

- THE “EASY AND FLEXIBLE” FORECASTING MODEL IN THE DANISH PLANNING SYSTEM

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Main aspects:

- *Denmark has chosen a simple forecasting model combining a quantitative and qualitative approach;*
- *The model is quite cheap. The Danish Health and Medicines Authority (DHMA) uses approximately 0,25-0,5 FTE per year doing the modeling (not taking into account the time spent by the stakeholders and the statistical analyst placed at Statens SerumInstitut);*
- *At the same time the model is easy to update in view of the fact that it's simple and the assumptions in the forecasting model are re-assessed in light of changing circumstances, new data, new policies and programs;*
- *There is a high degree of stakeholder involvement in the development and adjustment of the forecasting model, so the process of forecasting and setting the number of postgraduate training posts is very transparent.*
- *The supply forecasting model used for the four professions; doctors, dentists, dental hygienists and clinical dental technicians is basically the same*
- *The HWF forecasting model produces different scenarios on the base of different patterns values (i.e. university training capacity, and retirement patterns) for the supply of dentists, dental hygienists and clinical dental technicians. However, for the coming supply forecast they plan on implementing scenarios for doctors, too.*
- *For doctors the forecasting model assumes there are imbalances at the starting point, conversely for dentists, dental specialists, dental hygienists and clinical dental technicians a current equilibrium between supply and demand is assumed.*

Description:

In Denmark forecasting of health workforce is done for four professions; doctors (medical specialists included), dentists (dental specialists included), dental hygienists and clinical dental technicians.

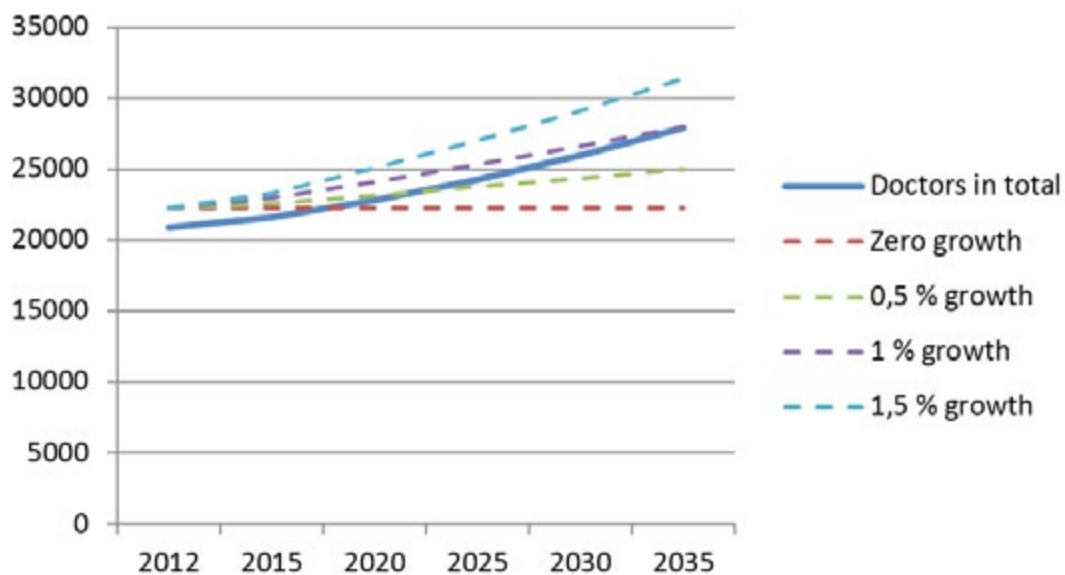
The Danish Health and Medicines Authority (DHMA) is responsible for the forecasting.

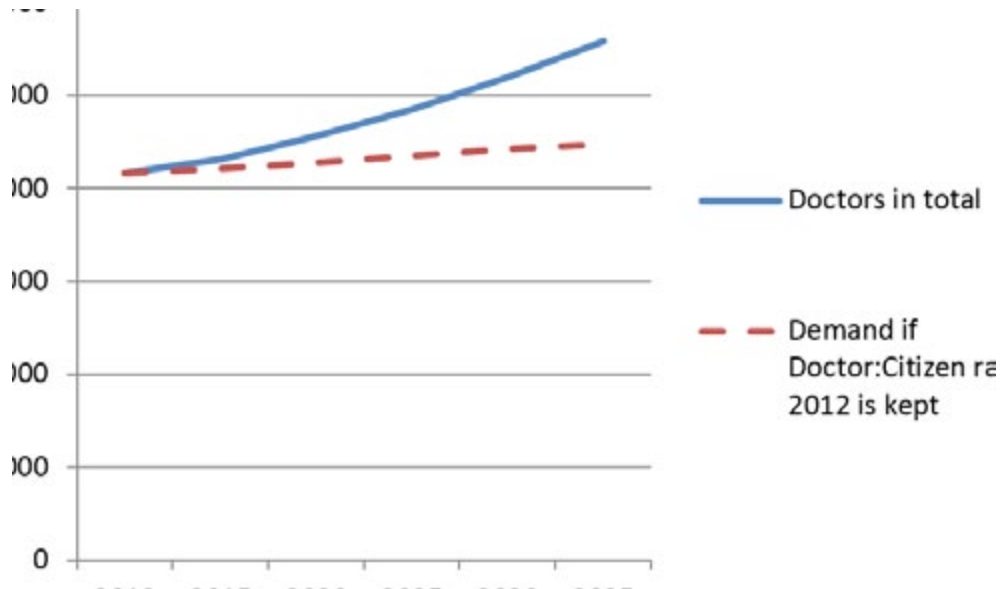


To assist the DHMA in the forecasting, the DHMA has established two Planning and Forecasting Committees in which different relevant stakeholders are represented. The Committees advice DHMA regarding the contents of the forecasting, the assumptions used and so forth. This implies that when DHMA wants to update the forecast the committees are involved.

The Danish forecasting process is divided into two processes. In the first process a quantitative forecast is produced. It's basically a stock and flow model where some of the assumptions are based on a classic time series analysis and other assumptions e.g. mortality and retirement is modelled with a logistic regression analysis. The second process is a hearing process involving relevant stakeholders.

The quantitative forecast includes a supply side and five very simplistic scenarios for the demand side. One scenario showing the demand for workforce if the current ratio between the profession and population size is being kept and four scenarios showing the expected demand for workforce if we see a 0 %; 0,5 %; 1 % or 1,5 % increase in demand per year. For doctors we assume imbalances between supply and demand at the starting point. For dentists, dental specialists, dental hygienists and clinical dental technicians a current equilibrium between supply and demand is assumed. The demand scenarios for doctors are illustrated in the figures below.





The forecast is updated every second or third year. The forecast is as already mentioned primarily focused on the supply side. However every fifth year a plan setting the number of postgraduate training post for medical and dental specialists is drawn up. In this process DHMA involve relevant stakeholders in a hearing process. Among the stakeholders is for example the Danish Regions, the Danish Medical Association, three Regional Councils for Postgraduate Medical Education and the Danish Medical Societies.

In the hearing process the stakeholders are presented with data regarding the current supply within the specific medical specialty or dental specialty. Both on a national and regional level. On the basis of the data presented the stakeholders are invited to answer a series of questions. For example:

- *How is the current balance between supply and demand perceived?*
- *Are there any specific regional differences in the supply or demand the plan must take into account?*
- *Is the demand expected to exceed or be lower than the expected supply? If so, why?*
- *Which factors is expected to influence the future demand within the medical specialty?*

The information provided by the stakeholders is first of all considered by the Planning and Forecasting Committees subcommittee. The subcommittee examines the data and information provided by the different stakeholders and draws up a plan for the number of postgraduate training posts. In examining the information provided the subcommittee tries to take different factors into account for example:

- *How many doctors/dentists can be expected to begin a postgraduate training post?*



- *Are there any special areas in an acute need of specialists?*
- *If the number of postgraduate training posts is increased in one specialty it can affect the demand for specialists in another specialty*
- *Increasing the number of postgraduate training posts in specialties having no problem recruiting can have a negative effect on recruitment to specialties already facing recruitment difficulties.*
- *The educational capacity in the different specialties.*

When the subcommittee has drawn up the plan it's first of all presented in the Planning and Forecasting Committee. If the committee gives the green light to the plan, it is afterwards presented in the National Council for Postgraduate Medical Education (for doctors) or presented in the National Council for Postgraduate Dental Education (for dentists).

It happens sometimes that small changes occur to the plan which is afterwards released by DHMA. As a general rule the plan for the number of postgraduate training posts cover a five year period and the Danish Regions and other stakeholders involved in the postgraduate education of doctors and dentists are required to follow the plan. However, if stakeholders within this five year period submit relevant information regarding the number of postgraduate training posts, the number can be changed within this period.

Results:

The quantitative forecast shows the expected supply within the profession and specialty. The supply forecast for doctors and medical specialist is presented below.

	2012	2015	2020	2025	2030	2035
GENERAL PRACTICE	4.458	4.370	4.454	4.708	5.212	5.732
ANAESTHETICS	970	1.038	1.094	1.122	1.167	1.247
OCCUPATIONAL MEDICINE	91	87	77	86	113	146
CHILD AND ADOLESCENT PSYCHIATRY	166	194	246	318	397	467
DERMATO-VENEROLOGY	154	156	172	204	238	268
DIAGNOSTIC RADIOLOGY	484	517	558	617	683	758



GYNAECOLOGY AND OBSTETRICS	549	560	554	581	618	669
GENEREL INTERNAL MEDICINE	155	128	85	49	20	5
GENEREL INTERNAL MEDICINE: ENDOCRINOLOGY	188	207	234	270	299	337
GENEREL INTERNAL MEDICINE: GASTROENTEROLGY AND HEPATOLOGY	165	179	192	224	258	297
GENEREL INTERNAL MEDICINE: GERIATRICS	87	92	126	176	228	282
GENEREL INTERNAL MEDICINE: HEAMATOLOGY	102	111	136	169	200	229
GENEREL INTERNAL MEDICINE: INFECTIOUS DISEASES	74	88	111	135	161	186
GENEREL INTERNAL MEDICINE: CARDIOLOGY	344	363	405	450	483	520
GENEREL INTERNAL MEDICINE: RESPIRATORY DISEASES	125	143	171	212	255	305
GENEREL INTERNAL MEDICINE: NEPHROLOGY	110	123	149	167	186	204
GENEREL INTERNAL MEDICINE: RHEUMATOLOGY	214	208	224	269	313	369
VASCULAR SURGERY	75	84	88	93	102	113
GENERAL SURGERY	482	489	512	525	549	587
CLINICAL BIOCHEMISTRY	86	87	83	94	113	133
CLINICAL PHARMACOLOGY	36	42	57	75	91	104
CLINICAL PHYSIOLOGY AND NUCLEAR MEDICINE	85	103	126	145	162	181
CLINICAL GENETICS	26	44	59	78	94	111

CLINICAL IMMUNOLOGY	42	50	56	64	71	82
CLINICAL MICROBIOLOGY	95	99	106	111	121	135
CLINICAL ONCOLOGY	140	185	282	391	493	586
NEUROLOGICAL SURGERY	85	90	90	88	87	86
NEUROLOGY	292	324	386	459	526	592
OPHTHALMOLOGY	310	318	329	368	417	461
ORTHOPADIC SURGERY	700	740	770	782	804	867
OTO-RHINO-LARYNGOLOGY	342	349	349	385	416	440
PATHOLOGICAL ANATOMY AND CYTOLOGY	186	194	213	246	289	330
PLASTIC SURGERY	95	100	111	122	132	148
PSYCHIATRY	808	790	738	786	901	1.056
PAEDIATRICS	409	435	472	526	583	631
FORENSIC MEDICINE	9	12	19	28	35	43
PUBLIC HEALTH MEDICINE	137	130	136	144	158	184
THORACIC SURGERY	89	91	87	78	72	71
UROLOGY	157	167	192	216	245	279
MEDICAL SPECIALISTS TOTAL	13.125	13.486	14.246	15.561	17.292	19.236
DOCTOR WITHOUT SPECIALTY	7.720	8.088	8.559	8.699	8.685	8.657
DOCTOR IN TOTAL	20.845	21.574	22.805	24.260	25.977	27.894
DOCTORS ON LEAVE	918	987	1.078	1.130	1.165	1.196

DOCTORS IN TOTAL (INCL. DOCTORS ON LEAVE)	21.764	22.561	23.883	25.390	27.142	29.090
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Furthermore, as described, the forecast includes simplistic scenarios for the demand side. This makes it possible to have a discussion on how much growth is needed. Also, it make possible to establish what growth is acceptable when trying to take into account that there has to be future funding to support the increase in health workforce. At the same time, the scenarios make it possible to compare with some historic trends in the health workforce growth.

On the basis of the forecast as earlier described, a plan for the number of postgraduate training posts is drawn up. Furthermore DHMA advises the Minister of Higher Education and Science regarding the student intake within the 4 professions: doctors, dentists, dental hygienists and clinical dental technicians.

In the current Danish model a lot of trust is put into the stakeholders' advice even though it doesn't support the stakeholders with a lot of data regarding scenarios for the future demand for workforce. The stakeholders in that regard play a crucial role and if their advices turns out to be based on a wrong set of assumptions Denmark probably won't reach a balance between supply and demand in the future.

From time to time, stakeholders therefore encourage the DHMA to make a more elaborate demand forecast so that it's easier for the stakeholders commenting on the needed amount of health workforce. Making more elaborate demand scenarios where it's tried to model some expected trends in the health care sector should in theory make the stakeholders able to give better advice to the DHMA. At the same time a description of future scenarios for the health care sector should make it possible for politicians to have a discussion on in which direction the healthcare sector should be developed.

On the downside, a more elaborate demand model would also cost more to develop and regularly update than the current model and it's not sure whether the scenarios developed will give a more accurate picture of the future than the different stakeholders' current advice.



Helpful tips:

- *Establish a planning and forecasting committee;*
- *Establish a subcommittee that tries to implement the planning and forecasting committees wishes into a technical forecasting model;*
- *In the first years of modelling focus on developing a supply forecast combined with simplistic scenarios for the demand side;*
- *Develop a qualitative method for involving stakeholders in the description of future demand.*

Further information:

Currently the DHMA plan to update the forecast for doctors and medical specialists. For that task they have involved the Planning and Forecasting's subcommittee to review the model. For our next forecast they plan to include scenarios showing:

- *The expected supply if retirement age is increased by 2 years;*
- *The expected supply of medical specialists if all postgraduate training posts are filled;*
- *The expected supply of medical specialists if more postgraduate training posts than set in the current plan are filled;*
- *The expected supply of medical specialists if the future number of filled postgraduate training posts corresponds to the average number of posts filled in the period 2012-2014;*
- *The expected supply of doctors if we see an increase or decrease in the student intake;*
- *The expected demand based on the historic trend in health expenditure per capital;*
- *The expected demand for workforce if we see a 2 %, 3 % and 4 % increase in demand per year.*

The current forecasts and plans setting the number of postgraduate training posts are only available in Danish, and can be found in the links below.

- Forecast for Doctors <http://sundhedsstyrelsen.dk/publ/Publ2013/02feb/Laegeprogn2035.pdf>
- Plan for the number postgraduate training posts for medical specialists <https://sundhedsstyrelsen.dk/da/uddannelse-autorisation/special-og-videreuddannelse/prognose-og-dimensionering/~media/B19C3BD8AD734793B5B2BF9A998F23C7.ashx>
- Forecast for Dentists, dental hygienists and dental technicians http://sundhedsstyrelsen.dk/publ/Publ2013/12dec/Tandplejeprognose2013_2035.pdf
- Plan for the number postgraduate training posts for dental specialists <https://sundhedsstyrelsen.dk/da/uddannelse-autorisation/special-og-videreuddannelse/prognose-og-dimensionering/~media/56CE3E72A3E54886B8BBB656A9F939C7.ashx>