



The Johns Hopkins University's

 **2010 ACG International
Risk Adjustment Conference**



MAY 10-12 
Tucson, Arizona
Loews Ventana Canyon

**Using pharmacy information in a decision support system
to improve efficient delivery of primary health care.
A study on the Swedish National Drug Register**

**Applying the John Hopkins ACG Case-Mix system,
Rx-PM model on the Swedish National Drug Register**

Andreas Johansson, MSc. Ensolution AB

Mona Heurgren, The National Board of Health and Welfare in Sweden

Karen Kinder Siemens, Health Services R&D Center, JHU

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Aim of the project

- **Apply the Johns Hopkins ACG Case-Mix system, Rx-PM model on the Swedish National Drug Register (period 2006-2008)**
- **Analyse and compare results between different county councils and analyse if the drug use in the population can be used as an approximation for the need of care and as a tool to adjust the capitation payment system in the county councils**



Introduction to ACG Rx-system

- The ACG-Rx system, based on the unique Rx-MG categories, is an Rx-based risk adjustment tool (NDC, ATC, Read code) that can be used as a predictive model and to understand patterns of medication use
- Pharmaceutical utilization is a proxy for underlying morbidity.
- The John Hopkins ACG Case-Mix system, Rx-PM model is a grouping logic that uses drug utilization to measure the severity of the underlying morbidity, the therapeutic goal of medication use, and the duration of treatment
- Pharmacy data is presented in a new perspective that has not been available previously
- The tool can be used for Disease/Case Management, Profiling (Population and Provider) and to forecast pharmacy and total costs for large groups



Background

- Development of patient´s choice model in Sweden
”Vårdval”
- Need of instruments to measure morbidity
- Focus on cost of pharmaceuticals
- Pharmacy data is collected nationally but at this stage not diagnosis set in Primary Care
- Need of describe performance in Primary Care

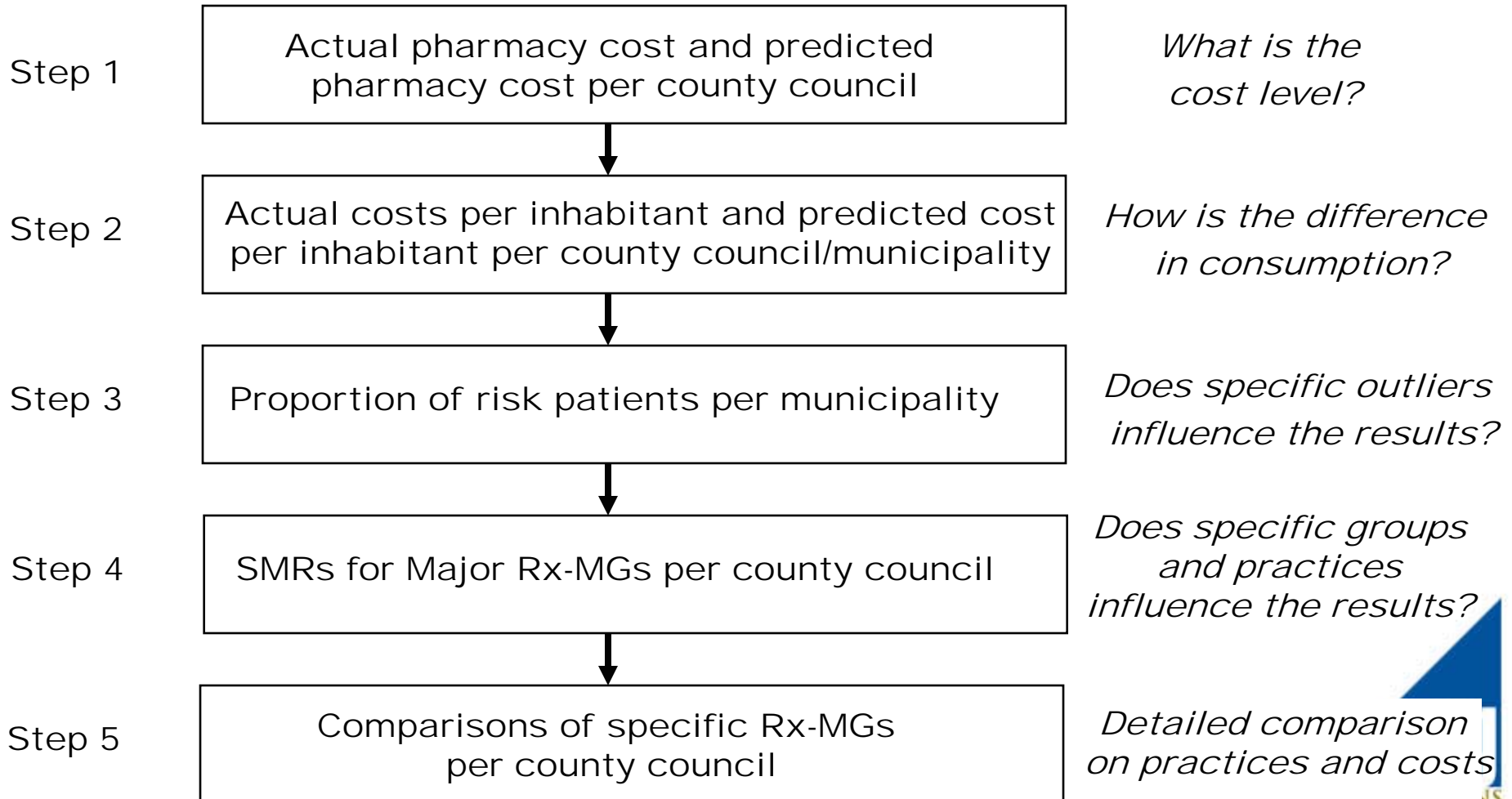


Grouping results

- 6,2 Mill. unique patients, 29 Mill. combinations of patients and used ATC-codes for each year
- Periods 2006, 2007, 2008
- Annually 24-25 Bill. SEK in total cost
- The grouping went well in practice

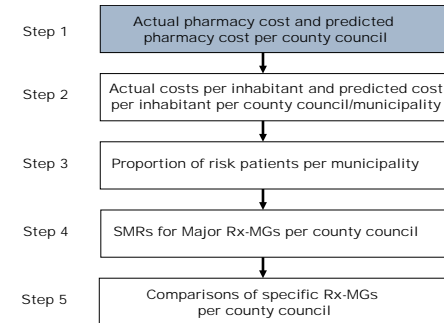


Analysis model



Actual pharmacy cost and predicted pharmacy cost per county council

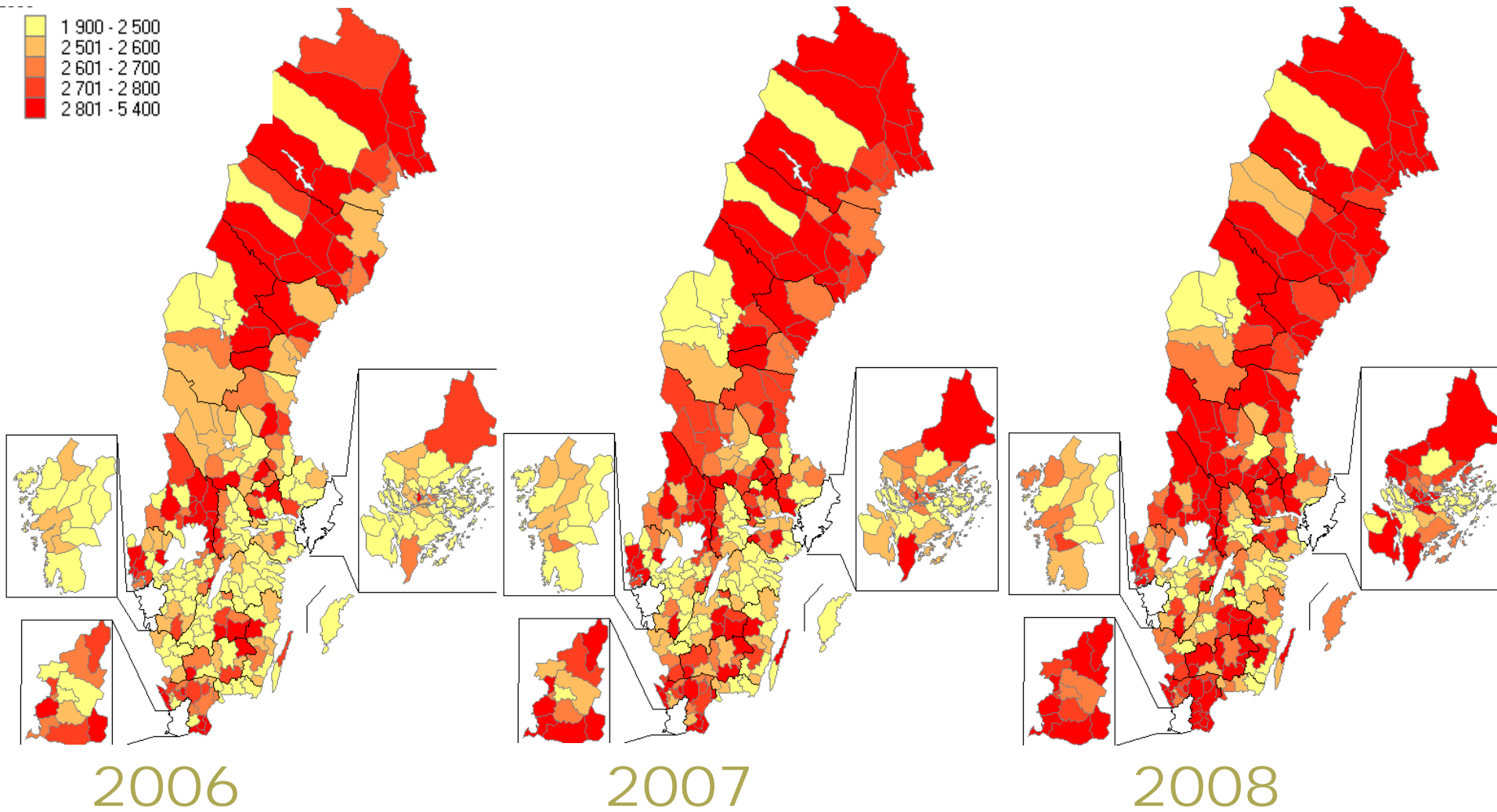
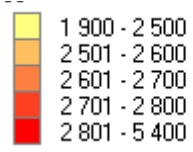
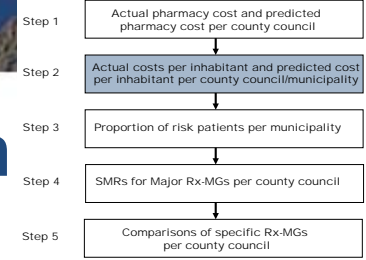
County council	Actual 2008 Pharmacy Expense	2008 Pharmacy Cost Prediction Using Unscaled PRI	Variation in predicted costs and actual for 2008
Stockholm	5 303 647 178	5 139 988 335	1,03
Uppsala	847 118 520	864 249 195	0,98
Södermanland	705 655 420	703 511 857	1,00
Östergötland	1 027 450 358	1 139 305 741	0,90
Jönköping	898 536 388	895 076 767	1,00
Kronoberg	504 075 321	487 266 166	1,03
Kalmar	618 074 215	637 789 791	0,97
Gotland	152 748 364	150 180 671	1,02
Blekinge	393 225 987	398 831 013	0,99
Skåne	3 538 233 088	3 267 557 141	1,08
Halland	772 191 846	781 341 882	0,99
Västra Götaland	4 049 344 382	4 209 239 410	0,96
Värmland	800 328 490	749 962 928	1,07
Örebro	701 933 901	758 137 722	0,93
Västmanland	707 962 041	672 419 683	1,05
Dalarna	773 043 612	739 503 341	1,05
Gävleborg	744 218 130	745 912 033	1,00
Västernorrland	696 730 564	651 852 324	1,07
Jämtland	318 765 227	352 880 219	0,90
Västerbotten	737 689 835	692 121 750	1,07
Norrbottn	756 503 275	678 160 685	1,12
	25 105 554 100	24 820 166 508	1,01



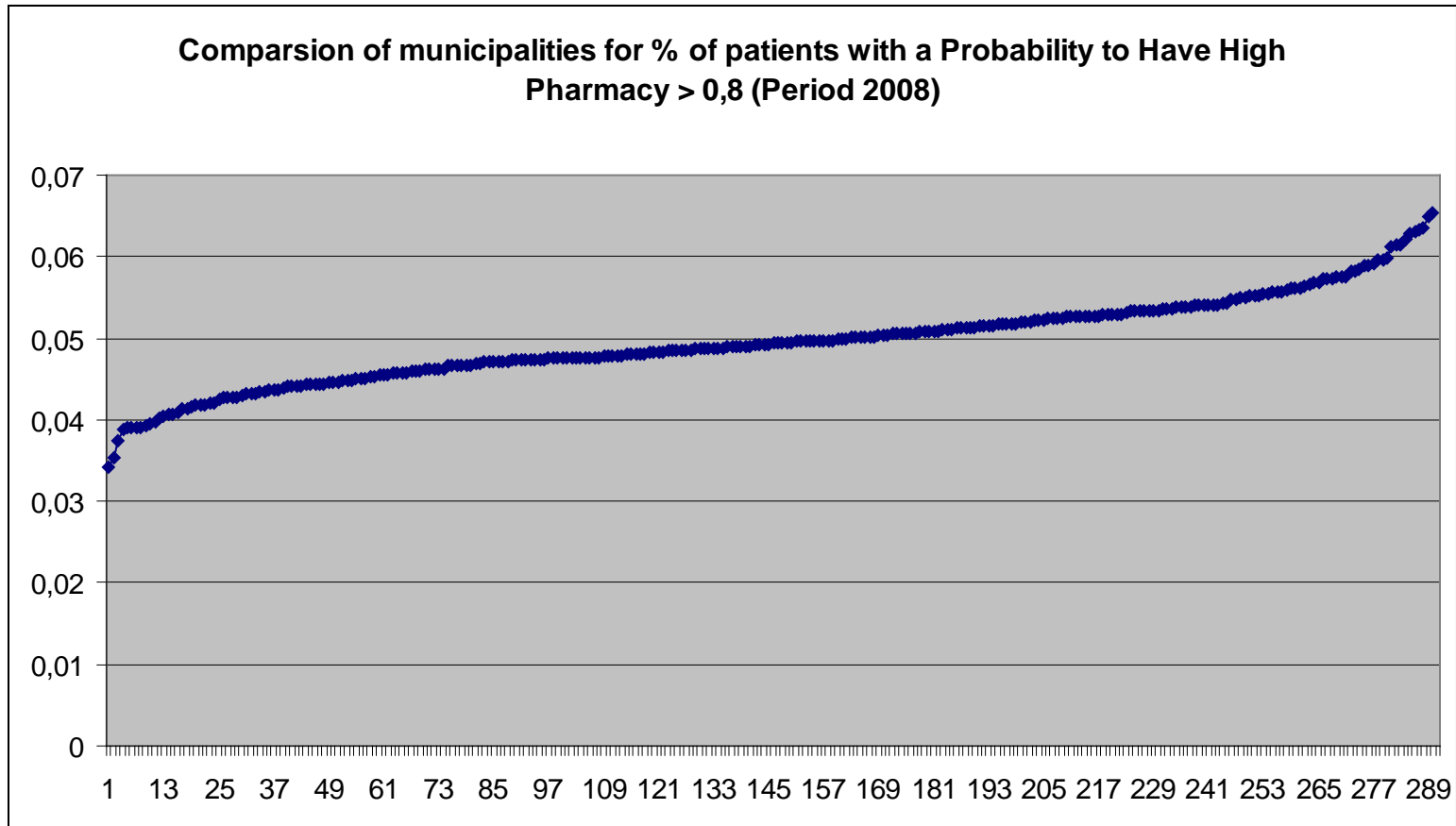
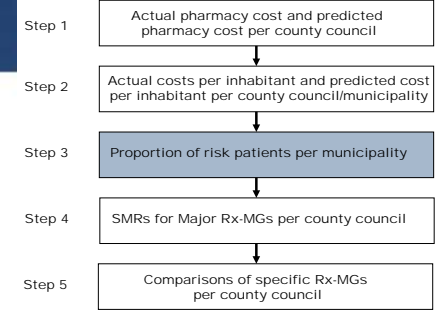
PRI = Predicted Resource Index
 Unscaled PRI, PRI in absolute numbers



Pharmacy cost per inhabitant as a comparison between the municipalities



Analysing risk patients

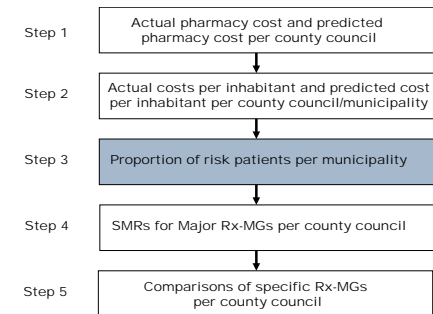


Probability > 0,8 = % of patients that has a probability over 80% to be risk patients for pharmacy cost for the coming period



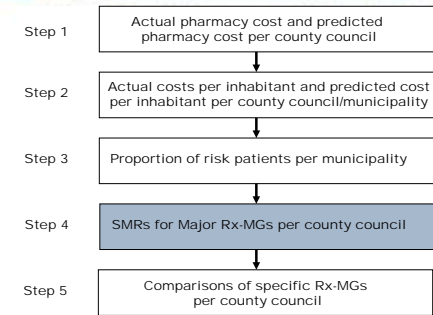
Analysing risk patients on municipality level. Example from Kronoberg and Jönköping

	% with a Probability to Have High Total Expense > 0,8 (2008)	% with a Probability to Have High Pharmacy > 0,8 (2008)
ANEBY	5,18%	4,60%
GNOSJÖ	4,75%	4,04%
MULLSJÖ	4,91%	4,47%
HABO	4,43%	3,89%
GISLAVED	4,97%	4,69%
VAGGERYD	4,79%	4,20%
JÖNKÖPING	4,97%	4,78%
NÄSSJÖ	5,49%	5,50%
VÄRNAMO	5,04%	4,70%
SÄVSJÖ	5,18%	4,75%
VETLANDA	5,22%	4,88%
EKSJÖ	5,46%	5,26%
TRANÅS	5,49%	5,38%
UPPVIDINGE	5,85%	5,83%
LESSEBO	5,95%	6,16%
TINGSRYD	6,04%	5,96%
ALVESTA	5,38%	5,34%
ÄLMHULT	5,17%	4,90%
MARKARYD	5,45%	5,28%
VÅXJÖ	5,11%	5,04%
LJUNGBY	5,41%	5,09%
HÖGSBY	5,36%	4,75%



Probability > 0,8 = = % of patients that has a probability over 80% to be risk patients for pharmacy cost and for total cost for the coming period

SMR by Major Rx-MG per county council



2008 Age/Sex Expected/1000

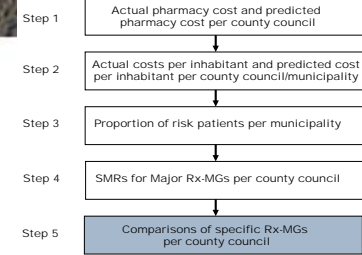
Major Rx-MG	Major Rx-MG Name	19 Västmanland	20 Dalarna	21 Gävleborg	22 Västernorrland	23 Jämtland	24 Västerbotten	25 Norrbotten
ALL	Allergy/Immunology	132,18	133,56	133,62	133,69	133,38	130,98	133,03
CAR	Cardiovascular	220,84	234,94	233,43	235,31	233,92	213,09	227,93
EAR	Ears, Nose, Throat	5,67	5,78	5,78	5,79	5,75	5,57	5,77
END	Endocrine	116,87	122,58	122,25	122,95	121,43	112,56	119,84
EYE	Eye	74,82	77,18	76,79	77,24	77,31	73,40	74,98
FRE	Female Reproductive	70,38	66,21	67,49	66,64	68,30	75,13	67,00
GAS	Gastrointestinal/Hepatic	127,89	133,63	133,01	133,64	133,61	124,66	129,86
GSI	General Signs and Symptoms	216,12	222,77	222,49	222,96	222,66	212,03	219,41
GUR	Genito-Urinary	32,90	35,17	34,93	35,26	35,12	32,01	34,54
HEM	Hematologic	3,65	3,70	3,70	3,68	3,72	3,62	3,69
INF	Infections	266,66	267,56	267,74	268,35	267,92	265,30	266,09
MAL	Malignancies	13,56	14,33	14,25	14,34	14,30	13,19	13,96
MUS	Musculoskeletal	10,42	11,18	11,07	11,16	11,21	10,10	10,72
NUR	Neurologic	39,77	41,16	41,06	41,13	41,17	38,95	40,35
PSY	Psychosocial	148,21	154,02	153,50	153,87	154,01	144,73	150,02
RES	Respiratory	159,62	161,16	161,11	161,76	160,94	157,36	160,05
SKN	Skin	108,45	110,16	110,08	110,33	110,23	107,76	109,17
TOX	Toxic Effects/Adverse Effects	0,05	0,05	0,05	0,05	0,05	0,04	0,05
ZZZ	Other and Non-Specific Medications	157,86	164,08	163,12	163,84	164,19	154,53	158,87

SMR, Standard Morbidity Rate = Number of expected patients per Major Rx-MG grupp per 1000 inhabitants

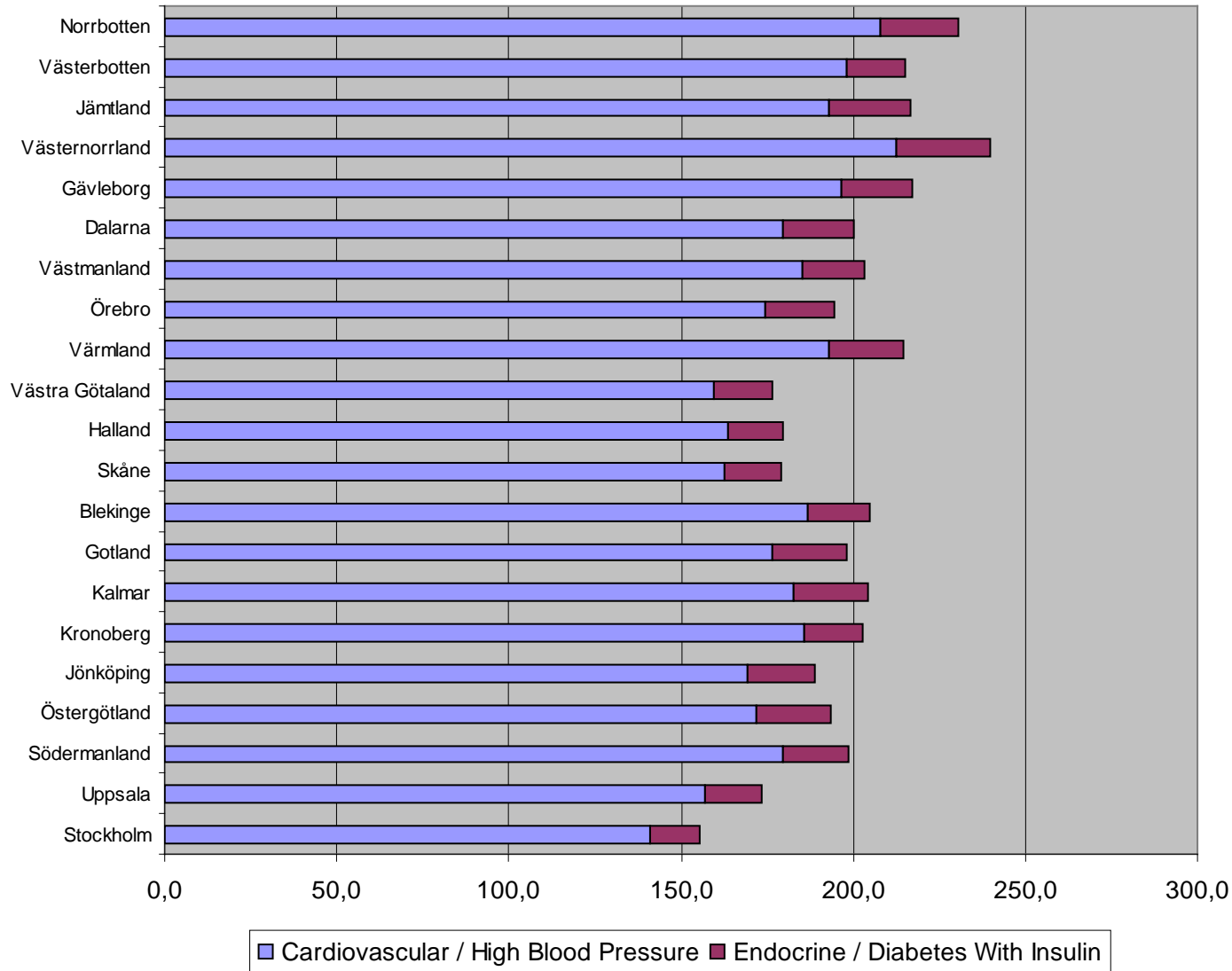
Major Rx-MG grupp = Morbidity group based on pharmacy consumption



Comparsion between Rx-MGs



Number of cases per 1000 inhabitants for two selected Rx-MG groups (2007)



Conclusions

- The Rx-model works well for Swedish data
- The model provides an large amount of data for analysis and usage in practice
- The model provides functionality for also predicting change in total cost
- Specific analysis for measuring costs for high risk patients
- Measures generated from the system could i.e. be used in open comparisions (öppna jämförelser)
- More analysis with diagnosis and cost data on county council level still needed to prove if Rx-MG can be a useful tool for resource allocation in a capitation model
- The combined models (Rx-PM + Dx-PM) with diagnoses and pharmacy data is recommended to use
- Pharmacy data alone has an higher explanatory value than age and gender but still low in comparsion with combined models



Opportunities for Learning and Interaction Regarding ACGs

- Web Site:

- ❖ www.acg.jhsph.edu (International)
- ❖ www.ensolution.se (Nordic countries)

- Contact:

Andreas Johansson, Ensolution AB
andreas.johansson@ensolution.se
Mbl +46 709-900030

Dr. Karen Kinder Siemens –
Director, International ACG
kkinder@jhsph.edu

