PlanCAD - Linking administrative databases to improve Health Workforce Data

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Overview presentation

- Health Workforce Planning in Belgium
- Need for data to 'feed' mathematical model
- Overview of data sources / Register
- Data linking project 'PlanCAD'
  - Method, Procedure, Possibilities
- Future steps and improvements
- Summary & final remarks

Health Workforce Planning in Belgium

- Planning Commission : Advisory organ – analyzes needs and recommends policy actions to regulate health workforce
  - E.g. setting of access quota for physician & dentist professions
  - Organisation of medical care, redistribution of tasks
- Discussions in Planning Commission are based on available workforce statistics and projections made with a mathematical forecasting model

Mathematical model

- = Workforce planning tool
- = Stock and flow model with supply and demand side
- Allows to quantify the effect of proposed measures on future stocks. E.g. access restrictions, work time changes, …
- Incorporates hypotheses about future evolutions in the calculation of future available workforce size, composition, densities and FTEs
- This model is descriptive and predictive, but not prescriptive (= tool for policy makers)

Mathematical model needs data!

- Demand side
  - Population figures and projections
  - Health care consumption data
- Supply side
  - Inflow : Students / Obtained degrees / Professional Migration
  - Stock : available reserve of professionals

    => ! Main source = Health Professionals Register ('Cadastre')

  - ! Available information in Register is not sufficient

Health Professionals Register

- Officially : Federal Database of the Health Care Professionals (law 2003)
- = **NOMINATIVE LIST** of all the persons who are licensed to practice a recognised health care profession in Belgium

➢ **Recognised professions**: Physicians, Dentists, Physiotherapists, nurses, midwives, paramedical professions,…

➢ ! This list grows almost yearly as more professions are regulated and access is controlled

➢ = 440.806 individuals on 31/12/2013

➢ **Permanent synchronisation** with National Population Register (deaths, address changes)

➢ Basis of annual workforce statistics

Contents of Register

For each recognised Health Care Professional information is recorded :

- Personal details
- Degree, specialties, competences,..
- Nationality, language,..

Recorded information varies depending on the legal requirements of the different professions.

In short : all necessary information related to the licence to practice of an individual

Limitations of Register

- No information about the 'real', actual professional activity of the registered individuals => ! essential for elaboration of workforce planning and functioning of the mathematical forecasting tool
- Previously : estimated based on sample surveys
- ! But : this information is present in other administrative databases, i.e. social security and health insurance
- Databases accessible via **Crossroads Bank for Social Security** : Manages the Datawarehouse Labour Market & Social Protection

⇒ ! + other institutions can be contacted with Crossroads Bank as intermediary / clearing house and added as a data source

⇒ Linking Register with these sources: project « **PlanCAD** »

? Crossroads Bank for Social Security

= Motor and coordinator of e-government for the Belgian Social Sector (http://bcss.fgov.be/)

- Created in 1990 to exchange data between social security institutions & other actors
- Stimulate & support actors in social sector to grant more effective & efficient services
- Promote information security & privacy protection

- Provides research with statistical information

  =>! Privacy Commission controls access and correct usage of provided data

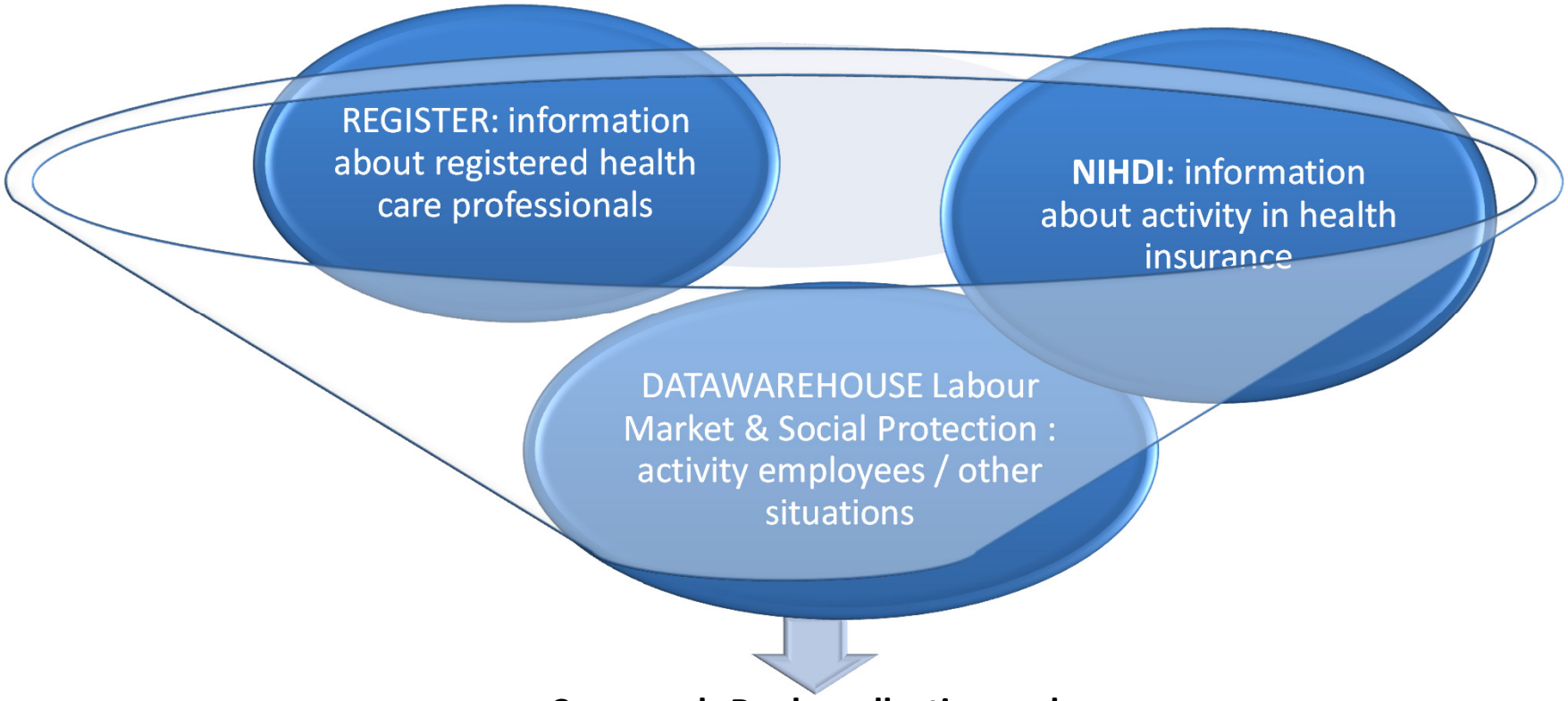
=> PlanCAD

= Individual, **anonymized** linking of the

- National Register of Health Professionals
- Social Security data sources (Datawarehouse CBSS)
- Health Insurance data (care providers profile data)

- *To determine the position and activity of these professionals on the Belgian Labour market*
- *To obtain statistical source data for health workforce projections*

Data Linking Process



Crossroads Bank : collection and anonymisation of data

Unit Workforce Planning: data cleaning and preparation, linking, analysis and reporting

Data Linking Procedure

Detailed data demand

- Request of approval for data linking submitted privacy commission
- Justify need for data + detail privacy protection & data security
- time consuming procedure – minimum 6 months

Conditions to fulfil

- ! The **number and the detail** of the requested variables needs to be restricted in order to protect the anonymity (prevent possible identification individuals)
- !! Goal of PlanCAD ≠ creation of individual profiles of professionals
  ⇔ but : **analysis on an aggregated level** (dimensions:age, sex, language, sector)

After Approval

- Crossroads Bank collects the requested data from sources and replaces national ID number with anonymous code
- Transmission of data to Unit Planning
- Unit Planning performs the data linking, based on anonymous code

Selected variables : examples

Health Professionals Register	Health Insurance (NIHDI)	Datawarehouse Labour Market
• Degree (Type & language) • Recognition, Visa • Age & Sex • Nationality • …	• Profile Data Medical practitioners • Number of Medical Acts • Forfait, … • Acts by type • …	• Professional status • Sector employer (NACE) • FTEs • District of employment • …

Example of linked data

	Register			Social Security		Health Insurance		Indep.
ANON. ID Nr.	Age	Sex	District	FTE	Sector Employer	Acts	Spec Codes	Categ. Indep.
1	25-29	M	Namur	/	/	3000	014	Primary
2	35-39	F	Genk	/	/	0	179	/
3	45-49	M	Bruges	/	/	0	/	/
4	30-34	M	Huy	0.45	Health	2000	186	Second.
5	50-54	F	Brussels	0.55	Industry	0	/	/
…	..	..	..	..	..	..	..	..

Possibilities PlanCAD

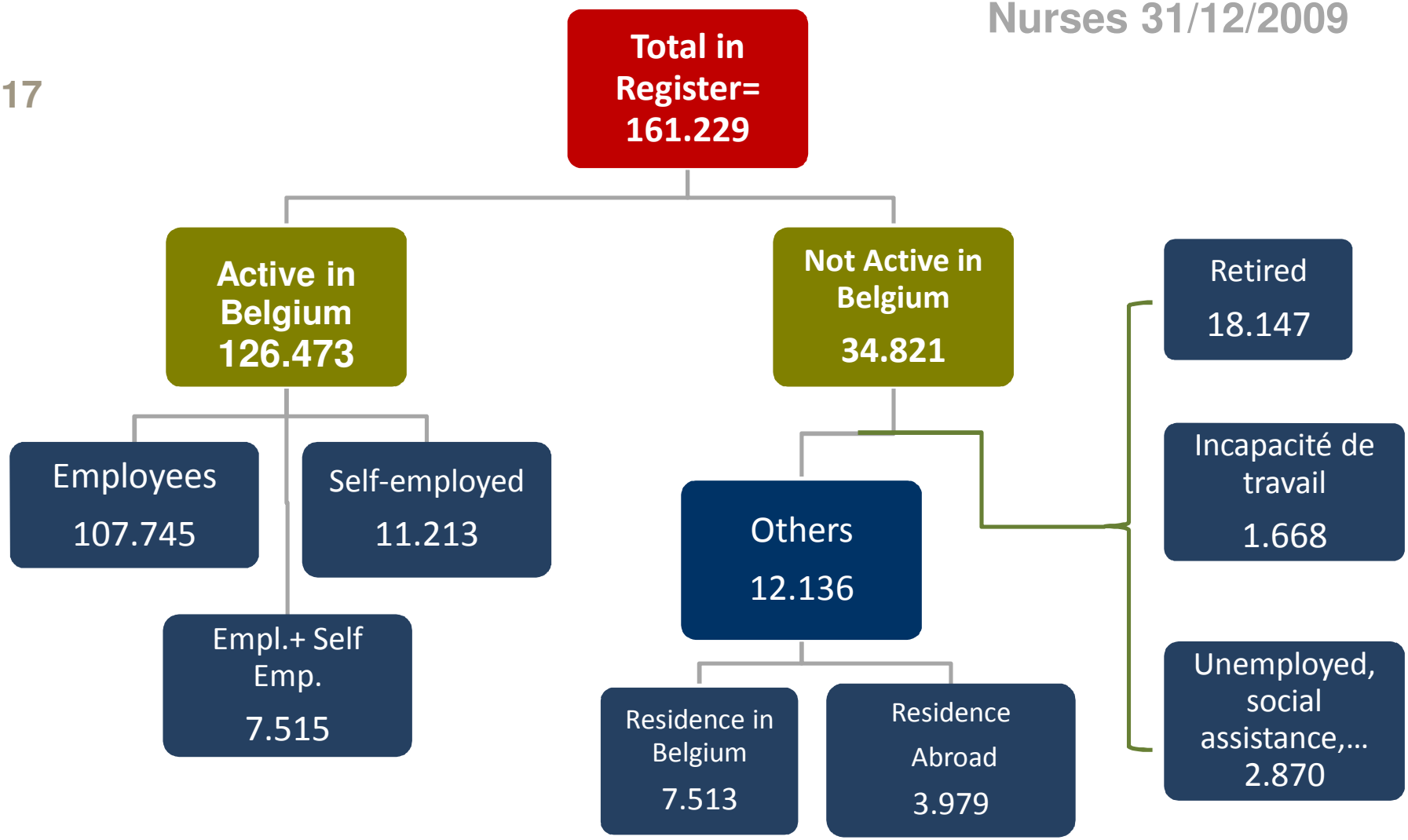
- **Information about** :
  - Level and type of activity of the different segments of the workforce of a professional group
  - FTE-volumes and mean FTEs
  - Geographical distribution of the existing workforce
  - Evolutions 2004-2012
  - Analyses of the activity by nationality, age, sex, district
- …

- ! Possibilities can be expanded by adding further data sources

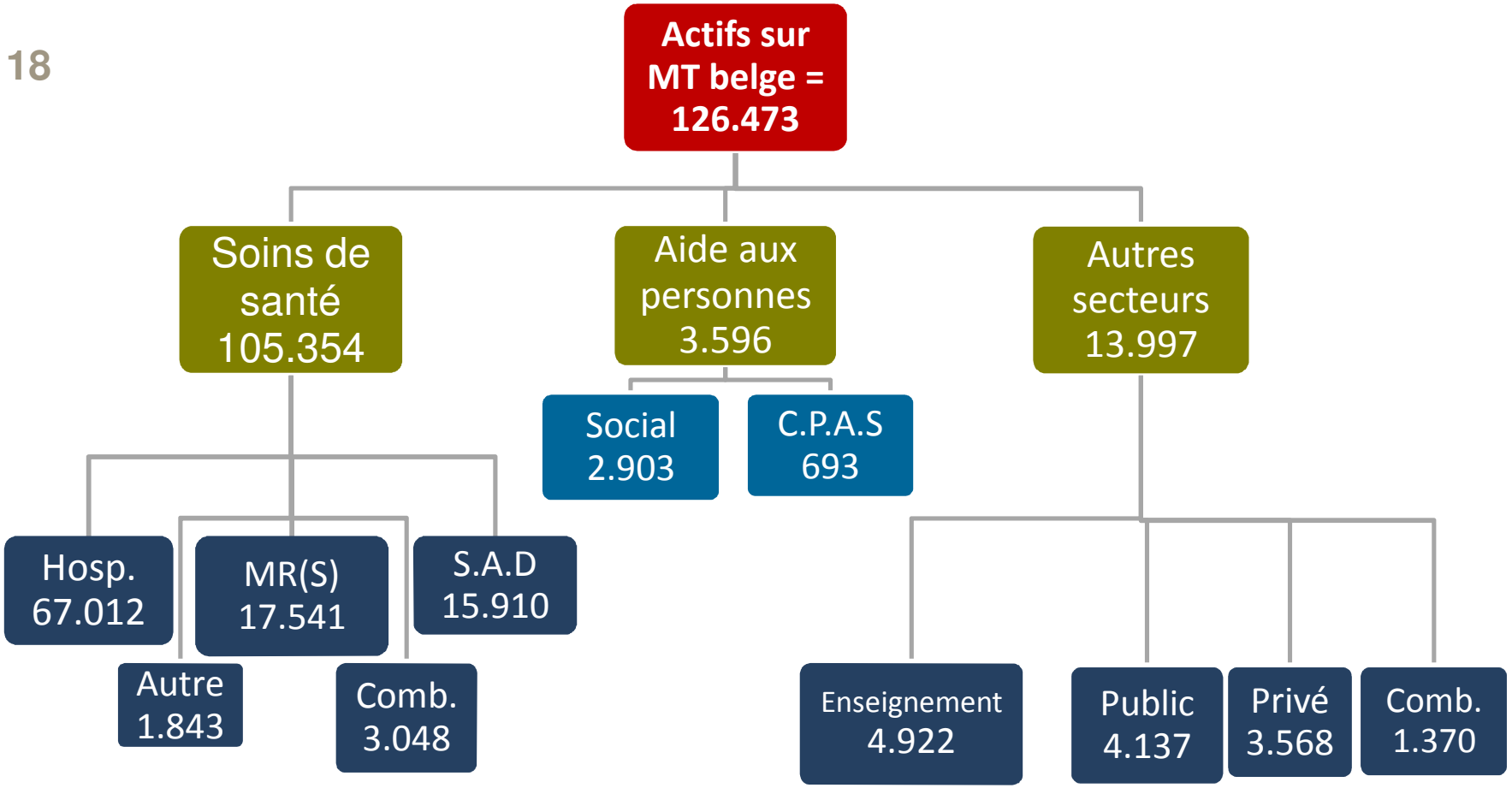
Too much data ! !

- => Automating analysis & reporting
- Standardized approach for the different professions / specialties
  - Statistical programming ('SAS macros')
  - Analysis template to produce standardized reports for each (sub-)specialty
  - ! reporting in bi-lingual context (labelling & legends)
- Some examples : => …

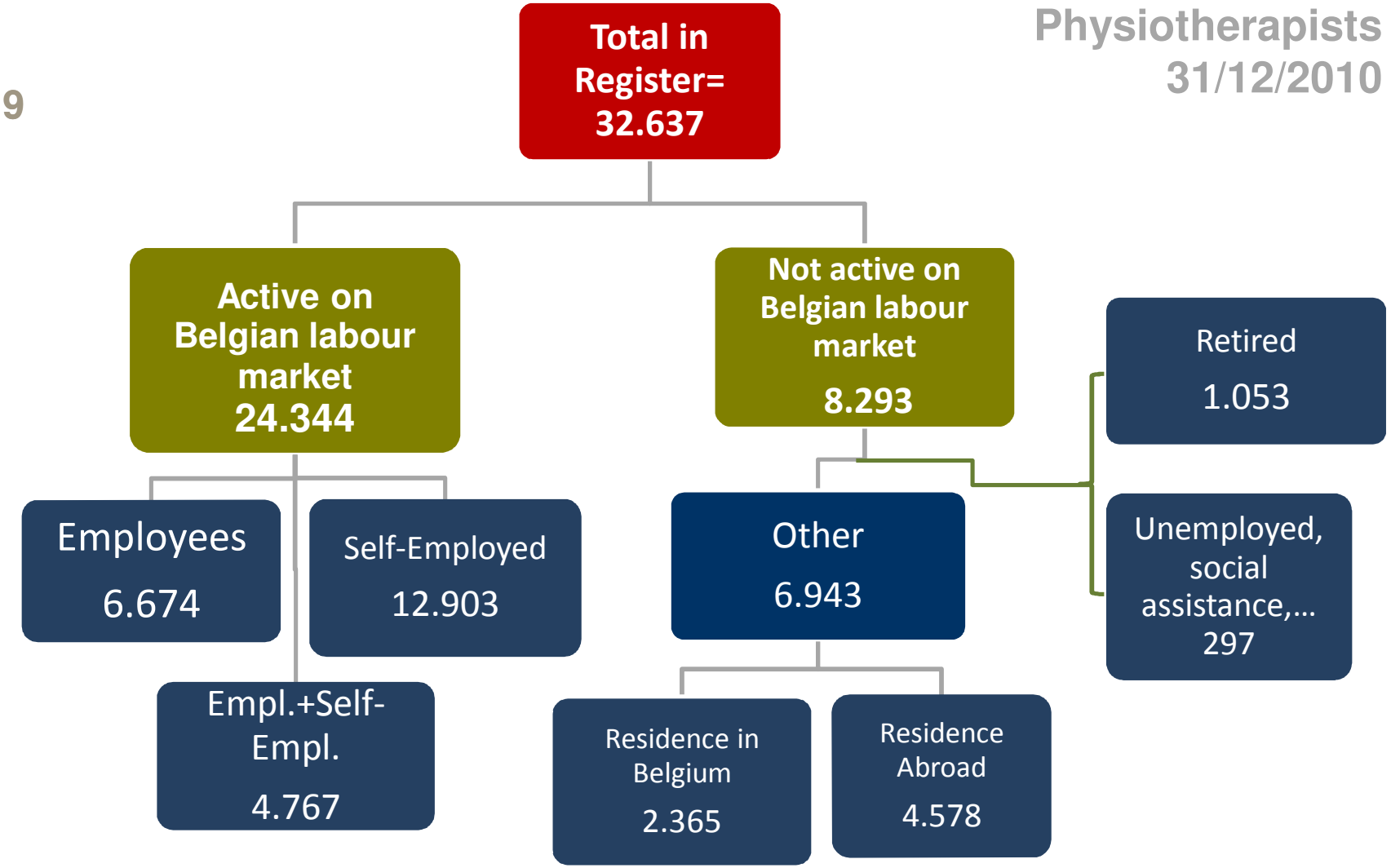
Nurses 31/12/2009



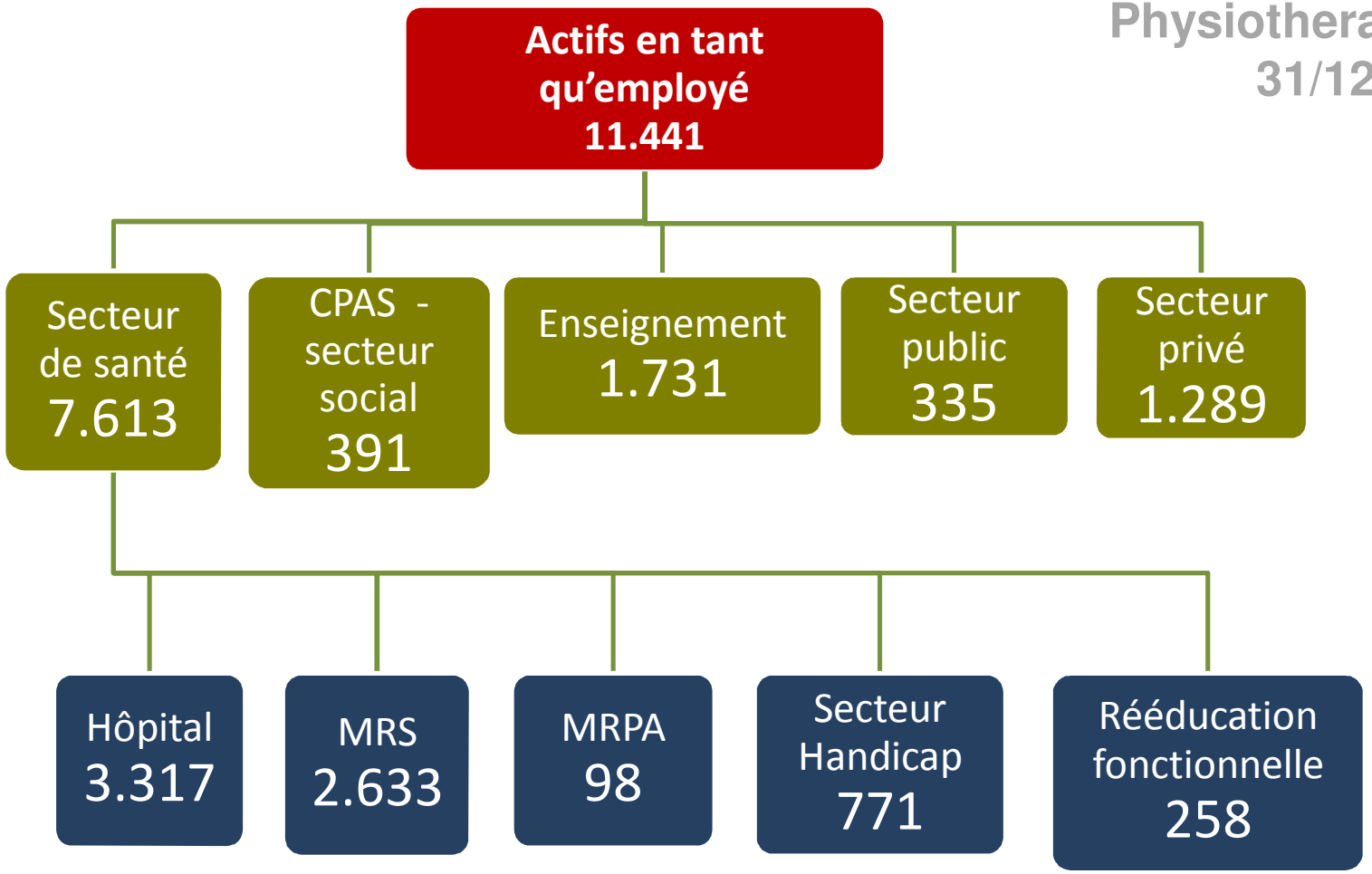
Nurses 31/12/2009



Physiotherapists 31/12/2010



Physiotherapists 31/12/2010



Physicians- Age pyramids-active individuals

	Totaal				Mannen		Vrouwen		Leeftijdspiramide
	N	RIZIV	%RIZ	% van totale aantal	N	%RIZ	N	%RIZ	% van totale aantal
.. < 30	1	0	0,0		1	0,0	0	0	
30 < 35	95	60	63,2		61	68,9	34	52,9	
35 < 40	174	141	81,0		122	82,0	52	78,8	
40 < 45	162	137	84,6		116	86,2	46	80,4	
45 < 50	184	161	87,5		141	87,2	43	88,4	
50 < 55	180	142	78,9		147	80,3	33	72,7	
55 < 60	144	124	86,1		127	87,4	17	76,5	
60 < 65	125	105	84,0		116	85,3	9	66,7	
65 < 70	69	40	58,0		66	59,1	3	33,3	
70 < 75	47	15	31,9		41	29,3	6	50,0	
75 < ..	88	13	14,8	05 10	84	15,5	4	0,0	10 05 05 10
	1.269	*938*	*73,9*		*1.022*	*74,1*	*247*	*73,3*	

! Embargo => fictional data !

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Age pyramids – FTEs by sector

	Totaal					Mannen				Vrouwen				Leeftijdspiramide
	RIZIV	G.[1]	RSZ	G.[2]	% van totale volume	RIZIV	G.[1]	RSZ	G.[2]	RIZIV	G.[1]	RSZ	G.[2]	% van totale volume
.. < 30	0	0	0	0		0	0	0	0	0	0	0	0	
30 < 35	38	0,49	30	0,74		32	0,58	21	0,76	6	0,27	9	0,70	
35 < 40	147	1,02	38	0,81		120	1,17	29	0,80	27	0,65	9	0,86	
40 < 45	158	1,12	27	0,85		132	1,27	19	0,85	26	0,69	8	0,85	
45 < 50	199	1,21	20	0,78		166	1,31	11	0,68	33	0,87	10	0,95	
50 < 55	171	1,18	25	0,88		160	1,34	23	0,88	11	0,43	2	0,88	
55 < 60	143	1,10	18	0,86		133	1,16	15	0,85	10	0,65	3	0,89	
60 < 65	102	0,94	19	0,81		100	0,98	17	0,79	2	0,34	2	1,00	
65 < 70	24	0,44	2	0,42		24	0,45	2	0,42	0	0,07	0	0	
70 < 75	5	0,18	0	0		4	0,17	0	0	1	0,25	0	0	
75 < ..	2	0,10	1	0,93	05 10 15	2	0,10	1	0,93	0	0	0	0	15 10 05 05 10 15
	989	*0,98*	*181*	*0,81*		*872*	*1,06*	*138*	*0,80*	*117*	*0,61*	*43*	*0,84*	

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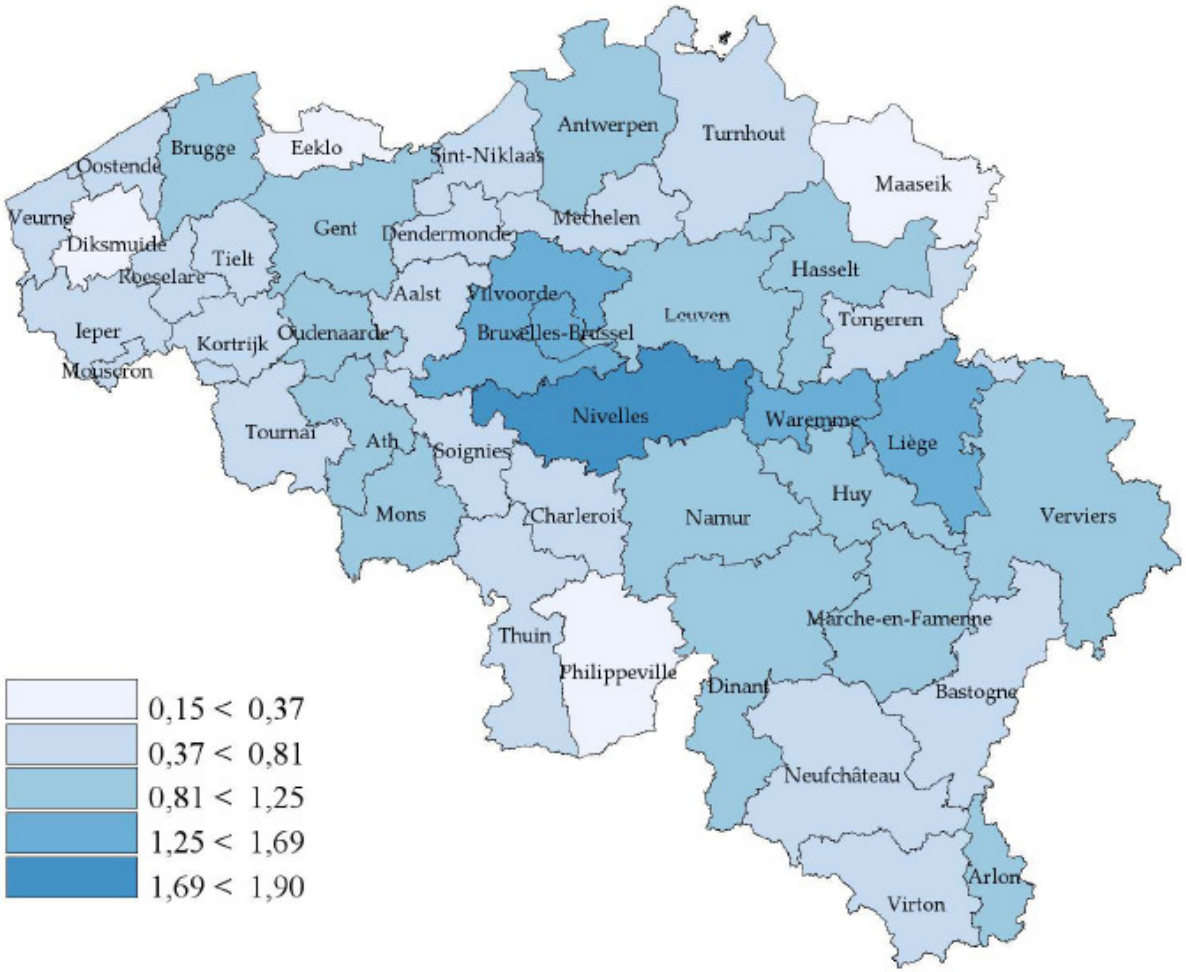
Densities and mean activity levels

	FOD		RIZIV				RSZ+	% Leeftijd			% Geslacht	
Woonplaats	N[1]	Dens.[1]	N[2]	Dens.[2]	VTE	Gem.	N[3]	% N[1] ..<45	% N[1] 45<65	% N[1] 65-..	% N[1] V	% N[1] M
Brussel	156	1,35	136	1,18	86	0,63	27	31,41	56,41	12,18	33,33	66,67
West-Vlaanderen	70	0,60	67	0,57	96	1,43	4	41,43	50,00	8,57	12,86	87,14
Oost-Vlaanderen	122	0,84	109	0,75	131	1,20	19	45,08	51,64	3,28	23,77	76,23
Vlaams-Brabant	138	1,25	123	1,12	156	1,26	50	41,30	55,80	2,90	16,67	83,33
Antwerpen	127	0,71	110	0,61	142	1,29	23	45,67	50,39	3,94	17,32	82,68
Limburg	63	0,74	53	0,62	76	1,44	6	47,62	47,62	4,76	9,52	90,48
Henegouwen	88	0,66	83	0,62	66	0,80	8	25,00	62,50	12,50	13,64	86,36
Waals-Brabant	74	1,90	70	1,80	63	0,90	16	33,78	55,41	10,81	24,32	75,68
Namen	44	0,91	41	0,85	47	1,16	7	38,64	56,82	4,55	25,00	75,00
Luik	129	1,19	123	1,13	108	0,88	20	38,76	53,49	7,75	25,58	74,42
Luxemburg	20	0,73	17	0,62	16	0,93	1	25,00	75,00	0,00	5,00	95,00
Buitenl. & Onbekend	106	.	6	.	2	0,36	1	33,02	66,98	0,00	20,75	79,25
Brussels Hoofdst. gew.	156	1,35	136	1,18	86	0,63	27	31,41	56,41	12,18	33,33	66,67
Vlaams gewest	520	0,81	462	0,72	600	1,30	102	44,04	51,73	4,23	17,12	82,88
Waals gewest	355	1,00	334	0,94	301	0,90	52	33,52	57,75	8,73	21,13	78,87

Densities : professionals / 10.000 inhabitants



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Evolution 2004-2012

WG	Totaal - Individuen					VTE			Grafische weergave
	RIZIV	Comb.	RSZ+	Ander	INDEX	RIZIV	RSZ+	INDEX	-
2004	223	40	7	12	100	252	51	100	
2005	231	46	7	10	104	263	52	104	
2006	238	46	5	9	106	261	50	102	
2007	263	44	6	13	116	293	53	114	
2008	274	45	4	13	119	292	49	112	
2009	273	45	5	11	118	279	47	108	
2010	280	43	8	10	121	281	50	109	
2011	279	44	7	14	122	298	49	114	
2012	284	50	5	16	126	301	51	116	

Methodological Challenges

- Available administrative data has not been collected **with workforce planning in mind**
- Requires **transformation & interpretation**
  - Definition of activity thresholds
  - FTE calculation not straightforward
  - Combining different variables to construct wanted parameter

Attention to data quality

- ! Data quality is dependent on quality of source databases (correct registration, coding, transmission) + correct functioning of data clearing house
- ! Quality control necessary
  - Checking delivered data are complete and correct
  - E.g. Looking at time-series to spot anomalies…
  - cross-checks between different sources

From stock to scenario

First:

Detailed description of the HWF on 31/12/2012

Then:

Data is fed into mathematical model and in combination with expected evolutions & proposed policy actions => projections for period 2012-2062 (5-year intervals)

- = Tool to develop and evaluate Workforce Planning measures

- Future scenario physicians : mid 2015

Continuous improvement & expansion

PlanCAD is a work in progress

- On basis of feedback, information requests and encountered shortcomings, we adapt and expand the data linking to other sources and new variables
  - (=> effort to reflect realities of labour market)
- Datawarehouse Labour Market & Social Protection adds to its reach
- Some planned improvements:
  - Location of care provided by self-employed professionals
  - Information about border labour
  - Improving FTE parameter

Future Steps

- Up to now : 'One shot' Data linking projects by profession
- From 2015 onwards : setting up recurrent data linking for all recognised health professions
  - ➢ requires complex initial set up
  - ➢ reduced administrative overhead
  - ➢ improved data availability
  - ➢ Need for interactive and flexible reporting

PlanCAD Editions

- PlanCad Nurses N°1
- PlanCad Nurses N°2 (published)
- PlanCad Physiotherapists (published)
- PlanCad Physicians & Dentists
- (reception data summer 2014 – publication Trim.1 2015)
- From PlanCAD projects to PlanCAD system :
  recurrent data linking for all recognised health care professions

Strengths

- ✓ Department of health maintains the federal database of registered health professionals – information about individuals licensed to practice. Solid base to set up data linking
- ✓ Data linking projects allows us to identify the 'active' part of the registered workforce
  - ✓ Information about work setting & region
  - ✓ Access to data about practising and activity volume (FTE)
- ✓ built up know-how in managing and analysing large datasets in various PlanCAD projects => move to permanent data linking system

Challenges

- ✓ Process of collecting & linking data is complex (privacy issues – data availability) – currently leads to 2-years delay before data can be used for planning purposes

- ✓ privacy reasons → level of available detail can be restricted (e.g. nationality)

- ✓ Administrative data has been collected with other finality and may not always 'fit' workforce planning needs – interpretation & transformation needed

How to start ?

- ✓ Start by identifying data needs and look for matching data sources
- ✓ Build up network with data providers, obtain access rights, legal framework
- ✓ Data linking can start small and gradually increase in scope (+sources/+variables)
  - Use proxy variable if data is not (yet) available
  - Conduct ad hoc sample studies to obtain missing data

Why invest in data collection & quality?

- Detailed **monitoring** of the supply and activity level of the recognised health professions
- Development of future scenarios using **reliable** source data
- **Timely** prediction of future shortages, bottlenecks, oversupply
- Providing **evidence based** recommendations and policy advice

⇒Main goal : health workforce planning based on up-to- date, complete and accurate data

Final remarks

- Essential information for workforce planning purposes may be available in existing administrative databases
- Improving quantity & quality of available data is a continuous process
- Data can be efficiently analysed and reported using automated procedures
- ! Data is means to an end = groundwork to enable workforce forecasting and planning

Thank you!

Contact : plan.team@health.belgium.be

Consult our publications at:

http://www.health.belgium.be/hwf

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