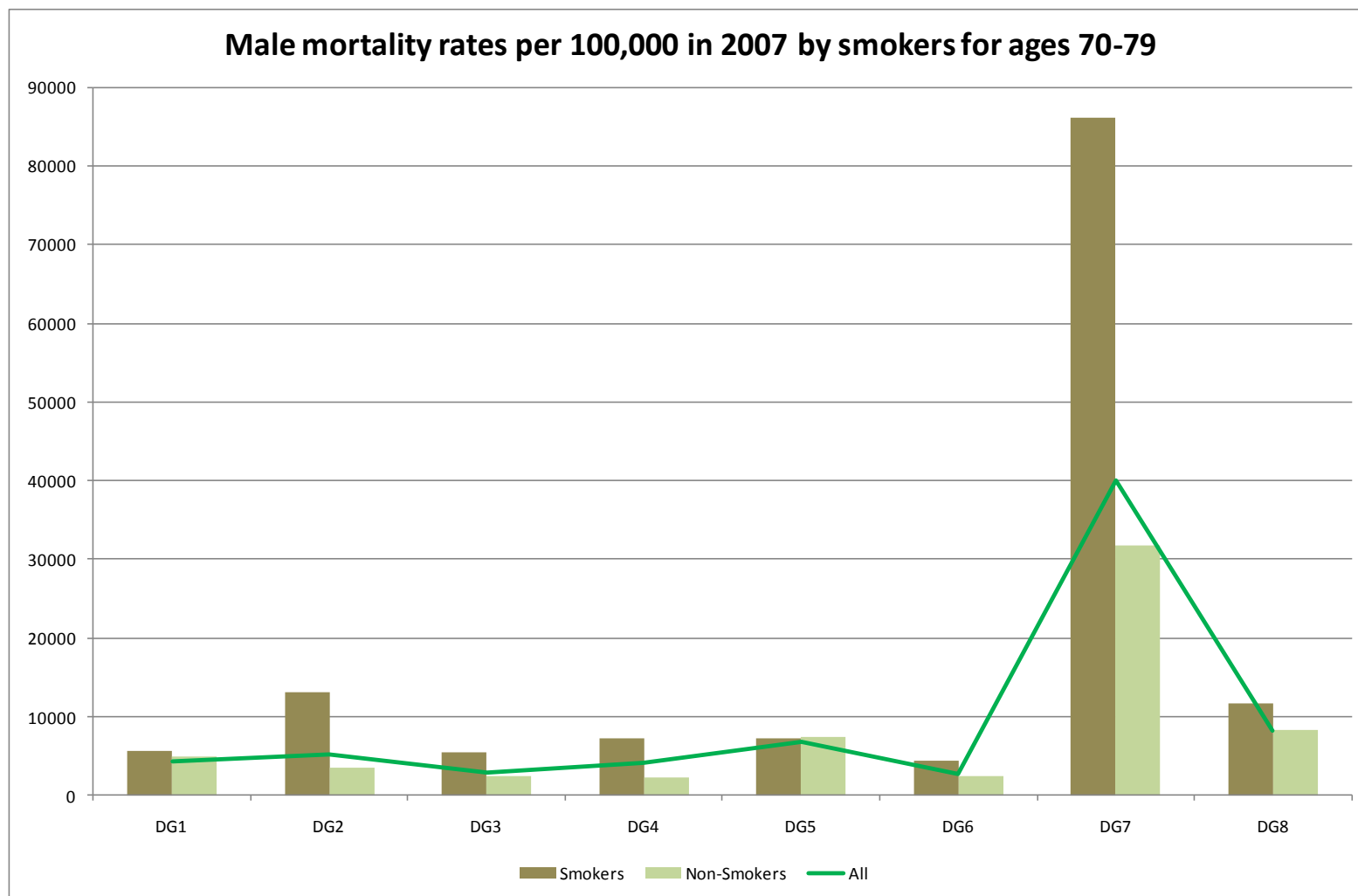
Female mortality rates for ages 70-79 by IMD2007 (GPRD data – England)



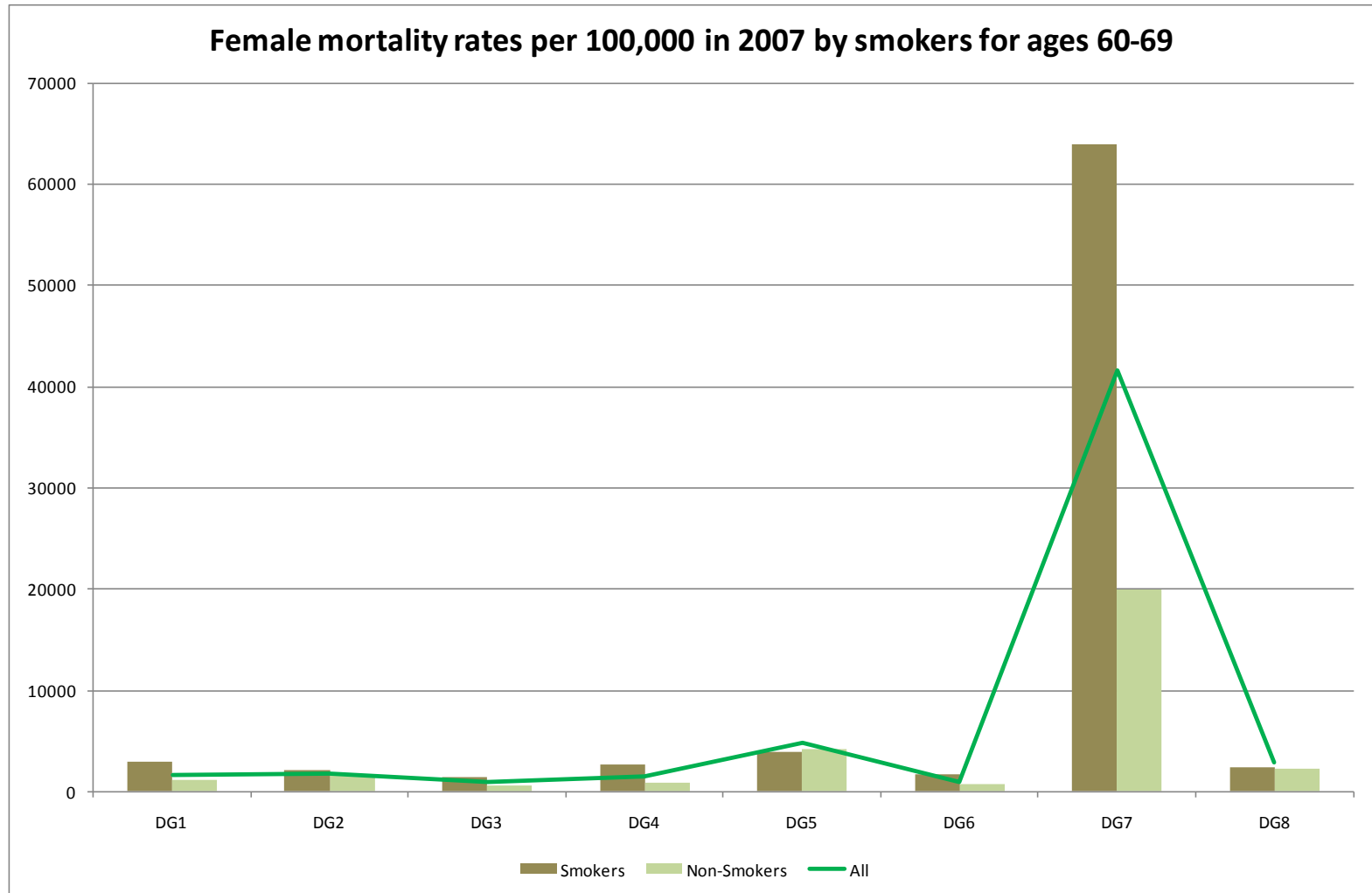
Male mortality rates for ages 60-69 by smoking status (GPRD data – UK)



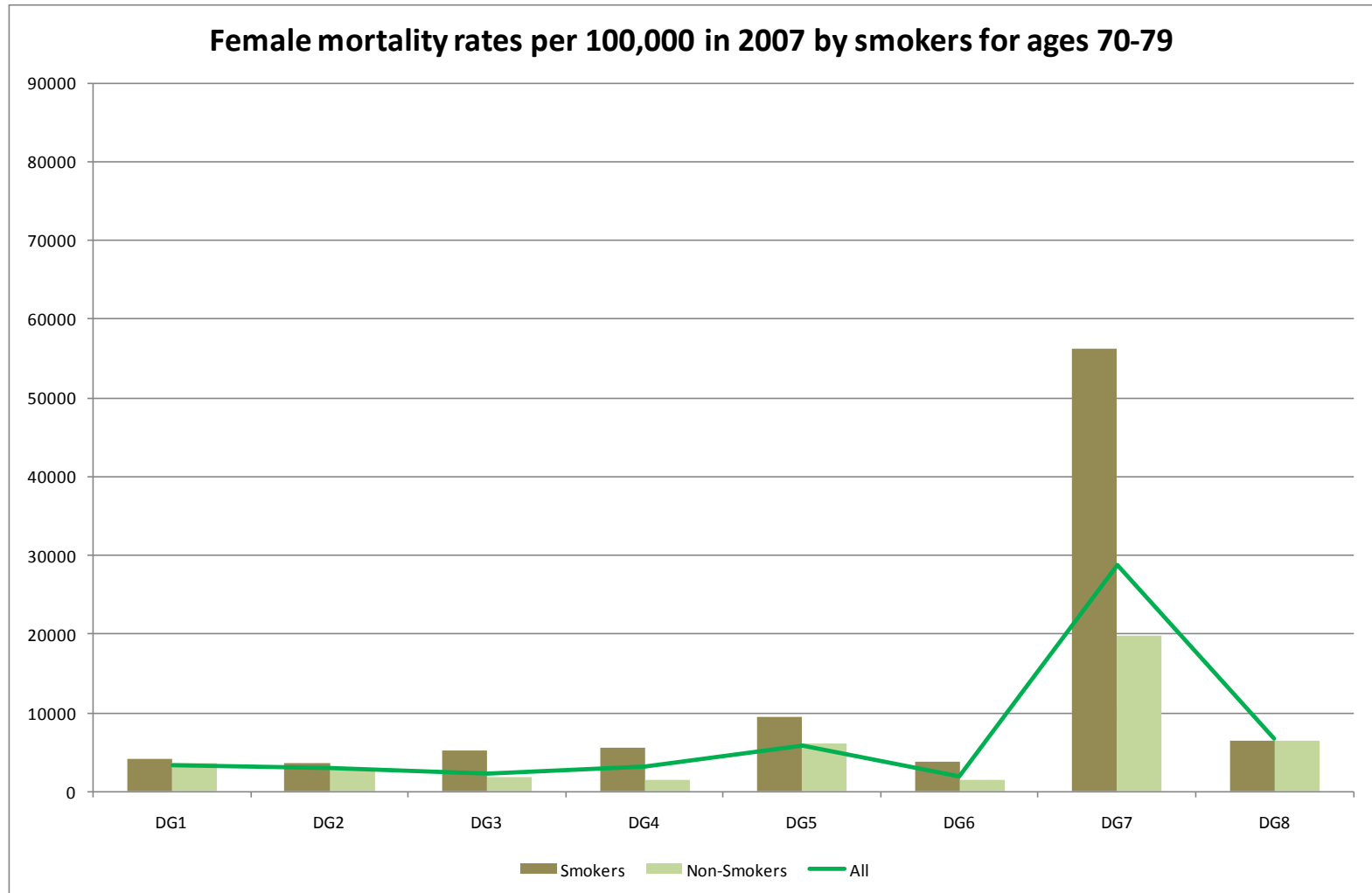
Male mortality rates for ages 70-79 by smoking status (GPRD data – UK)



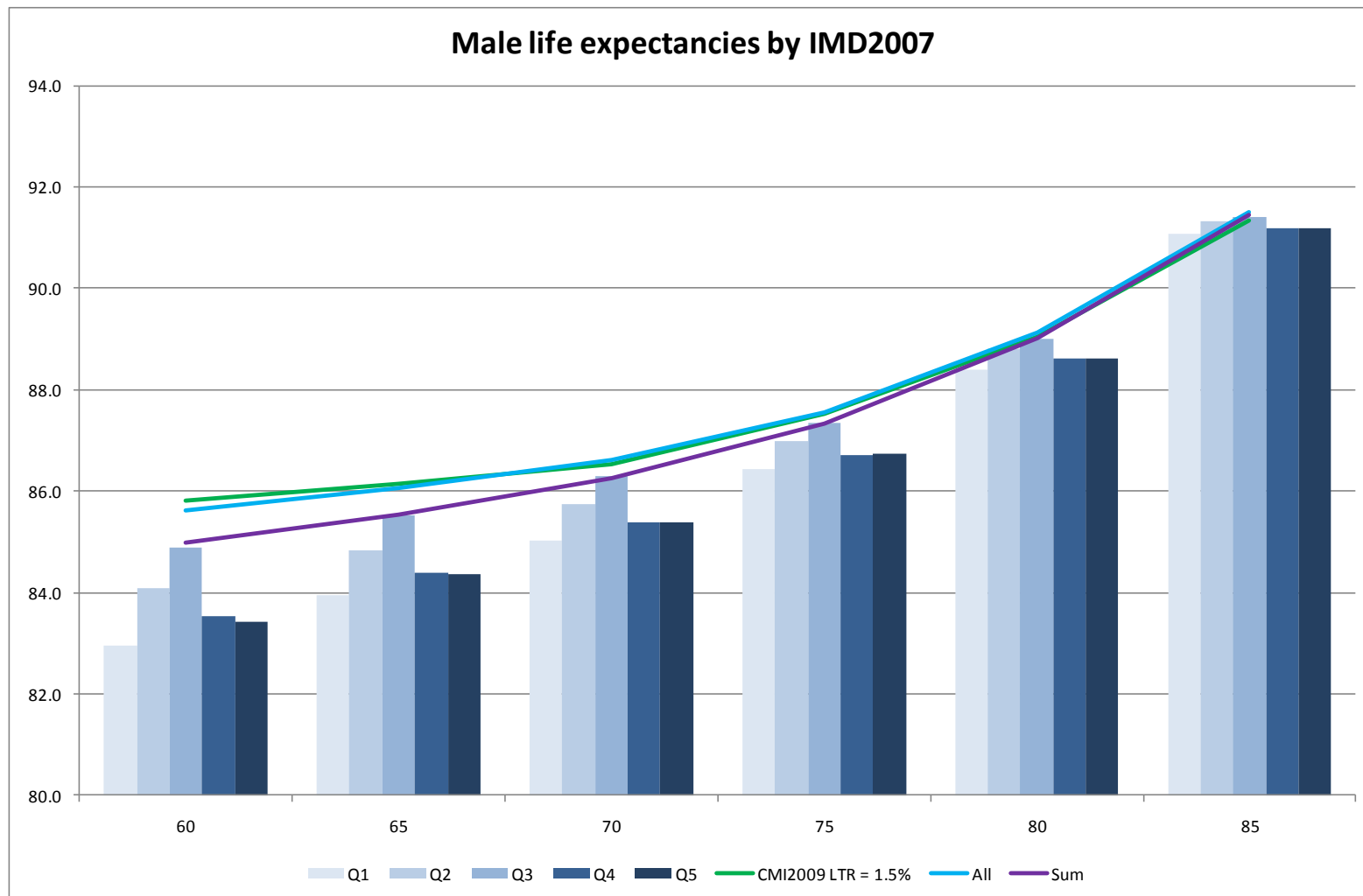
Female mortality rates for ages 60-69 by smoking status (GPRD data – UK)



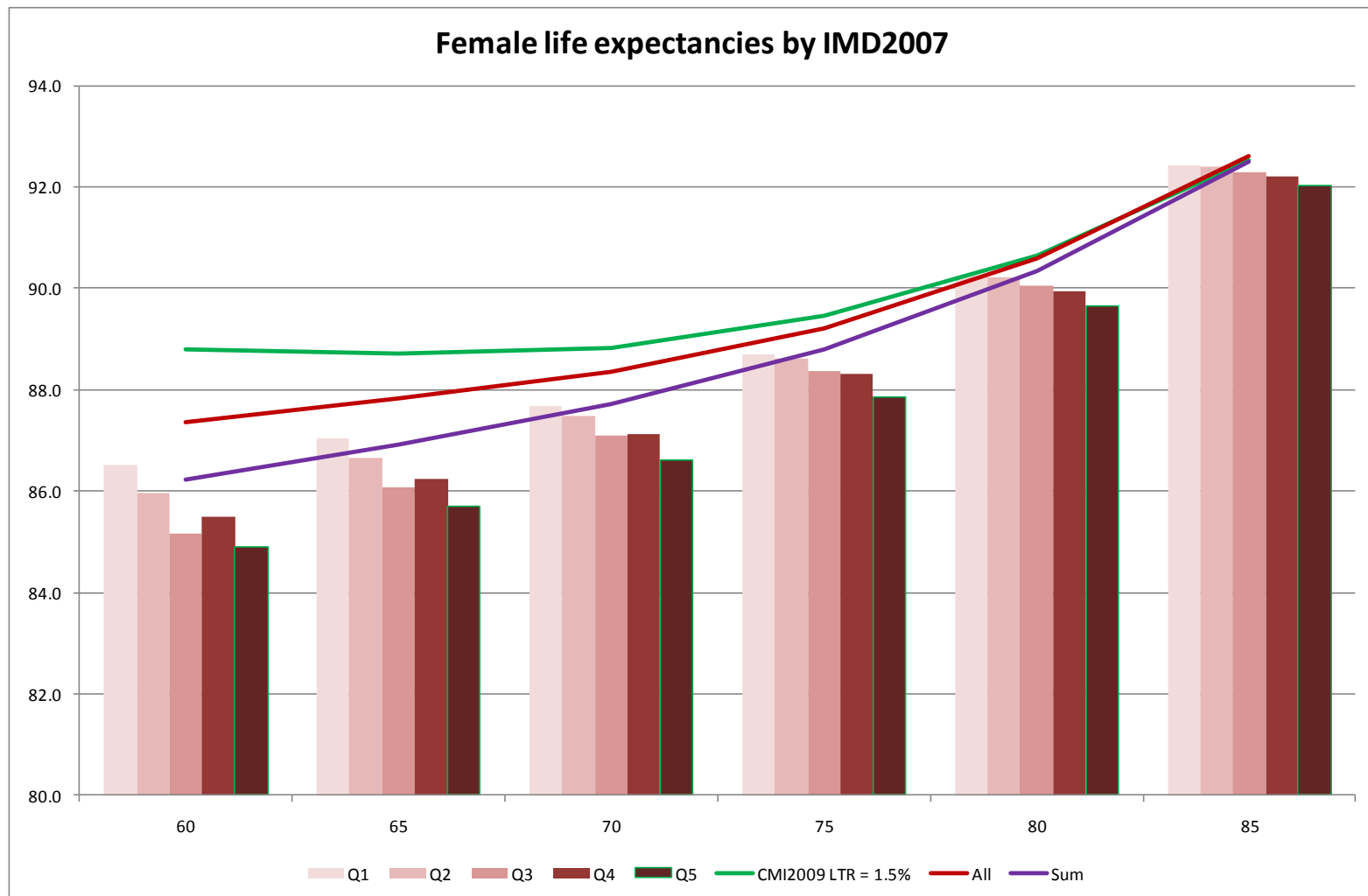
Female mortality rates for ages 70-79 by smoking status (GPRD data – UK)



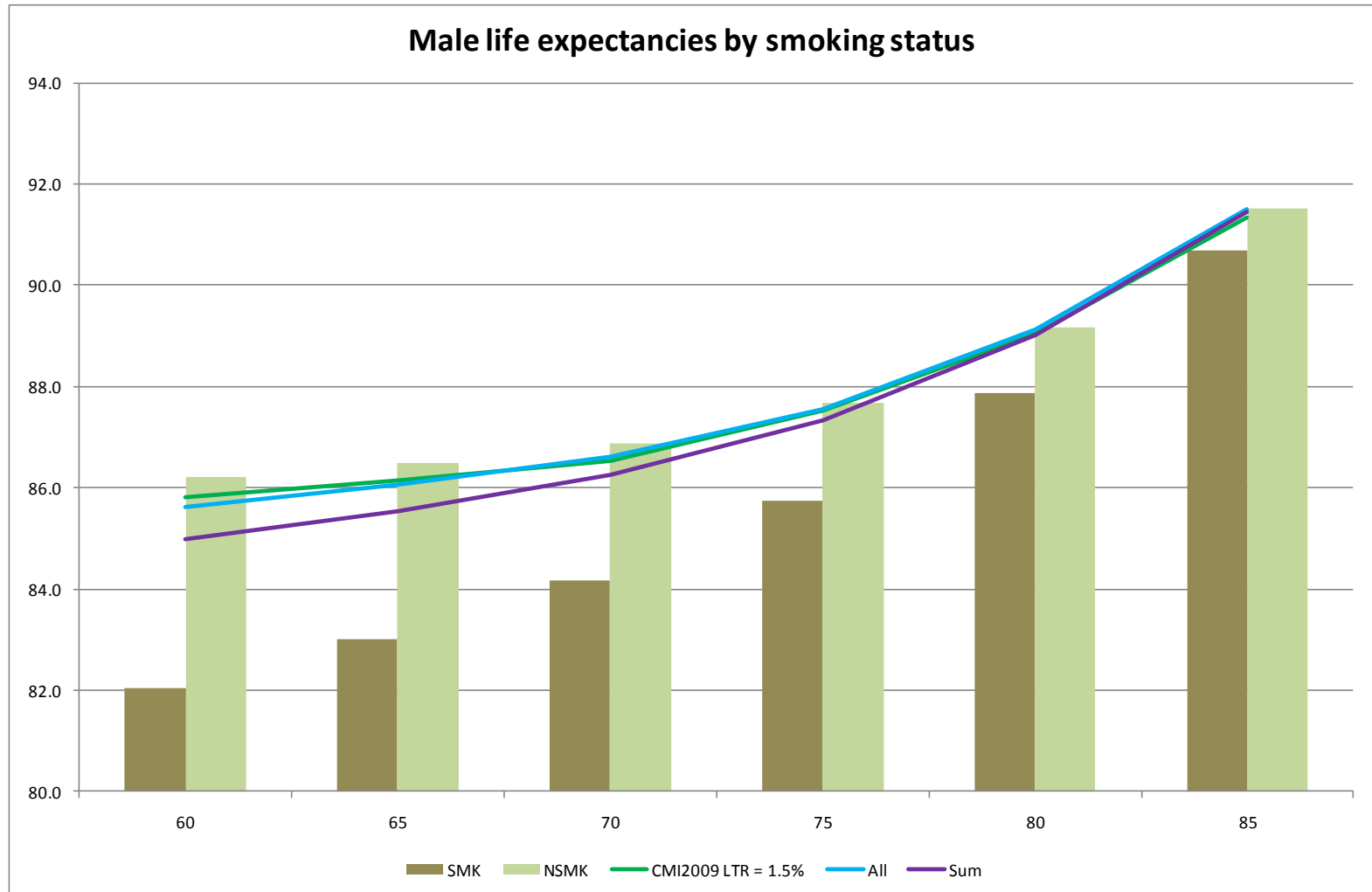
Life expectancies – males by IMD2007 (GPRD data – UK & England)



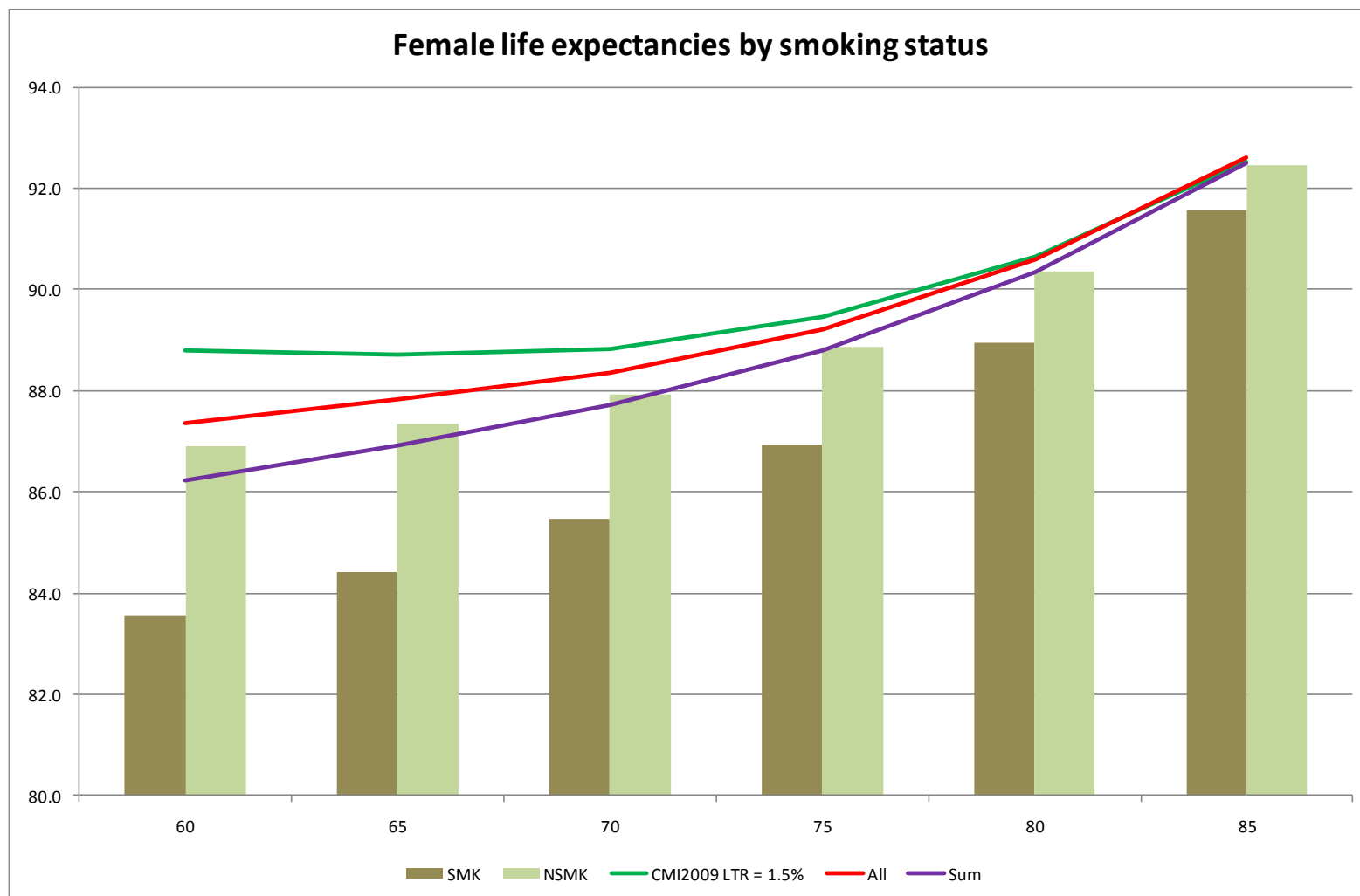
Life expectancies – females by IMD2007 (GPRD data – UK & England)



Life expectancies – males by smoking status (GPRD data – UK & England)



Life expectancies – females by smoking status (GPRD data – UK & England)



Implications

- GPRD reveals disease and mortality differences among socio-economic classes
- Potentially able to contribute to underwriting of annuitants
- Potentially able to contribute to projection of future trends by studying historical trends (work in progress)
- Reconciliation to other datasets (work in progress)

Acknowledgements

- Joseph Lu (Legal & General)
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- Daniel Ryan (Swiss Re)

Questions or comments?

