The introduction of new technologies and financial support for the innovational pharmaceutical industry in the veterinary medicine sector based on the development of priority areas of the Ukrainian regions

I. V. Bushuieva*А,Е,Ф, N. M. BorysenkoВ,С,Д

Zaporizhzhia State Medical University, Ukraine

The purpose of the work was to monitor the level of financing of innovation activities and regional level technologies transfer by regions of Ukraine on the basis of medium-term priority directions of innovation activity of the strategic priority on the national level “Technological renewal and development of the agro-industrial complex” and to realization of regional innovation priorities on the development and introduction of the latest biotechnologies and veterinary security medicines for farm animals.

Materials and methods. Analytical, comparative, graphical, statistical, descriptive, generalization methods were used in the work. The research materials are normative-legislative acts, official information of regional state administrations on the results of innovation activities within the framework of regional development strategies (in 13 regions of Ukraine), regional programs of scientific-technical and innovation development for 2017–2018.

Results. The monitoring results give an opportunity: to assess the legal and regulatory framework for the formation of the medium-term priorities of the innovative activity of the agro-industrial complex (AIC) as a state and each individual region and the veterinary sector as a whole (taking into account the needs of the industry in veterinary medicines, veterinary supplies, premixes, vaccines, serum, diagnostic kits, etc.); to evaluate the financial support of medium-term priorities of the innovative activities by local budgets with the provision of veterinary medicines at the regional level; to evaluate the effectiveness of innovation activities for created, acquired and transmitted new technologies in the pharmaceutical sector of veterinary medicine; to compare the obtained indicators with the previous periods, to track their dynamics and the tendency of development of medium-term priority directions of innovation activity at the regional level; to use the results of monitoring in the formation of the list of medium-term priority directions of innovation activity at the regional level up to 2021 in the form of directing funds for struggling with animal diseases and, thus, creating safe conditions for human health.

Conclusions. The elaboration of the regulatory framework, namely, the Resolution of the Cabinet of Ministers of Ukraine from October 18, 2017 No. 980 “Some issues of determining the medium-term priority areas of innovation activity at the sectoral level for 2017–2021”, but this document needs to be improved in the areas of identification the priority directions of innovation activity in the pharmaceutical sector of veterinary medicines.

Впровадження нових технологій і фінансове забезпечення інноваційної діяльності фармацевтичної галузі сектора ветеринарної медицини на основі розвитку пріоритетних напрямів регіонів України

І. В. Бушуєва, Н. М. Борисенко

Мета роботи – здійснити моніторинг рівня фінансування регіонами України інноваційної діяльності та трансферу технологій регіонального рівня на основі середньострокових пріоритетних напрямів інноваційної діяльності загальнодержавного рівня стратегічного пріоритету «Технологічне оновлення та розвиток агропромислового комплексу» та реалізації регіональних інноваційних пріоритетів з питання розроблення та впровадження новітніх біотехнологій і забезпеченості ветеринарні лікарськими препаратами для сільськогосподарських тварин.

Матеріали та методи. Використали методи: аналітичний, порівняння, графічний, статистичний, описовий, узагальнення. Матеріали дослідження: нормативно-законодавчі акти, офіційна інформація обласних держадміністрацій щодо результатів інноваційної діяльності в рамках стратегій регіонального розвитку (за 13 областями України), регіональні програми науково-технічного та інноваційного розвитку за 2017–2018 pp.
Внедрення нових технологій і фінансове забезпечення інноваційної діяльності фармацевтичної отраслі сектора ветеринарної медицини на основі розвитку приоритетних напрямів розвитку регіонів України

Висновки. Опрацювання нормативно-законодавчої бази, як-от постанови КМ України від 18 жовтня 2017 р. № 980 «Деякі питання визначення середньострокових приоритетних напрямів інноваційної діяльності галузевого рівня на 2017–2021 роки» показало, що цей документ потребує вдосконалення в питаннях визначення приоритетних напрямів інноваційної діяльності в фармацевтичному секторі ветеринарних препаратів.

Ключові слова: інновації, фінансування, ветеринарні препарати, приоритетні напрями, стратегія розвитку, фармацевтична галузь, регіон.

Актуальні питання фармацевтичної і медичної науки та практики. – 2019. – Т. 12, № 3(31). – С. 314–321

At the present stage, the state pays much attention to the development of advanced new technologies in the agro-industrial sector, given the strategic importance of introducing innovative, high-quality, competitive domestic veterinary medicines to preserve the livestock population. In the Resolution of the Cabinet of Ministers of Ukraine from October 18, 2017, No. 980 “Some issues of determining the medium-term priority areas of innovation activity at the sectoral level for 2017–2021” (further – Resolution), state was emphasized the development, production and implementation of highly effective veterinary drugs using biotechnological methods [1].

As about 150 nosologies of animals and humans were common, the above-mentioned Resolution was monitored on pharmaceuticals (about 50 % of veterinary medicines are produced at enterprises of the pharmaceutical industry,
subordinated to the Ministry of Health of Ukraine), and on innovations in the veterinary sector. In the course of further analysis, the structure of the Resolution was taken as the basis.

**Aim**

The purpose of the work was to monitor the level of financing of innovation activities and regional level technologies transfer by regions of Ukraine on the basis of medium-term priority directions of innovation activity of the strategic priority on the national level “Technological renewal and development of the agro-industrial complex” and to realization of regional innovation priorities on the development and introduction of the latest biotechnologies and veterinary security medicines for farm animals.

**Materials and methods**

The research was conducted according to the Resolution of the Cabinet of Ministers of Ukraine from October 18, 2017, No. 980 “Some issues of determining the medium-term priority areas of innovation activity at the sectoral level for 2017–2021” and official information of regional state administrations on the results of innovation activities within the framework of regional development strategies, regional programs of scientific-technical and innovation development for 2017–2018 using indicators for: financial support of medium-term priority directions of innovation activity at the regional level; creation, acquisition, and transfer of new technologies in medium-term priority areas of innovative activity at the regional level; innovation activity at the expense of enterprises own funds on the basis of statistical survey.

Information was processed from 13 regional state administration during the monitoring of the implementation of medium-term priority areas of innovation activity at the regional level. The monitoring of the implementation of regional innovation priorities for 2017 was carried out on the basis of medium-term priority directions of the national level, approved by 2018–2021 by the CMU Resolution No 1056 of 28.12.2016 [3].

**Results**

One of 7 priority directions of innovation activity for the period up to 2021 is defined by Article 4 of the Ukraine Law “About priority areas of innovation activity in Ukraine”, 2012 [2]: introduction of new technologies and equipment for high-quality medical care, treatment, pharmaceuticals (5 priority).

The main problem and one of the key priorities of Ukraine’s economic growth is ensuring food quality and safety (9 priority action), namely: bringing national legislation in the field of veterinary and phytosanitary safety in line with EU directives and regulations, increasing the safety and quality of food products in as a result of the introduction of European standards and enhancement of the institutional capacity of the relevant executive authorities.

In 2017–2018 almost all financing volumes (99.4 %) were carried out in four regions of Ukraine: Donetsk (1118877.36 thousand UAH, or 94.0 % – the biggest volume), Zaporozhye (14053.63 thousand UAH, or 1.2 % – fourth position), Ivano-Frankivsk (15385.3 thousand UAH, or 1.3 % – third position) and Chernihiv (33962.20 thousand UAH, or 2.9 % – second position). The rest of the regions had a small share (below 1.0 %) of financing, of which the smallest – in Kherson (188.12 thousand UAH, or 0.02 %) (Fig. 1).

Technological development of the agro-industrial (agricultural) complex in the format of treatment and prevention of animals implies a constant positive dynamics of innovations, in particular, the application of fundamentally new technologies for the maintenance, feeding, treatment, and prevention of animal diseases, which in turn requires the use of funds.

Thus, it was found that financing of innovation activity on the basis of this strategic priority amounted to 605618.85 thousand UAH, or 50.9 % of the total funding priorities, which is on 20.0 % less compared to 2017 (757094.45 thousand UAH or 71.7 %). Despite the decrease in volumes of financing in 2018, the direction of the agro-industrial complex, as in 2017, ranks first among the seven strategic directions.

The list of medium-term priorities for this strategic direction, as compared to 2017, has changed due to the optimization of the number of priorities (7 instead of 8) and the updating of the subject, therefore their comparison is carried out according to the total amount of funding (Fig. 2).

It was determined that mid-term financing was implemented in eight (in 2017 in five) regions, among which there were in Donetsk (as in 2017) almost all volumes (UAH 604217.80 thousand or 99.769 %), the smallest – in Volyn (6.0 thousand UAH, or 0.001 %), in 2017 – in Kirovohrad (35.00 thousand UAH or 0.005 %) (Fig. 3, Table 1).

By types of innovation activity, as in 2017, the vast majority of funds were directed at the implementation of innovation projects, programs (448911.12 thousand UAH, or 74.1 % (in 2017 – 79.9 %) in Donetsk and Kherson regions; the remaining 25.9 % – for R & D (1212.93 thousand UAH, or 0.2 % in six regions (in 2017 – 0.1 % in three), except Donetsk and Kherson) and for the «Other» (155494.80 thousand UAH, or 25.7 % (in 2017 – 20.0 %) only in the Donetsk region).

That means the innovation activity of the regional level in 2018 in the field of the agro-industrial complex was carried out according to the same types and almost the same sharing of financing amounts as in 2017.

The financing was made from the budget (UAH 509.32 thousand, or 0.1 % in Ivano-Frankivsk, Ternopil and Kherson regions in almost equal shares) and for own funds of enterprises and organizations (UAH 605109.53 thousand, or 99.99 %) with the maintenance of the proportions of funding in 2017 (0.04 % and 99.96 % respectively) (Table 2).

Regarding the issue of the development and implementation of the latest biotechnologies in crop, stockbreeding and veterinary medicine, in terms of financing, the monitoring showed as followed in Table 3.
The introduction of new technologies and financial support for the innovational pharmaceutical industry in the veterinary medicine sector...

Fig. 1. Distribution of financing in 2017–2018 among Ukrainian regions of innovation activity on the basis of strategic priorities (ths. UAH, %) (according to the consolidated Analytical reference document "Implementation of the medium-term priority areas of innovation activity of the regional level in Ukraine in 2017–2018") [4].

Fig. 2. Distribution of financing in 2017–2018 for regional level innovation activity on the basis of medium-term priority directions of the national level IV strategic priority (%) (according to the consolidated Analytical reference document "Implementation of the medium-term priority areas of innovation activity of the regional level in Ukraine in 2017–2018") [4].
Fig. 3. Distribution of financing in 2017–2018 for regional level innovation activity on the basis of medium-term priority directions of the national level IV strategic priority (%) (according to the consolidated Analytical reference document “Implementation of the medium-term priority areas of innovation activity of the regional level in Ukraine in 2017–2018”) [4].

Table 1. Financing by Ukrainian regions of innovation activity and technology transfer of the regional level on the basis of medium-term priority directions of innovation activity of the national level of the strategic priority “Technological renewal and development of the agro-industrial complex” in the directions of innovation activity in 2018 [4]

| Managers of funds | Incl. by types of innovation activity | Total funding, thousand UAH | Incl. in the context of medium-term priority areas innovation activity of the national level |
|-------------------|-------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------|
|                   | Total                               | Specific weight, %           | Total                               | specific weight, % | Total                               | specific weight, % | Total                               | specific weight, % |
|                   |                                     |                             |                                     |                             |                                     |                             |                                     |                             |
| Volyn region      | Total, incl.                         | 6.00                        | 0.001                               | –                          | –                                  | –                           | –                                  | –                           |
|                   | Conducting R & D                     | 6.00                        | 0.001                               | –                          | –                                  | –                           | –                                  | –                           |
| Donetsk region    | Total, incl.                         | 604217.80                  | 99.8                                | –                          | –                                  | –                           | –                                  | –                           |
|                   | Implementation of innovative projects, programs | 448723.00                  | 74.1                                | –                          | –                                  | –                           | –                                  | –                           |
|                   | Other                                | 155494.80                  | 25.7                                | –                          | –                                  | –                           | –                                  | –                           |
| Ivano-Frankivsk region | Total, incl.                       | 151.20                     | 0.02                                | 151.20                    | 151.20                             | 151.20                      | 151.20                             | 151.20                      |
|                   | Conducting R & D                     | 151.20                     | 0.02                                | 151.20                    | 151.20                             | 151.20                      | 151.20                             | 151.20                      |
| Kirovohrad region | Total, incl.                         | 338.43                     | 0.05                                | –                          | –                                  | –                           | –                                  | –                           |
|                   | Conducting R & D                     | 338.43                     | 0.05                                | –                          | –                                  | –                           | –                                  | –                           |
| Kyiv region       | Total, incl.                         | 507.30                     | 0.1                                 | –                          | 507.30                             | 72.6                        | –                                  | –                           |
|                   | Conducting R & D                     | 507.30                     | 0.1                                 | –                          | 507.30                             | 72.6                        | –                                  | –                           |
| Ternopil region   | Total, incl.                         | 170.00                     | 0.03                                | –                          | –                                  | –                           | –                                  | –                           |
|                   | Conducting R & D                     | 170.00                     | 0.03                                | –                          | –                                  | –                           | –                                  | –                           |
| Kherson region    | Total, incl.                         | 188.12                     | 0.03                                | 188.12                    | –                                  | –                           | –                                  | –                           |
|                   | Implementation of innovative projects, programs | 188.12                     | 0.03                                | 188.12                    | –                                  | –                           | –                                  | –                           |
| Chernihiv region  | Total, incl.                         | 40.00                      | 0.01                                | –                          | 40.00                              | 5.7                         | –                                  | –                           |
|                   | Conducting R & D                     | 40.00                      | 0.01                                | –                          | 40.00                              | 5.7                         | –                                  | –                           |
| TOTAL             |                                     | 605618.85                  | 100.0                               | 339.32                    | 698.50                             | 100.0                       | 151.20                             | –                           |

--: no data
### Table 2. Funding innovation and technology transfer at the regional level on the basis of medium-term priorities of the strategic priority direction “Technological renewal and development of the agro-industrial complex” by regions in 2018 [4]

| Medium-term priority directions of innovation activity | Total funding, thousand UAH | Including: | Volyn region | Donetsk region |
|-------------------------------------------------------|-----------------------------|------------|--------------|---------------|
|                                                        | Total at the expense of budget funds | % | incl.: at the expense of budget funds | % | incl.: at the expense of budget funds | % |
| 4.3. Development and introduction of newest biotechnologies in plant growing, stockbreeding and veterinary. | 698.50 | 151.20 | 21.6 | – | – | – |
| 4.6. Development and introduction of technologies for animals’ diseases diagnostic and means for their protection. | – | – | – | – | – | – |
| **Total** | 60618.85 | 509.32 | 0.1 | 6.00 | – | 604217.8 | – |

*: no data

---

### Table 2 (continued)

| Medium-term priority directions of innovation activity | Including: | Ivano-Frankivsk region | Kyiv region | Kirovohrad region |
|-------------------------------------------------------|------------|------------------------|-------------|------------------|
|                                                        | Total at the expense of budget funds | % | incl.: at the expense of budget funds | % | incl.: at the expense of budget funds | % |
| 4.3. Development and introduction of newest biotechnologies in plant growing, stockbreeding and veterinary. | 151.20 | 151.20 | 100.0 | 507.30 | – | – |
| 4.6. Development and introduction of technologies for animals’ diseases diagnostic and means for their protection. | – | – | – | – | – | – |
| **Total** | 151.20 | 151.20 | 100.0 | 507.30 | – | 338.43 | – |

*: no data

---

### Table 2 (continued)

| Medium-term priority directions of innovation activity | Including: | Ternopil region | Kherson region | Chenihiv region |
|-------------------------------------------------------|------------|----------------|----------------|----------------|
|                                                        | Total at the expense of budget funds | % | incl.: at the expense of budget funds | % | incl.: at the expense of budget funds | % |
| 4.3. Development and introduction of newest biotechnologies in plant growing, stockbreeding and veterinary. | – | – | – | – | 40.00 | – |
| 4.6. Development and introduction of technologies for animals’ diseases diagnostic and means for their protection. | – | – | – | – | – | – |
| **Total** | 170.00 | 170.00 | 100.0 | 188.12 | 188.12 | 100.0 | 40.00 | – | – |

*: no data
Conclusions
Financing of the veterinary pharmaceuticals sector in different regions of Ukraine ranges from 0.7 % to 3.5 % of the total industry-financed funds.

The results of the conducted monitoring give an opportunity:
1) to assess the legal and regulatory framework for the formation of medium-term priority areas of innovation activity of the agro-industrial complex as a state and each individual region and the veterinary sector as a whole (taking into account the needs of the industry in veterinary medicines, veterinary supplies, premixes, vaccines, derivatives, diagnostics, etc.);
2) to evaluate the financial support of medium-term priorities of the innovative activities by local budgets with the provision of veterinary medicines at the regional level;
3) to evaluate the effectiveness of innovation activities for created and acquired new technologies in the pharmaceutical sector of veterinary medicine;
4) to compare the obtained indicators with the previous periods, to track their dynamics and the tendency of development of medium-term priority directions of innovation activity at the regional level;
5) to use the results of monitoring in the formation of the list of medium-term priority directions of innovation activity at the regional level up to 2021 in the form of directing funds for struggling with animal diseases and, thus, creating safe conditions for human health.

Conflicts of interest: authors have no conflict of interest to declare.

Information about authors:
Bushueva I. V., PhD, DSc, Professor of the Department of Clinical Pharmacy, Pharmacotherapy and MFE, Zaporizhzhia State Medical University, Ukraine.
Borysenko N. M., PhD Student of the Department of Clinical Pharmacy, Pharmacotherapy and MFE, Zaporizhzhia State Medical University, Ukraine.

References
[1] (2017). Deiaki pytannia vyznachennia serednostrokovykh priorytetnykh napraviv innovatsionalnoi diialnosti zahidnohorodzhavnoho rivnia na 2017-2021 roky: Postanowa Kabinetu Ministiv Ukrainy vid 18.10.2017 roku №980. [Some issues of defining medium-term priority areas of innovation activity of the sectoral level for 2017-2021: Resolution of the Cabinet of Ministers of Ukraine from October 18, 2017 №980]. Retrieved from https://zakon.rada.gov.ua/laws/show/980-2017-п. [in Ukrainian].

Table 3. Creation and using of new technologies based on the strategic priority line «Technological renewal and development of the agro-industrial complex» by regions in 2018 [4]

| Medium-term priority directions of innovation activity | Including: | Donetsk region | Kyiv region | Ternopil region | Kherson region |
|------------------------------------------------------|-------------|----------------|-------------|----------------|--------------|
| Number of created new technologies, units. | 15 | – | – | – | – |
| Number of new technologies acquired, units. | – | – | – | – | – |
| The volume of revenues from the transfer of new technologies, UAH. | 507.3 | 15 | 15 | – | – |

4.3. Development and introduction of newest biotechnologies in plant growing, stockbreeding and veterinary.
4.6. Development and introduction of technologies for animals’ diseases diagnostic and means for their protection.

Total: – – – – 15 15 507.3 – – – – – –

<: no data
The introduction of new technologies and financial support for the innovational pharmaceutical industry in the veterinary medicine sector...

[2] (2012). Pro priorytetni napriamy innovatsiinoi dlianosti v Ukraini: Zakon Ukrainy vid 05.12.2012 roku №5460-VI. [On the priority directions of innovation activity in Ukraine: Law of Ukraine from December 5, 2012 №5460-VI]. Vidomosti Verkhovnoi Rady Ukrainy. 2012. № 19-20. St. 166. [in Ukrainian].

[3] (2017). Deiaki pytannia vyznachennia serednostrokovykh priorytet-nykh napriamiv innovatsiinoi dlianosti zahalonerdzhavnoho rivnia na 2017-2021 roky: Postanova Kabinetu Ministriuv Ukrainy vid 18.10.2017 roku №980. [Some issues of defining medium-term priority areas of innovation activity of the sectoral level for 2017-2021: Resolution of the Cabinet of Ministers of Ukraine from October 18, 2017 №980]. Retrieved from https://zakon.rada.gov.ua/laws/show/980-2017-p. [in Ukrainian].

[4] (2018). Realizatsiia serednostrokovykh priorytetnykh napriamiv inno-vatsiinoi dlianosti v rehionakh Ukrainy u 2017 rotsi: Analitychna dovid-ka. [Implementing medium-term priority areas for innovation activity in regions of Ukraine in 2017: Analytical report]. Kyiv. [in Ukrainian].