No.3, Issue IV. March 2016
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Actualities of Hungarian pharmaceutical financing market

Newsletter

HEALTHWARE CONSULTING LTD.

News, current issues

- **Legislations** come into force between 01/02/2016 and 01/03/2016: there was no modification during this period
- **ARTICLE:** *"The National Health Insurance Fund's data service activity - the "Public Data Public Treasure"* link
- **NEWS:** *"Orban agreed the restructure of healthcare "* link
- **NEWS:** *"What will happen to the hospitals? - the Secretary of State spoke"* link
- **NEWS:** *"Swedish industry wants European medicines agency if UK quits EU"* link
- **NEWS:** *"Setback is coming in pharmaceutical acquisitions?"* link
- **NEWS:** *"Europe launches new fast approval scheme for promising drugs"* link
- **NEWS:** *"Ten thousand beds will be transferred from healthcare to social system"* link

Macro approach to financing healthcare and medicinal products

Balance of the Health Insurance Fund

Billion HUF

Health Security Fund	2015. I-XII.	2016 original appropriation	2016		
			I. month	% of appropriation	% of last year
Total of Budgetary Expenditures	**1 955,3**	**1 963,7**	**158,9**	**97,1%**	**102,8%**
Curative preventive provisions	960,6	982,4	78,1	95,4%	105,6%
Medicine subsidies	326,2	305,1	26,5	104,4%	101,8%
Medicine subsidies (pharmacy)	310,6	231,4	26,3	136,4%	101,2%
Total of Budgetary Revenues	**1 925,4**	**1 963,7**	**179,7**	**109,8%**	**105,6%**
Social Security Contributions	1 223,4	1 417,0	134,1	113,6%	119,8%
Contribution of Pharmaceutical Manufacturers and Wholesalers	65,3	58,0	4,8	98,3%	94,5%
Balance	**-29,9**	**0,0**	**20,8**		**134,3%**

In expenditures and revenues of 2016 budget, there is 2,77% increase compared to appropriation of 2015 and 0,43% increase compared to fulfilment of 2015. The central budget contribution is planned to be less with 26,5% than last year fulfilment, and this gap is filled with the 18,2% higher social security contribution (218 billion HUFs). The medicine subsidies plan is lower with 21,2 billion HUFs than last year expenses, but higher with 7 billion HUFs than the last year's original appropriation.
In the first month of 2016 the Health Security Fund produced a 12,69% surplus due to the higher social security contributions (+13,6%). Medicine subsidies shows 4,4% surplus as a result of the medicines' higher turnover particularly that reimbursement based on special permission.

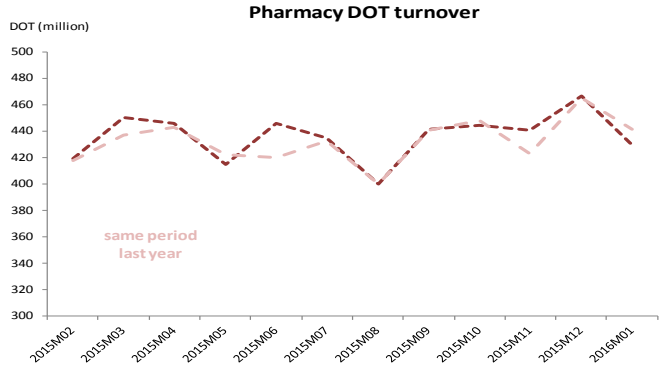
Changes to subsidised medicinal product categories

Changes in the public drug list	2015 Oct.	2015 Nov.	2015 Dec.	2016 Jan.	2016 Feb.	2016 Mar.	2016
Number of new products	34	23	8	28	9	19	56
Number of new AI	2	3	1	5	0	1	6
Number of delisted products	40	18	20	27	18	9	54
Prices							
Decrease	120	8	0	31	3	5	39
Increase	0	0	0	0	0	0	0

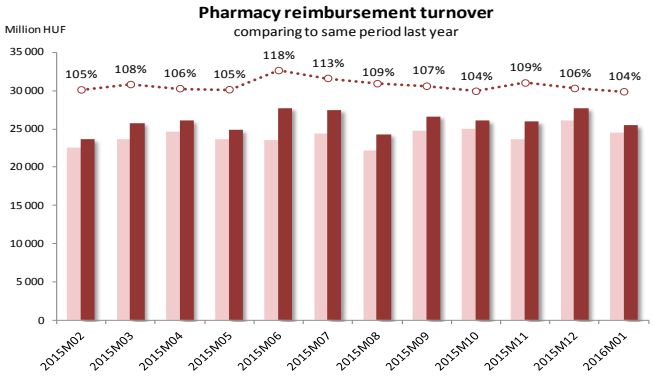
Changes in the public drug list	2015 Oct.	2015 Nov.	2015 Dec.	2016 Jan.	2016 Feb.	2016 Mar.	2016
Reimbursement							
Decrease	389	5	0	40	1	6	47
Increase	56	0	0	24	2	0	26
Co-payment							
Decrease	171	12	0	67	4	6	77
Increase	313	0	0	16	0	1	17

Source: Healthware analysis based on OEP-PUPHA data

Dynamics of the sales/circulation of prescription-only-medicine



Source: Healthware analysis based on OEP's data



Source: Healthware analysis based on OEP's data

Prescription drugs' DOT turnover in 2015 was 1,04% higher than in 2014, so the trend of drug consumption is still increasing, but in slower rate than in 2014 (2,74%) or 2013 (2,23%); while the reimbursement turnover was higher with 7,44%. The average reimbursement per DOT was higher with 6,34% than the 2014's average. New innovative reimbursement decisions were made in 2014 and 2015 generated 3,1% and 0,65% of annual reimbursement turnover, while only 0,4% of annual DOT turnover.
Drug sales in the first month of 2016 was 2,72% lower than the same period last year, while the average reimbursement per DOT increased with 6,44%. The reimbursement turnover was higher with 3,54% for this period compared to last year.

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Market data

Marketing authorisation information

2015	EMA	OGYI
New brands	90	185
New SKUs	873	2 149

2015 - Q4	EMA	OGYI
New brands	22	41
New SKUs	149	479

January 2016	EMA	OGYI
New brands	9	9
New SKUs	86	77

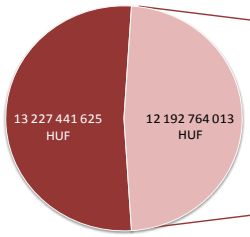
Source: Healthware analysis based on OGYI's and EMA's data

Average number of medical sales reps; 01/2016

All	1 590
Medicinal products	1 337
Medical aids	237
Both	16

Source: Healthware analysis based on OGYI's

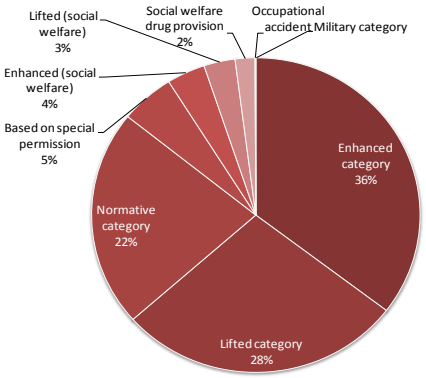
TOP10 DISTRIBUTOR by all reimbursement paid in January 2016



TOP 10 - DISTRIBUTOR	Reimbursement
Novartis Hungária Kft.	2 363 735 559 HUF
SANOFI-AVENTIS Zrt.	1 608 901 385 HUF
EGIS Gyógyszergyár Zrt.	1 295 975 653 HUF
Richter Gedeon Vegyészeti Gyár NyRt.	1 239 105 134 HUF
TEVA Gyógyszergyár Zrt.	1 179 463 922 HUF
Pfizer Kft.	1 101 600 069 HUF
Novo Nordisk Hungária Kft.	942 703 282 HUF
Lilly Hungaria Kft.	837 260 210 HUF
Janssen-Cilag Gyógyszerkereskedelmi Marketing Szolgáltató K	814 602 555 HUF
Sandoz Hungária Kereskedelmi Kft.	809 416 244 HUF

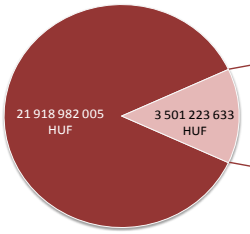
Source: Healthware analysis based on the sales turnover that pharmacies produced from POM

Drug reimbursement by legal title; 01/2016



Source: Healthware analysis based on the sales

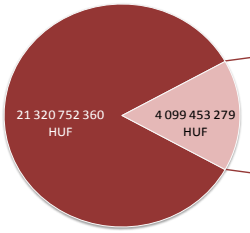
TOP10 BRAND by all reimbursement paid in January 2016



TOP 10 - BRAND	Distributor	Reimbursement
CLEXANE	SANOFI-AVENTIS Zrt.	531 963 798 HUF
GLIVEC	Novartis Hungária Kft.	520 587 684 HUF
XEPLION	Janssen-Cilag Gyógyszerkereskedelmi Market	433 129 749 HUF
SPIRIVA	Boehringer Ingelheim Pharma Gesellschaft m.	347 447 568 HUF
LANTUS	SANOFI-AVENTIS Zrt.	334 050 189 HUF
HUMULIN	Lilly Hungaria Kft.	283 928 352 HUF
TASIGNA	Novartis Hungária Kft.	272 224 688 HUF
SUTENT	Pfizer Kft.	267 068 038 HUF
TECFIDERA	Biogen Idec Hungary Kft.	265 269 414 HUF
LEVEMIR	Novo Nordisk Hungária Kft.	245 554 153 HUF

Source: Healthware analysis based on the sales turnover that pharmacies produced from POM

TOP10 ATC by all reimbursement paid in January 2016



TOP 10 - ATC	International non-proprietary name (INN)	Reimbursement
B01AB05	enoxaparin	531 963 798 HUF
V06D	other nutrients	522 978 541 HUF
L01XE01	imatinib	520 587 684 HUF
N05AX13	paliperidone	500 711 751 HUF
C10AA07	rosuvastatin	415 097 899 HUF
R03BB04	tiotropium bromide	347 447 568 HUF
A10AE04	insulin glargine	341 549 216 HUF
A10AB01	insulin (human)	341 454 891 HUF
C09BA04	perindopril and diuretics	305 437 243 HUF
L01XE08	nilotinib	272 224 688 HUF

Source: Healthware analysis based on the sales turnover that pharmacies produced from POM

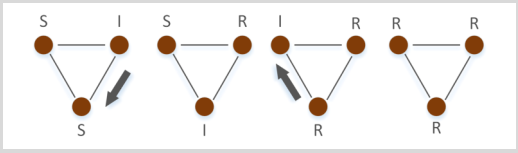
TOP10 ATC by number of patients in January 2016

TOP 10 - ATC	International non-proprietary name (INN)	Patients
B01AC06	acetylsalicylic acid	346 912
C09BA04	perindopril and diuretics	286 096
C08CA01	amlodipine	261 024
C07AB12	nebivolol	243 602
C10AA05	atorvastatin	226 676
C10AA07	rosuvastatin	222 587
M04AA01	allopurinol	203 185
A11CC05	colecalciferol	195 750
C09AA04	perindopril	175 750
A02BC02	pantoprazole	175 699

Source: Healthware analysis based on the sales turnover that pharmacies produced from POM

Epidemic spreading modelled with network processes — Case study

The network science appears at more and more fields of science as a modelling method recently. The network processes are based on graph theory. In our case study we attend to network processes of epidemic spreading. Predictions could be made with simulations constructed on several models, that helps to get acquainted better with features of a given epidemic. The models are complex because we would like to model the dynamics of the population as realistically as possible. Thus we have to construct a few more parameters and more complex mathematical methods to the given model.
One pillar of the epidemic spreading is the SIR model. Previously mentioned tools of the graph theory forms base of the model.



We can see a graph with three nodes on the figure above. The nodes denote the people and the edges denote the connection between them. Hence nodes of the graph have three potential states in this case: **S** (susceptible), **I** (infected) and **R** (recovered). On the figure the arrows indicate the direction of infection. At first there is one infected patient and then disease spread further, finally everybody gets immune.

Several other models could be constructed due to spread of the infection, based on the statuses of nodes. There is a case when it is not possible to get immune, but may get recovered from the given disease, it called SIS model.
The Ebola epidemic outbreak (notified in March 2014) was examined with the SEIR model. Spread of the infection was analyzed and division of the vaccines were optimized among infected countries. The assay based on data released by the WHO.

Flowchart on the right illustrates the possible states SEIR model may have [1]. In comparison with previous model, in this one **R** state includes dead patients also, and a new **E** (exposed) state was created which includes individuals who became infectious after a latency period. Note that in this model the case of an infectious patient getting into the susceptible state again, is not examined.

Spread of the Streptococcus pneumoniae (PCV) bacterium was analyzed with SIS model in another paper [2]. This disease threats especially infants and younger children because their immune system is not able to fight the disease. The whole model is created with Markov-chains and parameters from real data are used during the simulation.
We can see that in order to get a more clear picture about dynamics of spread of disease, the modelling of epidemic spreading is a good opportunity. Before outbreak of the disease we can determine the necessary amount of vaccine the patient needs to get and the area it has to be delivered at. In Hungary there is opportunity for preparation of such a model, for instance in case of Pneumococcus, distribution of the healthy and infected individuals and number of vaccines in a given age group can be apposite base of preparing an epidemic spreading network model.

Required data for modeling of spreading of Streptococcus pneumoniae (PCV)

Name	Description	Institute
Number of Hungary population based on age and location	age group splitting (under 2 years old, over 65 years old, everybody else); location splitting (county, region, country-wide)	KSH (Hungarian Central Statistical Office)
In line with Susceptible (S) knowledge	number of healthy individual, who are in Susceptible (S) state so far	ANTSZ (National Public Health and Medical Officer Service) / OEP (National Health Insurance Fund of Hungary)
	number of infected patient	
Number of vaccines	number of vaccines	ANTSZ / OEP

[1] J.Morrow, Modeling the spread of Ebola
[2] A. Gray, D. Greenhalgh, X. Mao, J.Pan, The SIS epidemic model with Markovian switching, J.Math.Anal.Appl. 394 (2012) 496-516.

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