

Health Economic Issues in Leukemia

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- What are the issues?
- Comparator report of access to cancer drugs in Europe
- Burden and cost
- Variations in access – some examples
- Where are we heading?



The issues

- Focus in health care systems have changed
 - From input to outcome
 - From market authorization and guidelines to use and effectiveness in clinical practice
 - From payment for use of resources and throughput to pay for performance
- Focus in medical innovation has changed
 - From new mechanisms of action to unmet medical needs and cost-effectiveness
- Decisions about resource allocation increasingly based on HTA studies, including economic aspects



Patient Access to Cancer Drugs in Europe: Comparator Reports, 2005, 2007, and 2009

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Available at:

www.comparatorreports.se



Key learnings from the reports (1)

- European cancer incidence is increasing and mortality decreasing
 - indicating the efficacy of screening programs and modern treatments
- Survival for most cancers is improving significantly
 - but there is great variation between countries within Europe and across diagnoses
- **European countries spend more on cancer screening, prevention and treatment**
 - **but costs for cancer as share of health care expenditures (6-8%) is still far lower than the relative burden of the disease (16% of DALYs lost).**
- There is a trend towards more ambulatory treatments,
 - which reduced the number of hospital-days for cancer, despite more patients being treated



Key learnings (2)

- Indirect costs
 - Are reduced due to reduced mortality and morbidity
 - The average duration per case of inability to work due to cancer is dropping for most diagnoses
 - But still twice as high as the direct costs
- Cost of cancer drugs
 - Has increased rapidly, but still only 15 per cent of total direct costs
 - Will continue to increase but at a slower pace
- Role of HTA for access has increased
 - But still no evidence of major impact on access
 - Differences in access explained by economic, health care, and medical practice factors



Direct and indirect cost of cancer

Best long term data are from the US

- Cancer accounts for about 5% of all health care expenditures in the USA
- The share for cancer has been stable over the last 30 years
- Cost of hospitalisation is the dominating cost item
- Indirect costs in terms of lost production is more than double the direct health care costs
- Lack of systematic data on costs from most countries



Direct cost of cancer in Euro per capita

Under 50	50-100	100-150	150-200	Over 200
Bulgaria Romania	Czech Republic	Italy	Belgium Netherlands	Austria Norway
Estonia Latvia Lithuania	Finland Hungary	Spain Portugal	Denmark	France Germany
Poland	Slovenia	United Kingdom	Ireland Iceland	Luxembourg
Slovakia			Greece	Sweden Switzerland

Cancer accounts for 5-8 % of total health care costs.
 Cancer represent 16% of all DALYs lost.
 Drugs account for 10-20% of direct costs of cancer care



Burden of malignant haematological diseases; Cancer incidence in Europe 2004

Leukaemia	86 000	2,8%
<i>Lymphoid leukemia</i>	46 000	
<i>Myeloid leukemia</i>	40 000	
Lymphomas and multiple myeloma	113 000	3,7%
Total	200 000	6.5%

Source: WHO Global burden of disease



Burden of malignant haematological diseases; Cancer mortality in Europe 2004

	Annual Deaths	Share of all cancer deaths
Leukaemia	67 000	3,6%
Lymphomas and multiple myeloma	79 000	4,2%
All cancers	146 000	7.4%

Source: WHO Global burden of disease



Burden of malignant haematological diseases; DALYs in Europe 2004

	DALYs	Share of cancer related DALYs
Leukaemia	745 000	4,4%
Lymphomas and multiple myeloma	718 000	4,2%
All cancers	1 460 000	8.6%

Source: WHO Global burden of disease



Cost of haematological diseases Germany 2006 (M€)

	Cost of illness	Share of cancer costs
Cancers incl. CIS	17107	100,0%
Malignant cancers	14579	85,2%
Cancer in lymphoid, haematopoietic and related tissue	1654	9,7%
Leukemia	739	4,3%

Source: The Federal Health Monitoring System



Burden of haematological diseases

Direct and indirect costs of malignant lymphoma in Germany 2000 (M€)

Direct and indirect costs of malignant lymphoma in Germany 2000 (M€)

	Direct costs	Indirect costs	Total costs	Direct share of total costs
Hodgkins disease	78	69	147	53,1%
Non-Hodgkins lymphoma	418	404	822	50,9%
CLL	262	52	314	83,4%
Plasmocytoma	116	144	260	44,6%

Source: Reis et al, European Journal of Cancer, 2006:379-385



Example of activity based cost estimate

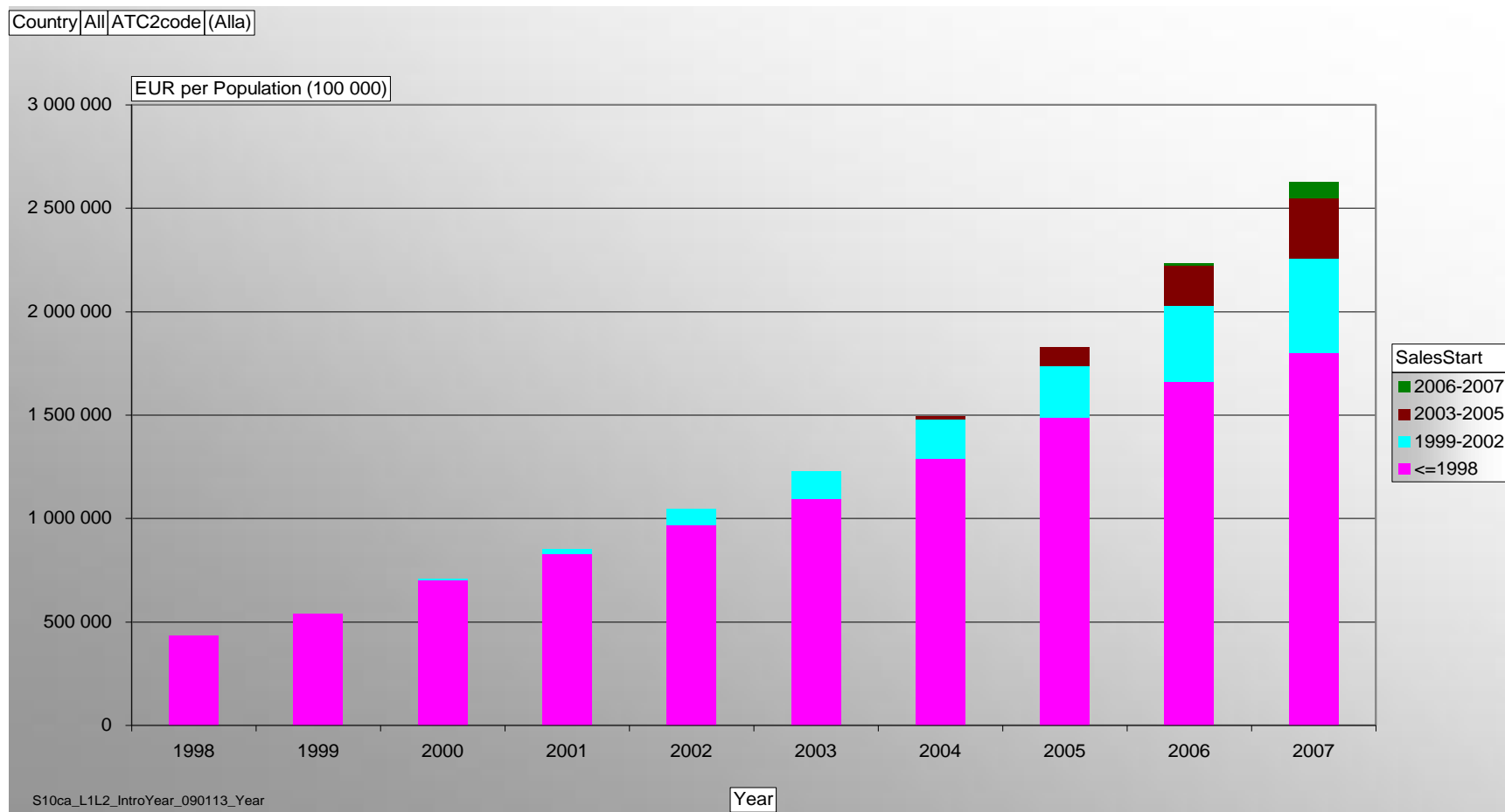
Total cost of AML in Sweden 1992, 461 mill. SEK

	Proportion of total costs (%)
Induction therapy	46
Consolidation therapy	12
Maintenance therapy	9
Allogeneic BMT	3
Autologous BMT	6
Relapse treatment	23
Outpatient care	1
<i>Total direct cost (225 million)</i>	100
Morbidity	9
Mortality	91
<i>Total indirect cost (235 million)</i>	100



Sales of cancer drugs in Europe 1998-2007.

Different colors of the bars indicate first year of global sales.
(i.e. purple= drugs available in 1998 or earlier)



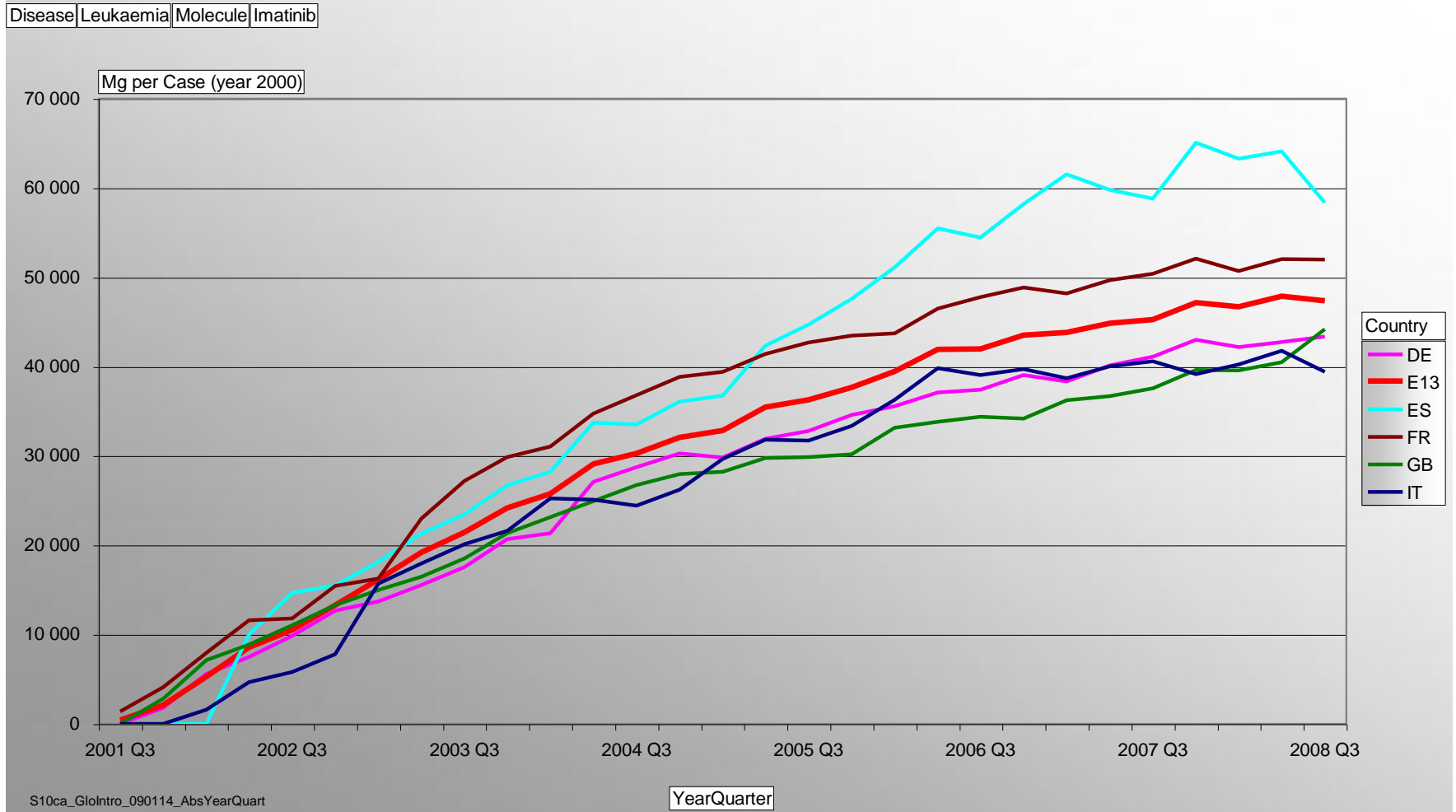
Examples of variations between countries in use of haematology drugs

Mg/case of leukemia or mg/ 100 000 inhabitants Q1 1998 – Q3 2008.

- Chronic Myeloic Leukemia (CML)
 - Imatinib
 - Dasatinib
 - Nilotinib
- Chronic Lymphocytic Leukemia (CLL)
 - Alentuzumab
- Non Hodgkin Lymphoma (NHL)
 - Rituximab
- Multiple Myeloma (MM)
 - Bortezomib

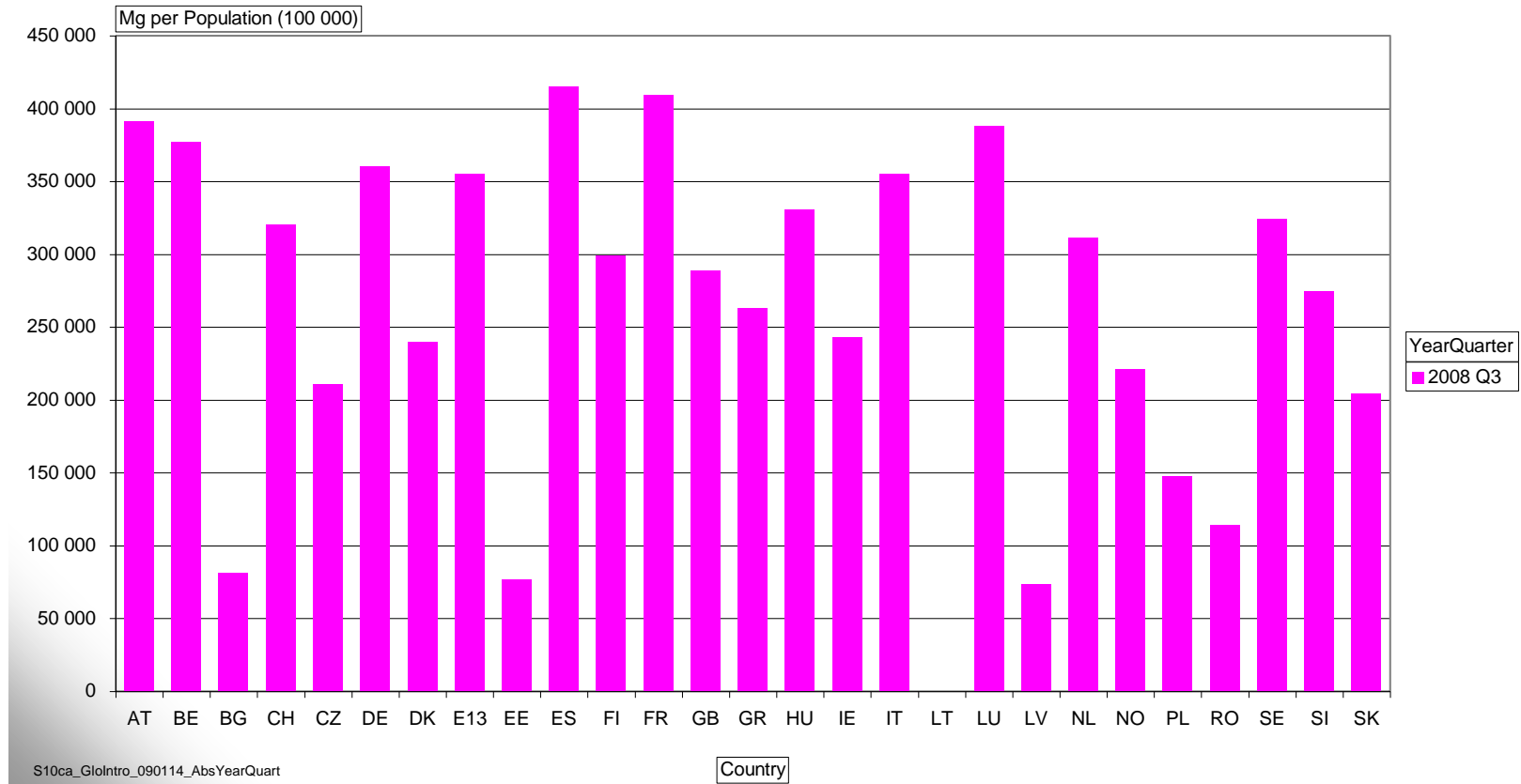


CLL: Use of imatinib, (mg/case) in E13 (western European average), France, Germany, Great Britain, Italy, and Spain.



Use of imatinib, per 100 000 inhabitants in Europe in 2008. Incomplete sales data from Greece, Ireland, Luxembourg and Portugal.

Molecule | Imatinib



CML – Cost and cost-effectiveness

- CML patients above 65 years in the US, diagnosed between 1991 and 1993.
 - The average Medicare payments over a period of 5 years from diagnosis or until death to be \$35,785 for CML patients and \$21,161 for control subjects
 - Additional costs \$ 14 000
- Introduction of INF-alpha
 - Additional cost approx \$ 180 000 over life time
- Introduction of imatinib
 - Estimated life time costs \$425 000
- What is the cost-effectiveness of progress in treatment?



Cost-effectiveness of imatinib in a US setting

Reed et al Cancer 2004:2574-2583

RESULTS. The mean estimated survival with first-line imatinib therapy was 15.30 years, compared with 9.07 years with IFN+LDAC. Undiscounted lifetime costs were approximately \$424,600 with imatinib and \$182,800 with IFN+LDAC. Using a 3% discount rate, the incremental survival gain with imatinib was 3.93 life-years and 3.89 quality-adjusted life-years (QALYs). Incremental discounted lifetime costs were found to be \$168,100 higher with imatinib, resulting in incremental cost-effectiveness ratios of \$43,100 per life-year saved (95% confidence interval [95% CI], \$37,600–51,100) and \$43,300 per QALY (95% CI, \$38,300–49,100).



Cost-effectiveness of imatinib in a US setting

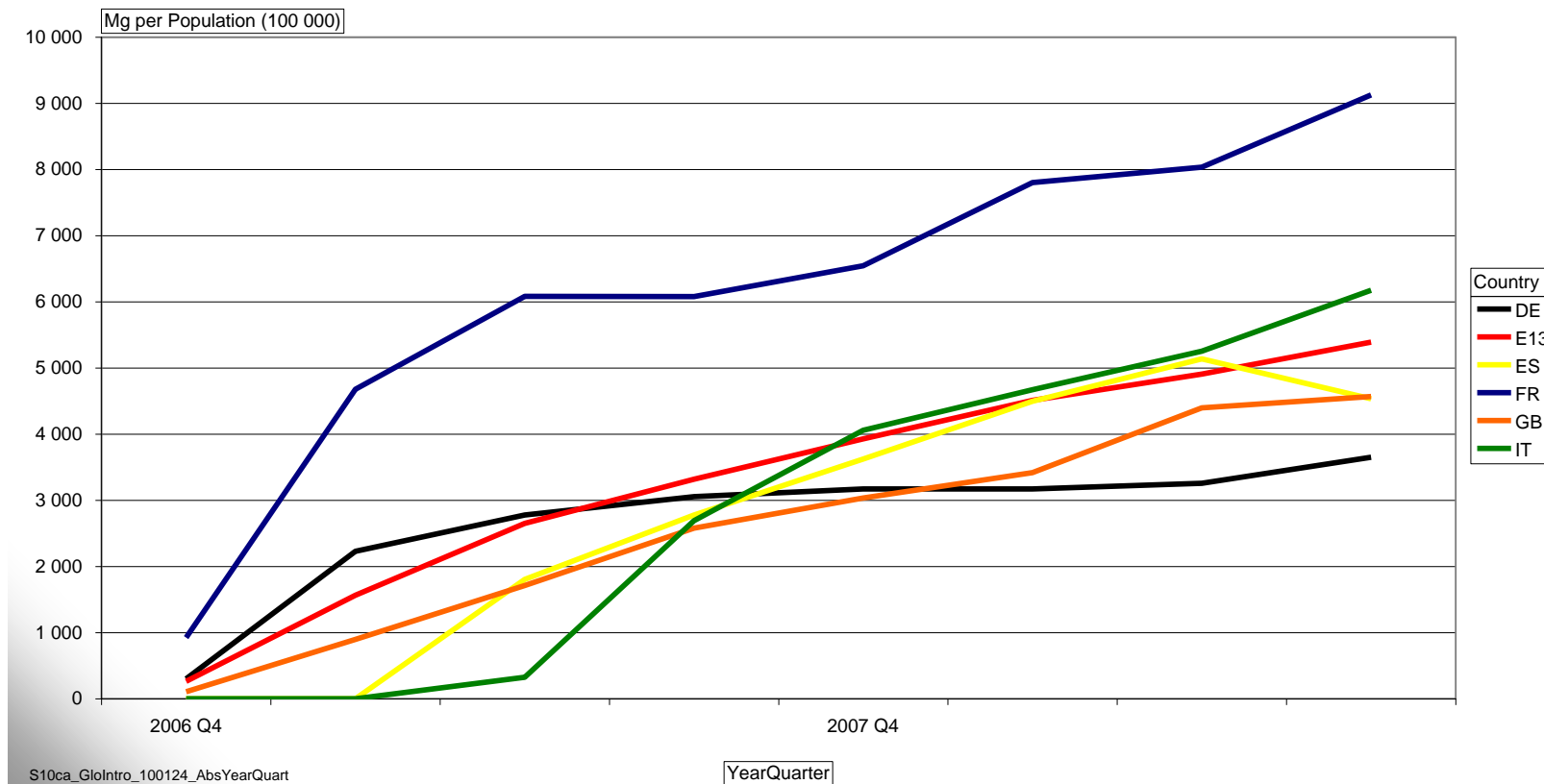
Reed et al Pharmacoeconomics 2008:436-446

- **RESULTS:** Five-year survival for patients randomized to imatinib was better than predicted in the original model (89.4% vs 83.2%). We estimated remaining life expectancy with first-line imatinib to be 19.1 life-years (3.8 life-years over the original model) and 15.2 QALYs (3.1 QALYs over the original estimate). Estimates for IFNalpha remained at 9.1 life-years and 6.3 QALYs. When we applied AWP to study medications, incremental cost-effectiveness ratios (ICERs) were \$US 51,800-57,500 per QALY. When we applied WACs, ICERs were \$US 42,000-46,200 per QALY.
- **CONCLUSION:** Although the analysis revealed that the original survival estimates were conservative, the updated cost-effectiveness ratios were consistent with, or slightly higher than, the original estimates, depending on the method for assigning costs to study medications.



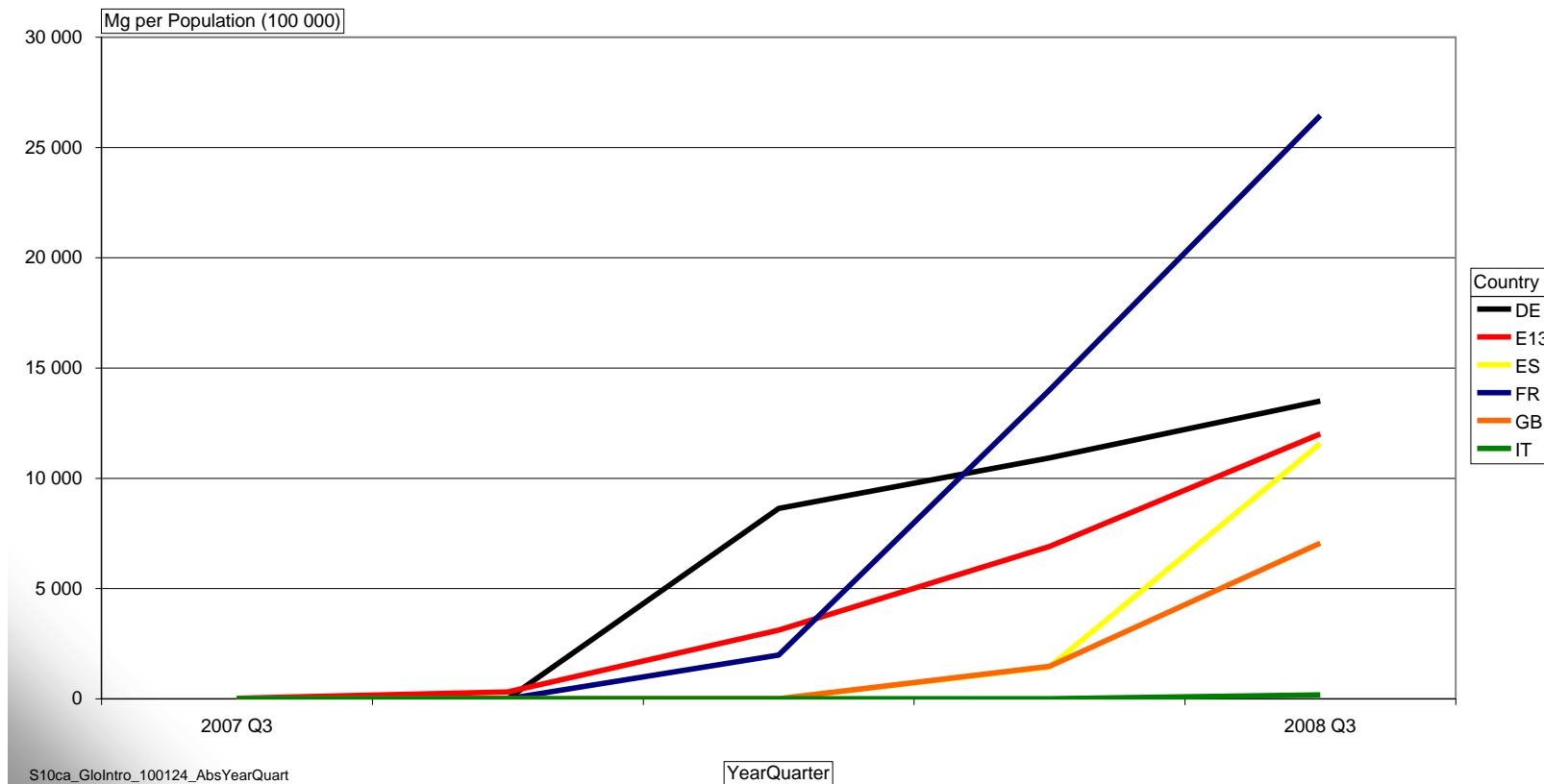
Use of dasatinib (mg/100 000 inhab.) in E13 (western European average), France, (FR), Germany (DE), Great Britain (GB), Italy (IT), and Spain (ES).

Disease | Leukaemia | Molecule | Dasatinib



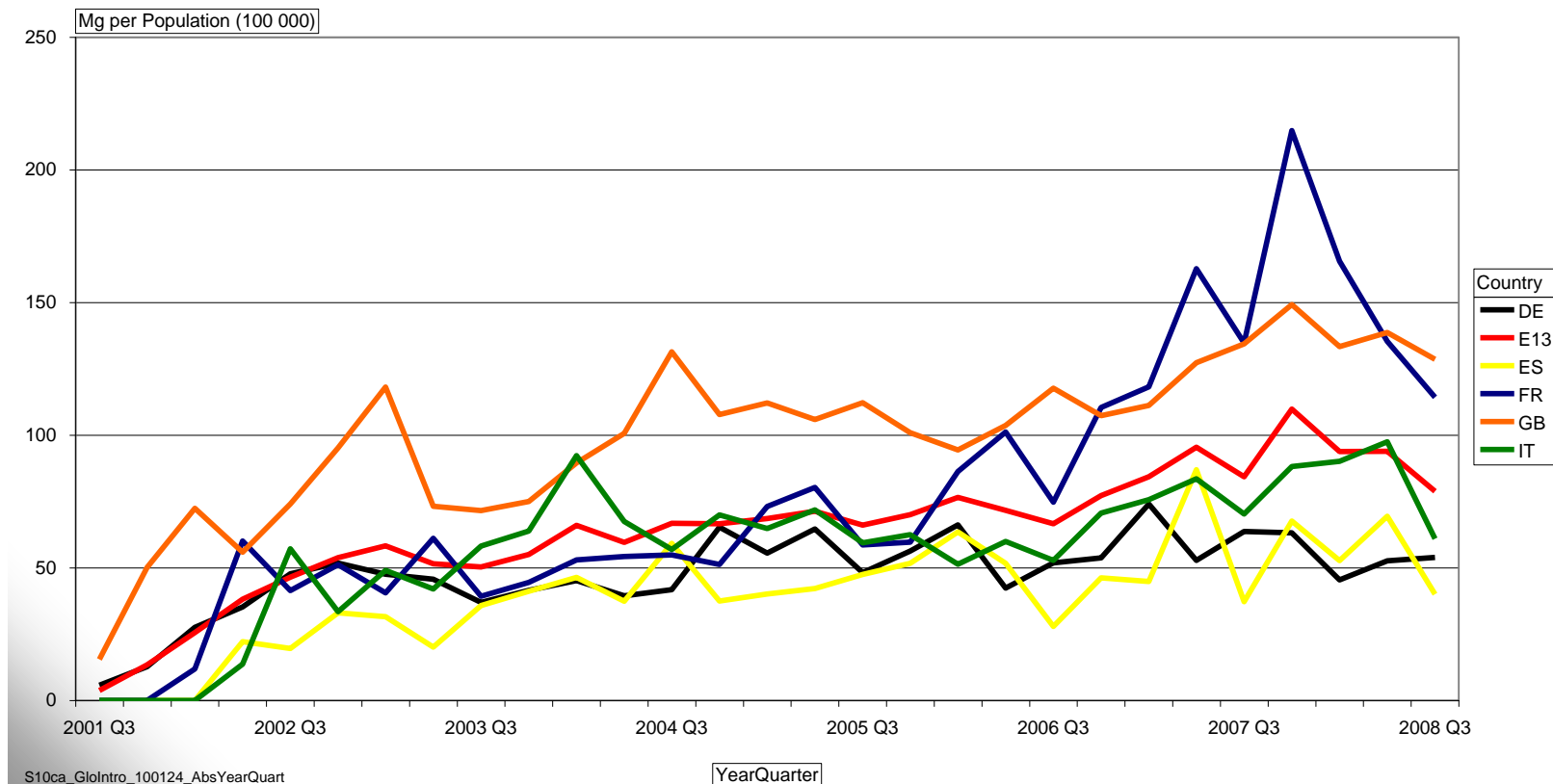
Use of nilotinib (mg/100 000 inhab.) in E13 (western European average), France, (FR), Germany (DE), Great Britain (GB), Italy (IT), and Spain (ES).

Disease|Leukaemia|Molecule|Nilotinib



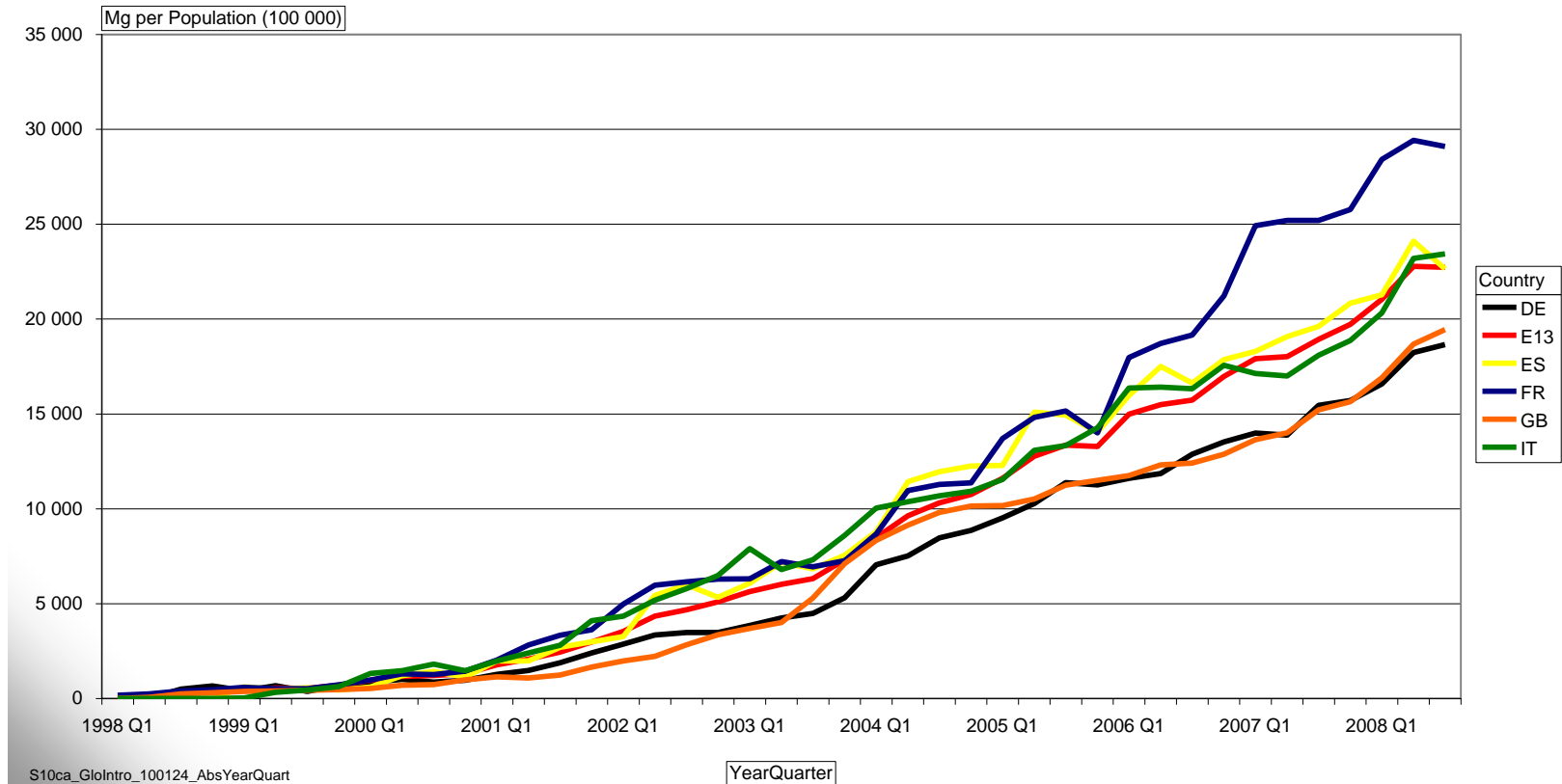
CLL: Use of alemtuzumab (mg/100 000 inhab.) in E13 (western European average), France, (FR), Germany (DE), Great Britain (GB), Italy (IT), and Spain (ES).

Disease|Leukaemia|Molecule|Alemtuzumab



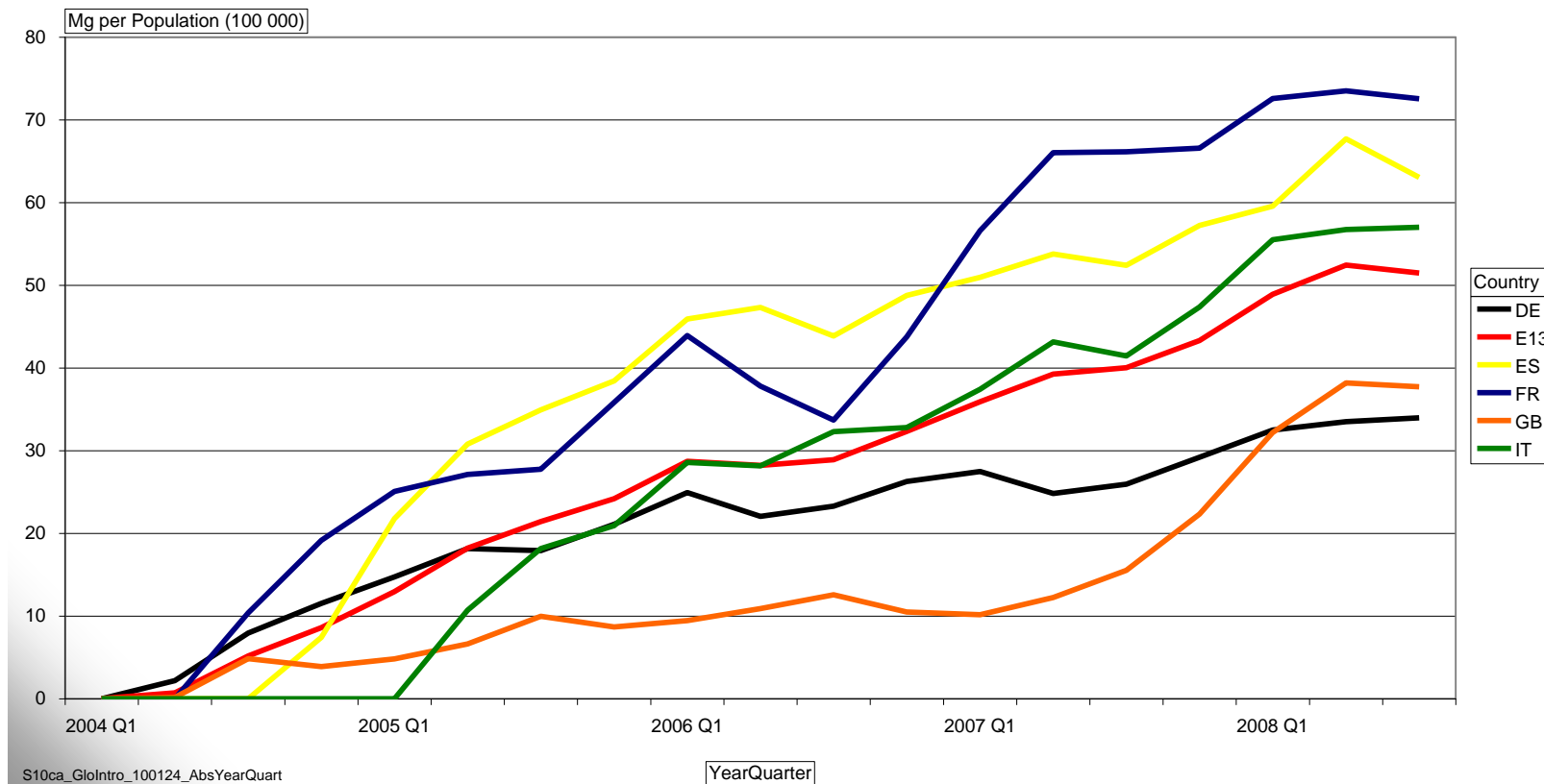
NHL: Use of rituximab (mg/100 000 inhab.) in E13 (western European average), France, (FR), Germany (DE), Great Britain (GB), Italy (IT), and Spain (ES).

Disease|Leukaemia|Molecule|Rituximab



MM: Use of bortezomib (mg/100 000 inhab.) in E13 (western European average), France, (FR), Germany (DE), Great Britain (GB), Italy (IT), and Spain (ES).

Disease | Leukaemia | Molecule | Bortezomib



Where are we heading?

- Increasing demands on evidence about relative effectiveness and cost-effectiveness for new treatments
 - Development of methods and data sources for assessment of cost-effectiveness
- Variations in access to new treatments will be an increasingly important topic for European and national health policy
 - Relevant data must be collected and analysed as a basis for rational decisions

