Health Research in Kazakhstan

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Contents

1. The main directions and guiding principles of scientific activities in Kazakhstan

It would be a mistake to conclude that scientific development in Kazakhstan has been neglected. Having inherited a sufficiently powerful system and a network of scientific centres, Kazakhstan is striving to preserve and develop certain priorities in this field.

1.1 The management of science

Until 11 March 1996 the structure of the management of science was as follows. The Ministry of Sciences and New Technologies (MSNT), the central State authority for the management of science and technology, was set up by presidential decree no. 600 on 7 February 1992. Cooperating with the MSNT were the Senior Certification Committee (formerly the State Certification Committee), the National Patent Office, the National Space Agency and the Atomic Energy Agency of Kazakhstan. All these departments participated to some extent in decision-making in the field of science and technology, according to their field of competence.

The National Academy of Sciences of Kazakhstan (NAS R?) and the Kazakh Academy of Agricultural Sciences (?AAS) were the lead organizations in coordinating fundamental research in the appropriate areas of science and technology. Their elective bodies – the executive committees (presidiums) – which are currently public organs, acted as managerial bodies, running subsidiary State scientific establishments. The allocations for scientific research in the State budget appear, therefore, under separate budget lines.

The National Academy of Sciences, the Kazakh Academy of Agricultural Sciences, and the Ministry of Sciences and New Technologies were incorporated in the central executive body of the Government, the Ministry of Sciences/Academy of Sciences by presidential decree no. 2895 of 11 March 1996. This decree states that the Ministry of Sciences/Academy of Sciences is a united state management body in the field of science and engineering implementing the Government's science and technology policy, and administering the financing of targeted programmes of fundamental and applied research on a competitive basis, as well as the pursuit of independent State inspection. It also states that the national scientific centres are a complex of science and technology units under the Ministry of Sciences/Academy of Sciences.

In the course of further improvements to the structure of State management bodies the National Space Agency (NSA) and the Atomic Energy Agency (AEA) were brought under the Ministry of Sciences and New Technologies (MSNT); the National Patent Office became a department of the Ministry of Industry and Trade; the National Academic Centre for Agrarian Research was formed from

various research establishments, pilot farms and experimental enterprises under the former Kazakh Academy of Agricultural Sciences.

The research organizations of the former National Academy of Sciences and the Kazakh Academy of Agricultural Sciences were put directly under the Ministry of Sciences/Academy of Sciences.

1.2 The new concept of scientific activity

The Ministry of Sciences/Academy of Sciences elaborated a new concept of State science and technology policy in 1996, which was examined and approved by the Government on 24 December 1996. The overall objective of the concept is to preserve and further develop a productive nucleus of science, to expand the role of science in the socio-economic development of the country and the gradual transformation of society as a whole.

The concept is designed for gradual implementation over the next 5-10 years and aims to maintain the steady development of science and technology by supporting the changes in its systems, by preserving and maximizing the country's scientific, technical and intellectual potential in order to create a progressive technological-economic structure of public services.

The basic provisions and mechanisms outlined below, aimed at achieving the system model of scientific and technological development, are contained in the concept.

1.2.1 Module for society-production-market

Science and technology are the basis of the module for "society-production-market". The Government's stratgey is to create a progressive technological-economic structure for the national economy as a basis for the preservation and growth of the scientific, technical and intellectual potential of the country, increasing the efficiency of a socially oriented market economy, its susceptibility to innovation, the strengthening of the technological and ecological security of the State and its balanced development.

Society's various demands upon science, engineering and technology rest on the basis of the science and technology development system model, specifically in its orientation towards solution of such major problems as:

- maintaining a competitive level in science, engineering and technology in the country;
- intensifying and targeting scientific research and development, as well as introducing advanced technologies;
- enacting legislation to ensure increased and selective demand for science and new technology, as well as the economic validity of innovative science and technology;

- keeping control and responsibility for the results of work, on behalf of the State apparatus, the scientific and engineering communities, the organizations and their workers.

1.2.2 Resource mobilization

In order to mobilize available resources and reserves for the development of science and advanced technologies the new concept envisages the following activities:

- conducting an inventory assessment, monitoring and analysis of the material base of science, of the real status and trends in personnel potential, organizational structures and management processes for science and engineering;
- setting up a targeted programme mechanism to organize scientific research, including the planning stages, financing, expertise, management and evaluation;
- creating a mechanism to provide multichannel subsidizing of scientific research institutions, teams of scholars and individual scientists;
- laying the foundation for technological development in the country by allocation of a prcentage of external funds invested in the development of the country's raw materials and the transfer of businesses managed by foreign companies, the cost price of commodity production and management services, as well as privatization in the scientific and technical sphere;
- using grants and other selected forms of financial and technical support for scientists/innovators and teams of scholars to fund their participation in international programmes and investment projects. For this purpose it is necessary to enact legislation for special tax benefits for funds received through various channels and invested in the development of the science and technology sphere;
- maintaining a steady increase in state funding for science.

1.2.3 Economic and ecological interests of society

An optimum combination of the economic and ecological interests of society together with an independent supply of energy and technological security are envisaged.

1.2.4 New forms of scientific centres

Improvement of the organizational structure of the management of science and technology will be continued by setting up new forms of scientific centres adapted to the conditions of a market economy, such as techno-parks, joint-stock scientific and technical companies, analytical and engineering centres, and various specialized structures.

1.2.5 Status of the science complex

As a major part of the main organizational measures there are plans to develop a legislative basis for the status of the science complex and scientists, the protection of scientific intellectual property, the insurance of scientific and innovative activities, as well as the development of forms of private pension provisions for scientific workers in higher education.

1.2.6 Commercialization and privatization of entities

A battery of measures for the commercialization and privatization of entities in the field of science and technology is foreseen, with the exception of a number of scientific organizations (the State science centres, academic institutes etc.), conducting fundamental and strategically important research in the country.

There are plans to develop criteria and a privatization mechanism in the scientific research sphere with the Ministry of Science/Academy of Science as the key decision-maker.

1.2.7 Integration of programmes

Within the framework of current regional policy in the country the concept aims at integrating the programmes of regional and district development with the nationwide and interregional programmes and projects.

1.2.8 Scientific and technical cooperation

The expansion of scientific and technical cooperation with States that have signed the agreement on reinforcing integration is stipulated in the concept. A number of measures will be taken to restore a universal scientific-technological, educational and informational space. The expansion of communications through Internet and other international information systems is foreseen.

The fulfilment of the concept of a State policy for science and technology in Kazakhstan aims at the development of science and technology as a component of the socio-economic and cultural progress of the country.

1.3 Realization of a targeted programme method

The priority areas of basic research have been reviewed and developed. These priorities were selected on the basis of the socio-economic, scientific, technical and cultural development of the country, as well as trends in scientific progress in the world at large. The present state of science in the country, the presence of established schools and fields of science, the opportunities for financial, human and material resources, and also conformity with the world level of research carried out in various fields of science were all taken into account. The priorities were determined with the participation of leading

scientists and were reviewed by the meeting of the Senior Science and Technology Council of the Ministry of Science/Academy of Science. The Council approved 33 priority areas.

In September 1996 the national press announced a competition in fundamental research projects for the programme for 1997-1999. The purpose of the competition was to attract a wide range of scientists and experts to tackle fundamental scientific problems, to increase the effective utilization of state financial resources allocated for research.

One of the key elements in ensuring greater efficiency in decision-making within the scientific and technical community, according to international norms, was the practice of independent scientific and technical expertise, based on the following principles: recognition of the country as an independent state, qualifications and objectivity, consulting and responsibility.

In 1996 a State scientific and technical inspection of the reports on fundamental research programmes was undertaken for the first time. Since then all fundamental research programmes and topics (1062 topics in the 1997 competition) have been subjected to State scientific and technical inspection. As a result it can be said that by the end of 1996 this inspection was involved in decision-making in practically all areas of science and technology financed by the State, with the exception of programmes and projects financed by the Ministry of Health, the Interdepartmental Scientific and Technical Council (ISTC) (assessment of these topics is carried out selectively), and the Science Foundation (the State inspection is not involved in the selection of the Foundation's projects).

1.4 Financing of science

Kazakhstan is experiencing the difficulties expected of a new stage in development, when the basis for a democratic, secular, social state has been laid. The situation in the social sector - health services, education and science - is of special concern. The dramatic situation in the development of science in the country is connected above all to the sharp drop in financing, which affects personnel, information systems, technology, and material security.

Research carried out in 1993 by the Ministry of Labour and Social Protection showed that development of the scientific–technical potential is directly affected by economic conditions in the country, in particular by the Gross Domestic Product (GDP). Taking GDP and the number of science teaching staff in the country in 1988 as the baseline, then with a decrease in GDP to 45 % by 1992, the number of scientific and science teaching staff decreased to 40 % (1).

The inadequacy of funding for scientific research complicates the creation of an effective system of career development for scientists. Such a system is necessary to attract the most capable recruits. Thus, a vicious circle is created, and even if sufficient funding were available for research, it could not be effectively used because of the shortage of properly trained staff (1,3,4).

In addition to the financial problems there is a need to improve coordination of research activities. The need for a system of planning and organization of scientific research has become urgent.

Figure 3.

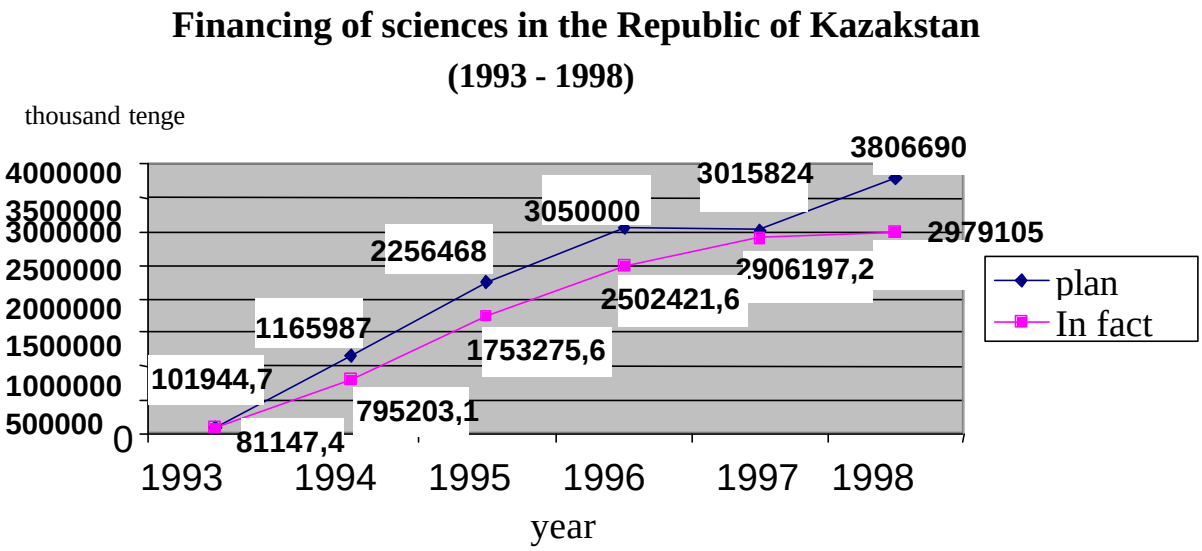


Fig.3 gives information on science financing in the country in 1993-1998 .

For the past 6 years (1993-1998) with an annual reduction in the budget in real terms, science has actually received overall about 80% of the planned budget. Before 1999 science was financed according to the approved budget. Since then topics of scientific research receive funds on a competitive basis.

1.5 Financing of scientific research

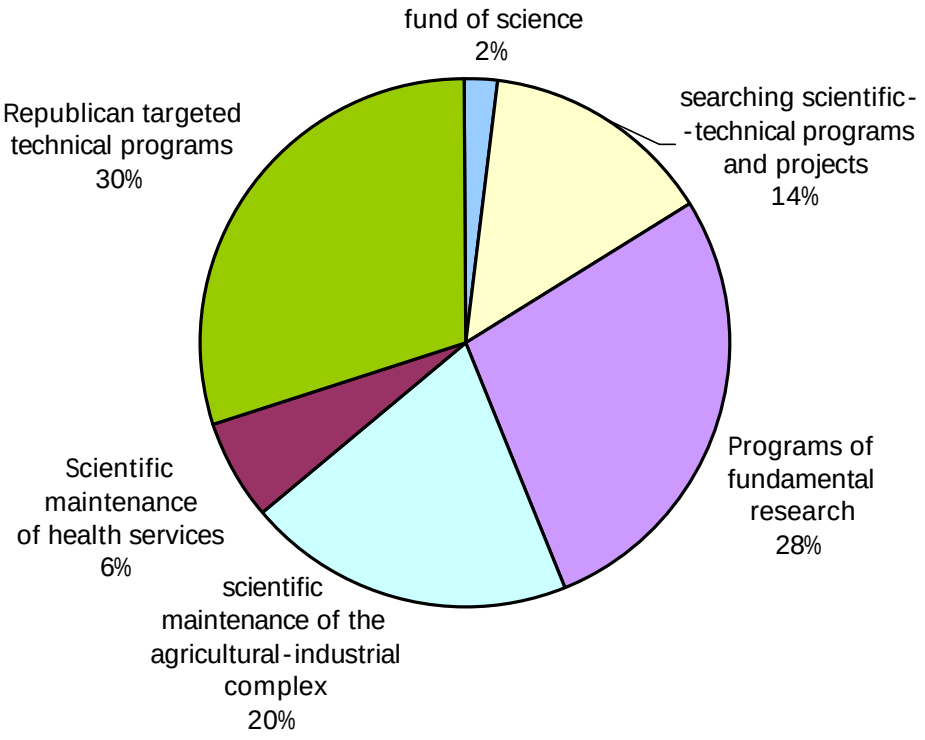
In 1996 the financing of research and planning was achieved " by one line ", that enabled the full achievement of the targeted programme method of management through a distribution of resources on a competitive basis and to priority areas, with an obligatory State scientific and technical inspection of all planned programmes and projects.

The budget allocation for science was authorized by the presidential decree at 3 050 000 tenge in 1996, including 3 030 630 tenge, or 15 % of budget expenditures for the Ministry of Science/Academy

of Science. The actual allocation received from the Exchequer was 2 502 421,6 tenge (83 % of the planned total). Actual financing of basic science fields was as shown in Fig. 4.

Figure 4

Financing of science in 1996



Note: health research received 183 million tenge or 0.09 % of the expenditures of the national health services budget

Programme of fundamental research - 712 959 tenge;

Scientific support for the Agricultural - industrial complex - 521 639,2 tenge;

Scientific support for health services - 161 931,1 tenge;

National targeted science and technology programmes - 739691,2 tenge;

Science Fund - 25 671,0 tenge;

Science and technology research programmes and projects - 286 530,2 tenge.

Wages, stipends and utilities were paid first and subsequently business trips and other expenses of scientific research. In connection with the introduction of a new budget classification and the work on budgetary banking, financing was carried out strictly according to allocated specifications, with no chance of any redistribution.

Table 1

The structure of the financing of scientific research in 1998.

Programme	Authorized plan	Specified plan	Received financing
Fundamental research	910 500	966 704.3	912 130.5
Scientific support for the agricultural – industrial complex	687 000	689 993	591 016.3
Scientific support for health services	200 500	200 500	197 080.3
National targeted scientific-technical programmes	1 044 470	1 096 253.2	844 118,2
Science Fund	114 200	60 000	21 113
Interdepartmental, branch, science and technology research programmes and projects	850 020	781 984.9	409 452.2

As is clear from Table 1, in 1998 fundamental research was financed at a level of 94.3 %, scientific support for the agricultural – industrial complex at 85.6 %, scientific support for the health services at 98.2 %, national targeted scientific - technical programmes at 77 %, the Science Fund at 35 %, and inter-departmental, branch, science and technology research programmes and projects at 52,3 % of the planned allocations.

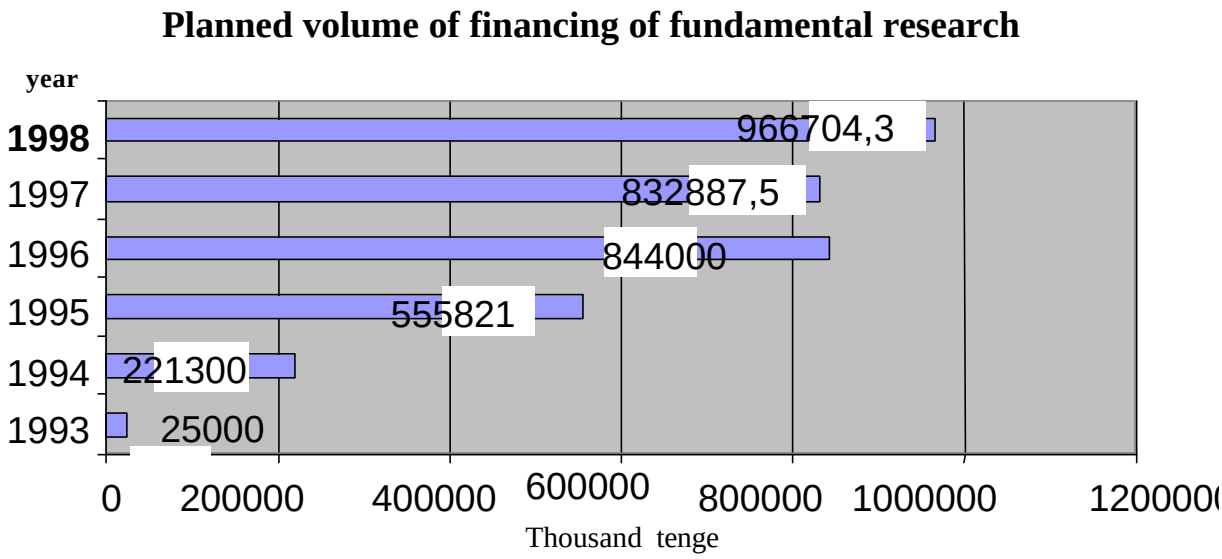


Fig. 5 gives information on the planned financing of fundamental research in 1993 -1998.

Figure 5

The financing of fundamental research comprises on average 25 % of the science budget as a whole. Fig. 6 gives the dynamics and structure of financing of biological and medical research of the Ministry of Science/Academy of Science from 1993 until 1998. As can be seen, extrabudgetary financing of biological and medical research was a small percentage of the total: 1-2% in 1993-1994; 6-11% in 1995-1997; 3% in 1998.

Fig. 7 gives the structure of budgetary expenses of biological and medical sciences. As can be seen, biological and medical research activities comprised about 80% of the budget, infrastructure from 13 % to 19 %, investment from 0.1% to 2%.

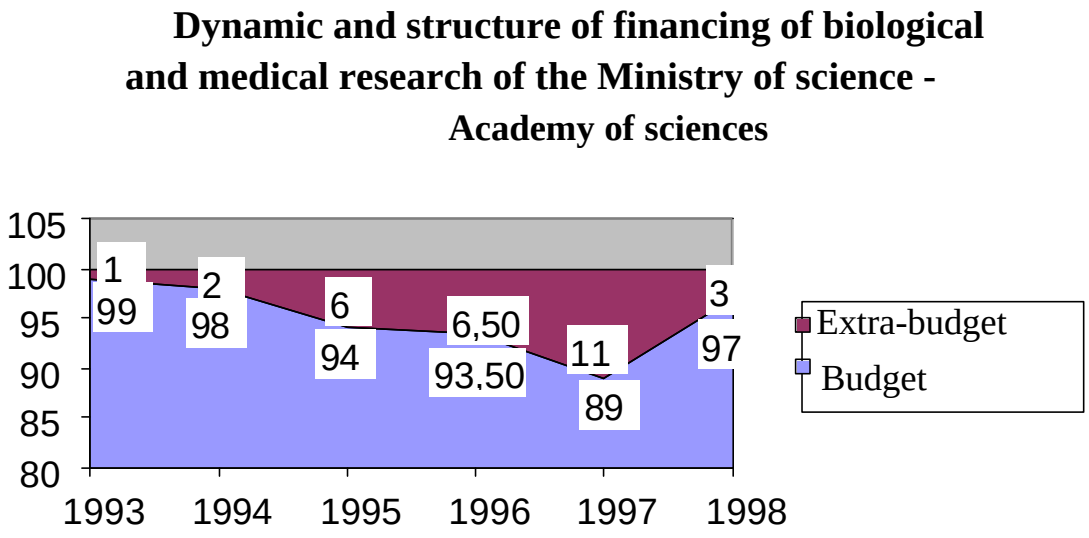


Figure 6

Structure of biological and medical sciences budget expenses

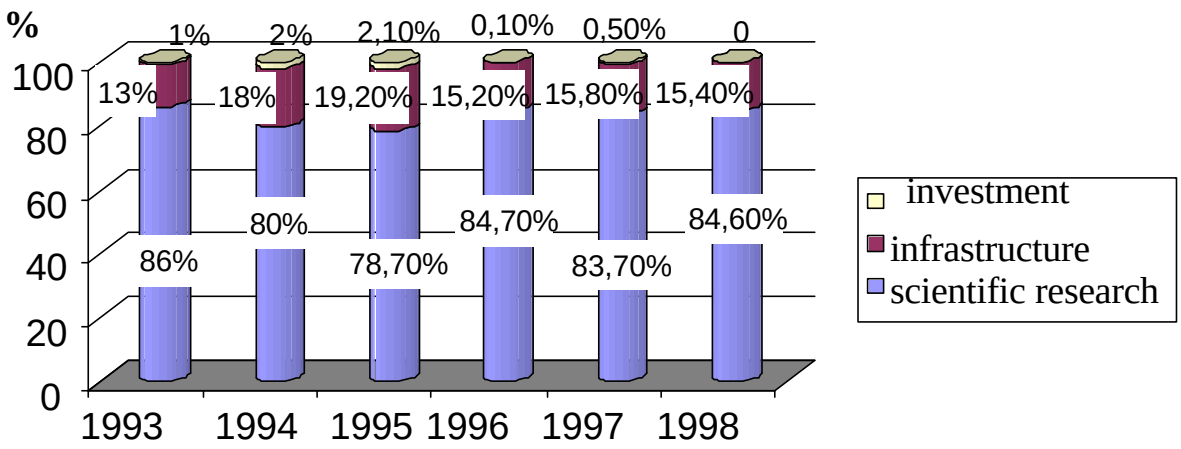


Figure 7.

This brief analysis testifies that the changes occurring in the country have directly influenced the conditions of research. The insufficiency of financial allocations influences scientific research efficiency. To carry out research it is necessary to attract extra-budgetary funds, grants, and humanitarian aid, and to develop competition in the field of scientific research.

The way out of the existing situation should be the reform of the scientific research field, including the application of effective forms of organization and management, with due importance given to economic factors. First of all a radical approach to financing and management is necessary. The changes in the principles of financing science should ensure the rationality of each establishment's activities.

In the future, scientific research should earn money independently and receive full financing, and occupy a worthy place in national development

Note: In November 1999 the Ministry of Science became the Ministry of Education and Science. Unfortunately, in the available literature there is still no information about the change in the above-mentioned concept or about other innovations.

2. The network, structure and potential of medical science in Kazakhstan

2.1 Number of scientific and science teaching staff

The aggregate number of workers in this sector is shown in Table 2. In 1997, 1998, and 1999, respectively, there were 2.4, 2.2, and 2.1 scientific workers per 10 000 population. The proportion of doctors engaged in scientific research was 6.88%.

In Kazakhstan, as in all countries of the former Soviet Union, there is a two-tiered training of scientific staff. After graduating from a higher medical institute and 2-3 summer practices, young people may work in research institutes and centres as junior scientific staff and begin to carry out research under the direction of professors. Or they enter postgraduate courses for target performance of scientific research under the direction of skilled scientific experts. The purpose of this stage is to complete a job of work and present one's dissertation, after which the candidate is awarded the rank of candidate in medical sciences by the Senior Certification Commission of the Government. After receiving this rank, the young researcher may carry out further scientific research, on the same topic or a new one. After completing a topic the presentation of the second dissertation follows and the rank of doctor of medical sciences is awarded. It is the highest scientific degree.

Table 2

Distribution of experts by post and scientific degree

Posts	TOTAL			Doctors of sciences			Candidates of sciences			without scientific degree		
	1997	1998	1999	1997	1998	1999	1997	1998	1999	1997	1998	1999
Head of laboratories	63	55	46	36	30	27	27	24	18	-	1	1
Head of branch, department	65	69	66	27	32	34	36	35	30	2	2	2
Chief scientific worker	21	21	20	20	21	20	1	-	-	-	-	-
Leading scientific worker, senior scientific worker, scientific worker, junior scientific worker	546	518	470	11	10	11	243	240	213	292	268	246
Rector of Medical Institutes (Academy)	6	7	7	6	7	7	-	-	-	-	-	-
Pro-rector of Medical Institutes (Academy)	15	11	10	11	9	8	4	2	2	-	-	-
Head of faculty	239	236	221	131	145	141	92	79	68	16	12	12
Professor	67	73	78	63	68	70	4	5	8	-	-	-
Associate professor	635	635	616	8	9	12	622	619	593	5	7	11
Senior lecturer, lecturer, assistant	2084	1930	1838	5	3	4	479	438	425	1600	1487	1409
Other	118	70	69	55	37	39	52	19	17	11	14	13
TOTAL	3859	3625	3441	373	371	373	1560	1461	1374	1926	1791	1694

A scientist with this degree may become the head of a scientific team or department, supervising young postgraduate students and candidates for scientific degrees. He is given the scientific rank of professor of medical sciences after preparing three examinations in science and publishing 1-3 theses/books.

In addition, there is a National Academy of Sciences, which selects member-correspondents and academicians among professors on the basis of special excellence displayed in the creation of a scientific school and in contributions to science. This practice is no longer obligatory as in the past, now that the Academy of Science has become a department of the Ministry of Science and Education.

In 1999 there were 4 medical academicians, 10 member-correspondents, 24 professors, and 1484 candidates of sciences.

This scientific staff can work in one of two systems: medical science or medical education. In 1997, 384 doctors of sciences and 1308 candidates of medical sciences worked in research institutes. The distribution of posts among them was as follows:

- Chief scientific workers, 20, scientific workers (leading, senior, junior), 546 in 1997, 470 in 1998 (a decrease of 13.9%).
- The number of faculty heads remained approximately steady (239 in 1997, 221 in 1999), the number of associate professors and lecturers decreased (from 635 to 616 and from 2084 to 1930, respectively).
- While the number of doctors of science was constant (373), the number of candidates of science decreased from 1560 to 1374, or by 11.9%.
- At the same time, the number of researchers without a scientific degree decreased from 1926 to 1694, or by 12%.

Thus, there has been a steady downward trend in the total number of science teaching staff in the country in recent years. Special dynamics can be observed in the number of candidates of sciences and persons who have not yet obtained a scientific degree.

Table 3.

Distribution of specialists by nationality and post in 1998

Posotion	Total	Nationality					
		Kazakh	Russian	Ukrainian	Belarusian	Uzbek	Others
Head of laboratory	55	28	21	1			5
Head of branch, department	69	53	10	3		-	3
Chief scientific worker	21	11	6		-	-	3
Leading scientific worker, senior scientific worker, scientific worker, junior scientific worker	518	321	125	10	3	2	59
Rector of Medical Institute (academy)	7	7					
Pro-rector of Medical Institute (academy)	11	6	4				1
Head of faculty	276	210	39	11	1	1	14
Professor	73	41	15	1			16
Associate professor	635	413	145	16	3	5	53
Senior lecturer, lecturer, assistant	1928	1354	379	66	9	6	114
Other	70	54	11	2	1		2
Total	***3663***	***2498***	***755***	***107***	***18***	***17***	***268***

Table 3 contains data on distribution of researchers by national origin, while Table 4 shows distribution by degree, branch of science and experience.

Table 4.

Distribution of scientific workers by scientific degree, branch of science and scientific experience in 1998

Scientific degree/branch of science	Total	Scientific experience					
		< 1 year	1-5 years	6-10 years	11-15 years	16-20 years	> 20 years
Doctor of sciences	388	3	22	53	51	57	202
- Medical	348	2	18	51	48	51	178
- Biological	31	1	4	2	1	5	18
- Pharmaceutical	3				1	1	1
- Other	6				1	1	4
Candidate of sciences	1484	9	253	355	244	158	465
- Medical	1214	8	211	287	207	123	378
- Biological	139	1	16	43	13	18	48
- Pharmaceutical	26		3	9	8	2	4
- Other	105		23	16	16	15	35
Without a scientific degree	1791	87	953	359	137	86	169
Total	***3663***	***99***	***1228***	***767***	***432***	***301***	***836***

Almost 85 % of doctors are doctors of science in the field of medical sciences and 15% in the field of biological and pharmaceutical sciences.

Table 5 shows data for the study of researchers by work experience. As is evident from the data the majority of researchers have work experience of up to 10 years.

Table 5.

Distribution of specialists according to work experience in post in 1998

Position	Total	Experience of work					
		<1 year	1-5 years	6-10 years	11-15 years	16-20 years	> 20 years
Head of Laboratory	55	6	14	11	6	5	13
Head of department, chair	69	8	39	15	5	-	2
Chief scientific worker	21	6	13	1	-	-	1
Leading scientific worker, senior scientific worker, scientific worker, junior scientific worker	518	59	268	125	27	21	18
Rector of Medical Institute (academy)	7	1	4	1	1		
Pro-rector of Medical Institute (academy)	11	1	6	2	2		
Head of faculty	276	34	123	63	28	14	14
Professor	73	11	41	12	5	1	3
Associate professor	635	43	279	161	73	38	41
Senior lecturer, lecturer, assistant	1928	126	1077	415	129	78	103
Other	70	8	41	9	7	3	2
Total	***3663***	***303***	***1905***	***815***	***283***	***160***	***197***

Table 6 contains information on the aggregate number of scientific and science teaching staff in Kazakhstan.

Table 6.

The information on the number of scientific workers in scientific institutes and medical institutes.

Name of establishment	Total number of workers	Doctor of sciences	Candidates of sciences
Republican scientific centre of mother's and child's health protection	43	5	38
Scientific centre of hygiene and epidemiology	46	21	25
Scientific research institute of cardiology	27	5	22
Scientific research institute of eye illnesses Almaty city	15	5	10
Scientific centre of paediatrics and child surgery	33	7	26
Scientific research institute of skin- venereal illnesses	24	5	19
Scientific research institute of radiology and oncology	62	26	35
Scientific research institute of tuberculosis	25	7	18
Scientific centre of surgery named after Syzganov	41	13	28
Scientific centre of urology named after Jarbosynov	25	7	18
Kazakh scientific research institute against plague	50	16	34
Scientific centre of radiation medicine and ecology	7	3	4
Scientific centre of health medical - economic problems	16	3	13
Total	414	123	290
State Medical Academy in Akmola city	128	28	100
State Medical Academy in Aktyubinsk city	148	30	118
Kazakh State Medical University named after Asfendiarov	472	85	386
State Medical Academy in Karaganda city	195	36	159
State Medical Academy in Semipalatinsk city	161	25	136
State Medical Academy of the South-Kazakhstan region	100	17	83
Faculty of upgrading qualification for doctors in Pavlodar city	29	3	26
Institute of upgrading qualification for doctors under the Ministry of health	114	35	79
Total	1347	259	1087
Republican scientific – clinical centre "Stomatology"	2	0	2
TOTAL	1763	382	1379

The great majority of researchers work in medical universities and academies, with about 25% working in research centres and institutes. In 1998 there were 13 centres, 6 medical institutes (including one medical university in Almaty and 5 medical academies in Astana, Shymkent, Karaganda, Semipalatinsk and Aktubinsk). In 1998 the National Centre for Problems of Healthy Lifestyles Development and the School of Public Health were added to the list.

Table 7 shows data on the movement of scientific staff in 1998.

Table 7.

Movement of scientific staff in scientific research institutes, scientific centres and medical institutes of the Ministry of Health in 1998

Name of establishment	Arrived			Left		
	Total	Doctor of sciences	Candidates of sciences	Total	Doctor of sciences	Candidates of sciences
Republican scientific centre of mother's and child's health protection	7	0	0	6	1	1
Scientific centre of hygiene and epidemiology	4	0	0	27	12	2
Scientific research institute of cardiology	2	0	0	0	0	0
Scientific research institute of eye illnesses Almaty	2	0	0	3	2	0
Scientific centre of paediatrics and child surgery	8	4	0	10	3	0
Scientific research institute of skin-venereal illnesses	5	1	0	1	1	0
Scientific research institute of radiology and oncology	1	0	0	10	7	2
Scientific research institute of tuberculosis	2	0	0	5	2	0
Scientific centre of surgery named after Syzganov	0	0	0	5	1	2
Scientific centre of urology named after Jarbosynov	0	0	0	2	1	0
Kazakh scientific research institute against plague	10	5	4	5	3	1
Scientific centre of radiation medicine and ecology	0	0	0	2	2	0
Scientific centre of health medical - economic problems	8	2	1	12	2	0
Total	49	12	5	88	37	8
State Medical Academy in Akmola city	27	5	5	31	6	3
State Medical Academy in Aktyubinsk city	14	2	3	50	23	4
Kazakh State Medical University named after Asfendiarova	32	8	0	98	39	9
State Medical Academy in Karaganda city	30	5	2	139	43	5
State Medical Academy in Semipalatinsk city	5	1	1	35	12	4
State Medical Academy of the South-Kazakhstan region	41	16	4	31	10	3
Institute of upgrading qualification for doctors of the Ministry of health	9	6	1	19	8	4
Total	158	43	16	403	141	32
Republican scientific - clinical centre "Stomatology"	4	0	0	5	3	0
TOTAL	211	55	21	496	181	40

The number of staff leaving was more than twice as the number engaged. This trend is especially noticeable in the medical institutes.

Table 8 gives data on scientific potential by age and sex.

The peak number of researchers is in the age bracket 35-40 years. Although women outnumber men by almost 2:1 overall, the majority of doctors of science and of professors are male.

On the whole, we can say that the network of research centres is preserved and there is a sufficient scientific potential. The significant movement staff, predominance of aged scientists and concentration of women among relatively low qualified scientific staff, deserve attention.

Table 8.

Distribution of specialists by scientific degree, title, age, sex (January 1, 1999)

Scientific degree and title	Total	Age											
		Male	Female	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	> 65
Doctor of sciences	388	266	122	-	-	1	7	35	57	72	110	53	53
Candidate of sciences	1484	592	892	-	38	132	195	196	263	207	299	112	42
Without scientific degree	1791	442	1349	71	352	409	358	185	173	107	95	29	12
Total	***3663***	***1300***	***2363***	***71***	***390***	***542***	***560***	***416***	***493***	***386***	***504***	***194***	***107***
Academician	4	4	-	-	-	-	-	-	-	-	-	2	2
Professor	261	177	84	-	-	-	1	11	24	50	85	44	46
Associate professor	719	344	375	-	-	7	37	69	142	141	223	69	31
Member –correspondent	10	9	1	-	-	-	-	2	-	1	1	3	3
Without scientific degree	2669	766	1903	71	390	535	522	334	327	194	195	76	251
Total	***3663***	***1300***	***2363***	***55***	***390***	***542***	***560***	***416***	***493***	***386***	504	194	107

3. Health research in Kazakhstan

3.1 Science and technology programmes

Thirteen science and technology programmes were implemented from 1997 to 1999. They mostly covered prevention, treatment, diagnosis and service organization in the following areas:

- skin - venereal illnesses;
- diseases of internal organs;
- child illnesses;
- urology;
- maternal and child health protection ;
- tuberculosis;
- oncology (2 themes);
- surgical illnesses;
- stomatology;
- hygienic and social problems of the population, economy and health management under conditions of reform;
- healthy lifestyle.

3.2 Key features of health research

- As is immediately apparent from the list of topics, they reflect precisely the focus of the leading scientific centres, i.e. these topics were created for the existing network and structure of the scientific centres. Only separate scientific departments and groups of scholars in medical universities can take part in carrying out separate fragments of these programmes. All scientific literature, expensive equipment and precise methods were concentrated in these scientific centres.

- About 90% of all scientific centres are concentrated in the former capital of Kazakhstan, Almaty. Only a few centres are located in the regions, i.e. there is an evident imbalance in arrangement and concentration of scientific potential.

- The centralization of management in the capital and hierarchy of medical management are important features.

- All topics of scientific research are clinical and there is relatively little fundamental research. The analysis in economy and health management reform showed that the themes are urgent (medical-demographic research, problems of primary health care and health economy), but they lag behind everyday life. For example, one problems under study cover budget-insurance medicine, while this model has already been tested and rejected by the Government.

- All scientific centres are financed from the national budget, through the Ministry of Finance, while the main health system (up to 80 %) is financed from the local budget.

3.3 Scientific centres' output

The output of the scientific centres is reflected in:

- the topic reports to the Ministry of Science;
- the number of doctors' and candidates' dissertations;
- the number of published scientific articles, monographs, books, and methodological recommendations;
- the number of applications of scientific results in practical health services.

On average 1-2 doctors' and 3-5 candidates' dissertations, 50-60 scientific articles, 1-2 monographs, and 3-6 methodological recommendations are presented for each theme.

Thus, the topics of scientific work corresponded largely to the existing network and structure of scientific centres concentrated in the former capital and reflected the tendencies of health development that took place within the decade.

4. Experts' evaluation of national health research

4.1 Panel of experts

Four national experts were interviewed as follows:

- the former Deputy Minister of Health;
- two chiefs of national research centres;
- the WHO representative in Kazakhstan.

The average age of the experts was 44.5 years. Three were doctors of science, one was a candidate of sciences. The average length of experience of work in the health system was 20.7 years. All the experts had experience at the international level.

The following answers were received:

4.2 Questionnaire

Is there a health protection strategy in Kazakhstan?

Two experts answered negatively. Two believe that it is the State Programme "Health of the people", adopted in 1998.

Is there a strategy of health reform?

Three experts answered negatively. One believes that it is the State Programme "Health of the people".

Is medical science needed?

- Does it answer the needs of the population? 3 - "no", 1 - "yes"
- Does it answer the needs of the health reform? 3 - "no", 1 - "yes"
- Does it answer the needs of practical health services? 3 - "no", 1 - "yes"

Is medical science promoted enough?

- for the population — 4 - “no”;
- for health department:
  - at the national level — 2 - “yes”, 1 - “no”, 1 - partially
  - at the regional level — 1- “yes”, 3 - “no”
- for the hospitals and polyclinics — 4 - “no”
- for the staff of the primary health services — 4 - “no”

Is there a partnership with medical science?

- the central body — 2 - “yes”, 1 - “no”, 1 - “partially”
- the regional level — 4 - “no”
- the local level — 4 - “no”

Is there information on priority setting?

Is there enough quantitative information at the levels of:

central management	2 “no”, 2 - “yes”
the regional level	4 - “no”
the local level	4 - “no”

Is there enough qualitative information at the levels of:

central management	4 - “no”
the regional level -	4 - “no”
the local level -	4 - “no”

What priorities should there be for receiving the necessary information about priority setting?

Detailed official statistical information	3 - “yes”, 1 - “no”
Deepening of research	4 - “yes”
Experts' evaluation	3 - “yes”, 1 - “no”
All of these combined	4 - “yes”

What research needs to be undertaken?

The following themes were listed: strategy, economy, management, healthy lifestyle, preventive medicine, condition of health and its forecasting, health reform.

Financing should be:

centralized, state - 1

mixed financing including the budget, grants, international projects etc. - 3

Participation in priority setting:

Who should take part in this process?

researchers	4 - “yes”
bodies of management	4 - “yes”
medical workers	4 - “yes”
community	3 - “yes”, 1 - “no”
international organizations	2 - “yes”, 2 - “no”
all of these combined	2 - “yes”, 2 - “ no”

Scale for rating research topics

Relevance

very relevant - 4

Avoidance of duplication

- sufficient information already available	1 - "yes"
- some information available but major issues not covered	2- "yes"
- no sound information available on which to base problem solving	1- "yes"
Feasibility	
- study feasible considering available resources	3- "yes" , 1- "no"
Political acceptability	
-topic fully acceptable	4- "yes"
Applicability	
-some chance of recommendations being implemented	3-"yes"
-good chance of recommendations being implemented	1-"yes"
Urgency	
-information could be used right away but a delay of some months would be acceptable	2- "yes"
-data very urgently needed for decision-making	2- "yes"
Ethical acceptability	
-major ethical problems	1-"yes"
- no ethical problems	3- "yes"

An analysis of the responses to this questionnaire is contained in the conclusions of this report set out below.

5. Conclusions

The following conclusions can be drawn from the data and descriptive information contained in the preceding chapters of this report:

5.1 Scientific potential

In Kazakhstan there is sufficient scientific potential. There are 2-2.4 health researchers per 10 000 population, or about 6.9 % of all persons with higher medical education. The network of researchers covers 14 research centres and 6 medical universities.

The ratio of men to women is 1:1.9, but men predominate among the doctors of science.The average age of a doctor of science is 56.3 years, and that of a candidate of science is 49.0 years.

Financing of medical science is carried out through the Ministry of Science and Education as a targeted programme area. General financing of science in Kazakhstan is underfunded by 23 % compared with the planned budget. Health research receives about 6% of all research funding in science. There was practically no allocation for equipment and new technologies in 1990 -1993. Extra-budgetary sources (grants, etc.) constitute a very small proportion of funding (3-6%). In general, financing of health is about 0.1% of the country's expenditure.

5.2 Results of the questionnaire

The experts' evaluation of health research shows:

- There is no precise, standard health protection and health reform strategy.
- Medical science and research do not, in general, respond to the needs of the population and health reforms. Their activities are covered only at the national level. There is a partnership of science and practice only at the level of national management.
- There is no clearly defined opinion about the adequacy of existing information on health priority setting. For this purpose it is necessary to carry out serious research on strategy development, economy, management, health promotion, an in-depth study of health parameters with forecasting of basic elements of illness formation. The financing of health - according to the majority of opinions - should be mixed.
- The experts believe that health research with the current availability of resources is appropriate. The data collected are necessary and there is an understanding that the data will be used for decision-making.

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