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Nikolay Ivanovich Pirogov and his contribution to medicine in 19th Century Imperial Russia

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Chapter 2

Development of Russian Medicine from the 9th to the beginning of 19th century. The role of physicians trained in the Netherlands.

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Abstract

The development of medicine in Russia is discussed from the beginning of the ninth century until the end of the eighteenth century. Before 1613 most of the population had little access to qualified medical care, but relied on traditional folk remedies. After conversion of Kievan Rus' to Byzantium Christianity, monks in the monasteries provided basic medical care in addition to folk healers. In contrast, the ruling classes had access to qualified foreign physicians. From the first Romanov Tsar, Mikhail Fyodrovich (1613-1645), on many foreign doctors were recruited including Dutch graduates of Leiden University. Talented Russian-born students of the Moscow Medical Hospital School, founded by Peter the Great and his Dutch court physician Nicolaas Bidloo, were sent to Leiden on state scholarship. Especially during the eighteenth century, Leiden trained physicians made very significant contributions to medicine and helped strongly to develop the medical faculty of the Moscow university.

Folk medicine and the role of the monasteries during Kievan Rus'

An open society

To better understand the history of medicine in Russia it is helpful to understand the history and the geography of that nation.[1,2] Throughout its history Russia varied between an open and an isolated country, and this is also reflected in the development of medicine. Ancient Russia was connected by a river in the north with Scandinavia and in the south with Byzantium. The country name dates from the second half of the ninth century when it was called Kievian Rus', a feudal state with Kiev as the capital.[3,4]

During its early history the majority of Russians had little or no access to qualified medical care, but relied on traditional folk and herbal remedies.[1,3,5] With the conversion of the Kievan Rus' state to Byzantium Christianity in 988 many monasteries were established, some of which also functioned as centers of education. They also offered basic medical care for the poor and needy. Ancient and early medieval manuscripts came to Kiev through Bulgaria and Byzantium. Monks and chroniclers like Nestor, who knew Latin and Greek not only collected Greek and Byzantine manuscripts, but also translated them to the Slavic language, to which they added their own knowledge based on local folk experience.

The oldest and most famous monastery was the Pecherskaya Monastery[1] or "Monastery of the Caves" in Kiev.[1,3-9] It received wounded and needy with all kinds of diseases from all over Kievan Rus'. For the most serious cases the monastery hospital had a special ward, where monks on duty provided the basic care for the sick.

Some monks specialized in the treatment of specific diseases; for example Alimpiy treated patients with skin diseases and Demyan treated children. In the eleventh century, many monks spent time in the monastery on the Mount Athos in Greece. On their return they put into practice the rudimentary medical skills they had learned there. The monks were not the only practicing healers. A distinct secular medical tradition had also evolved by the mid-eleventh century. In cities and at the courts of princes and boyars (noblemen) there were secular Russian and foreign folk healers called lechtsy (*лечцы*). Two known foreigners were Armenian and Peter the Syrian.

These healers used traditional medicine and passed their medical knowledge and secrets from generation to generation, from father to son in the so-called family medical schools. Widespread use was made of herbal remedies derived from plants

[1] We have used common English transcription for Russian among others the names 'Печерская лавра' and 'Алимпий'.

such as sage, nettle, plantain or wild rosemary, and from animals, e.g. honey and cod liver oil.
Folk healers were well aware of the healing power of the banya (sauna), which was the cleanest room in the house and was used for caring and cleaning the body, phlebotomy, massage, delivering a child and caring for the new-born, etc. Banya's are even nowadays in use in Russia.

In the oldest Russian law, the [*Russian Truth*], framed between 1113-1125 is written that a person who inflicted damage to another person's health, had to pay a sum of money to the state treasury so the victim could pay for the treatment of their injuries. Thus the law indirectly recognized for the first time the work of folk healers.

An isolated society during the Mongol Yoke
Kievian Rus' had existed for three centuries when in 1132 after the death of the last Prince of Kiev the country broke up into several small feudal regions. It lost its political independence and was isolated from Europe as a result of the invasion of the Mongol-Tatars named the Golden Horde. However, ongoing struggles made it impossible for the Moguls to create a strong Mongol government. The princes of the Grand Duchy of Moscow at the head of gathering the Russian regions steadily increased its power. The unification was completed by Tsar Ivan III (1462-1505) after the final overthrow of the Mongol yoke at the Battle of Moscow in 1480 and Moscow replaced Kiev as the political capital of the country then named Muscovy.
During the Mongol yoke foreign physicians virtually disappeared and they did not begin to return until the reign of Tsar Ivan III (1462-1505).

From rural to pharmaceutical medication during Muscovy (1481-1662)

One again an open society
After the victory over the Mongols the new state of Muscovy sought reconnection with Europe through the free port of Archangelsk. The first Muscovite emperor, Tsar Vasily Ivanovich III (1505-1533) appointed as his court-physicians some foreign doctors, among them Nikolay Lyuev (Nicolaus Bülow) from Lübeck, the brothers Marquart from Königsberg and Theophil, a captured Prussian doctor. [4,7,10,11]
But from letter exchanges between the Grand Duke and his wife it was apparent that for the illness of their children they had more trust in the empirical experience of the Grand Duchess than in doctors. Thus, the children were treated with the traditional folk remedies supplied by the home pharmacy.

Vasily's successor Tsar Ivan Vasilievich IV (1534-1584), known as Ivan the

Terrible, developed trade with England and other countries.[4,12,13] Widespread connections with other countries ensued and modern-drugs became more readily available. From 1550 more hospitals were built in many cities to cater for the elderly and sick. Ivan IV invited the first Doctors Medicinae (comparable to a PhD-physician) to Russia, including the brothers Arnold and Robert Lindsay and the pharmacist James Frencham from England. He also recruited in 1557 the pharmacist Arend Claessen van Stellingwerff from Holland. Even though Van Stellingwerff arrived first and became the court pharmacist for 40 years, it was the Englishmen James Frencham, who was appointed head of the first Imperial Pharmacy opened in Moscow in 1581. Frencham returned to England in 1583 but was again brought to Russia in 1602 by Tsar Boris Fyodrovich Gudonov (1598-1605), bringing with him a valuable collection of both common and less common drugs such as opium, camphor and Senna leaves. Between the death of Tsar Boris and the accession of the first Romanov Tsar, Mikhail Fyodorovich (1613-1645), there was a period of seven years' unrest and civil war.

With the development of book printing scientific sources of European knowledge, such as the manuscripts of Aristoteles, Hippocrates, Celsus and Galen, became available. Tsar Ivan IV and other Russian noblemen installed printing presses.[7] The first handwritten book on medicine of Roman origin was translated in 1423 to Polish and appeared in a Russian translation by Thomas A. Buturlin in 1588.[4,5,7] This textbook of 1561 pages contained copied drawings of herbs, trees, animals, distillation of brandy wine, philosophical education, phlebotomy and pharmacy. By 1616 German herb catalogues with colour pictures, which had existed since 1534, had been translated into Russian. In 1661 these books were presented to the Aptekarskiy Prikaz (Ministry of Pharmacy)[2] and came available to medical doctors, surgeons and pharmacists.
In 1812 like many other things during the invasion of Moscow by Napoleon these rare books and a big part of the archive of the Aptekarskiy Prikaz were destroyed by fire.[4,14]

Tsar Aleksey Mikhailovich (1645-1676) owned two Imperial Pharmacies in Moscow. The old pharmacy was located in the Kremlin and served the Imperial family and supplied almost nothing to private individuals.[5,12,13] The new second pharmacy, located in the city centre, had a significant turnover and employed several qualified pharmacists who were responsible to the Aptekarskiy Prikaz. The tsar had three herb gardens laid out in Moscow most with widely used herbs. Fresh herbs were also obtained from the surrounding villages. The gardeners were

[2] Historical meaning for 'Приказ' is 'Ministry' according to the dictionaries of S.I. Ozhegov – N.Yu. Chedova and of V. Dal'.

required on the first of April to inform in writing the Aptekarskiy Prikaz which seeds and quantity were needed, and in November provide a written report of the functioning of the gardens. The Imperial pharmacies now provided native herbs such as Symphytum majus, Helleborus Niger, Hypericum, Anisum stellatum, saltpetre and rhubarb. However, herbs still had to be imported from abroad for the Imperial pharmacies. In the 1660s two wars broke out between England and Holland among others about Russian trade[9] this resulted in the latter half of the seventeenth century the Dutch taking over the leading market position from the English for exporting and selling pharmaceutical products and herbs. Special staff members of the Prikaz were appointed to deal with deliveries and supplies, and the bookkeeping. They also were responsible for supplying the pharmacist or doctor medicinae the correct items as provided in the signed prescription, and were also responsible for making the end-of-year financial statement to the Aptekarskiy Prikaz.[14]

Tsar Peter the Great (1662-1725) inherited the both pharmacies and had the central pharmacy replaced by a new stone building and refurbished along European standards. In 1705 he allowed eight private pharmacies to be established in Moscow. Their owners held a free license and could sell all types of medicines with the exception of wine and other sorts of non-medical liquids to the general public. Pharmacies were also opened in Kazan, Gluchow, Riga and Reval (now Tallinn in Estonia). A pharmacy in Saint Petersburg, which in 1703 became the new capital of Russia, was not opened until 1760 because of the dominance of the state pharmacy system and the slow growth of population in the city.[12,13] The Tsar also had garrison pharmacies opened in several small villages. Following his second visit to Europe in 1717 Peter had two medicinal herb gardens established in Saint Petersburg and invested in obtaining and producing native medicines and medical products in several new, purpose built factories.[6,12]

Advances in medicine leads to changes in governance

Tsar Mikhail Fyodorovich (1613-1645), the first reigning Romanov, instituted improvements in social welfare and healthcare. Around 1620 he established the Aptekarskiy Prikaz (Ministry of Pharmacy) in Moscow.[4,5,7,13] (Fig. 1) An aristocratic landowner and member of the feudal aristocracy (Boyar) was appointed as minister and a secretary was responsible for day-to-day matters.

The Prikaz became responsible for the advancement of medicine and public health:

- It comprised three professional groups, pharmacists, doctors medicinae and barber surgeons (lekars). It examined pharmacists and doctors medicinae and supervised their registration. Foreign doctors could only be admitted to Russia following approval by the Prikaz after they had shown their diplomas and had successfully passed an examination to confirm their competence to practice.

Fig. 1. The building of the Aptekarskiy Prikaz in the Moscow Kremlin, pen and ink drawing, artist Margarita V. Apraksina, Saint Petersburg, 2016. Private collection, with permission

- It was also responsible for the daily stock of medical supplies as well as organizing the military pharmacies, paying medical administrators and settling legal cases.[12] One person within the Prikaz was authorized to purchase medical instruments and drugs from abroad, most often from Great Britain, the Netherlands[3] and Germany.[7,13,15]
- Another important task of the Prikaz was protecting the population against epidemics such as the bubonic plague, but the steps taken were often insufficient and weak.
- For soldiers, civil servants and boyars a standard care with treatment protocols was developed.[5,12] After investigation by a barber/surgeon, patients took their written injury report together with the prescription to the Prikaz to get the medication, which was paid by the state.
- The Prikaz opened the first medical school in 1654 with court physicians and foreign doctor medicinae providing the education.[6,16,17] Instructions were given in surgery, anatomy, pharmacology, practical diagnosis of internal diseases and ambulatory medicine. From the 30 students selected only 13 graduated in 1658. This school was closed in 1717 by Tsar Peter the Great.

In Russia in the sixteenth and seventeenth centuries pharmacists had the primary responsibility for healthcare. Medicine became more complicated. It changed from

[3] We have chosen for today's names of countries..

external application of herbs to herbal and drug prescriptions in combination with surgical treatments. Following his visits to Europe Peter the Great introduced several innovations, including appointing doctors medicinae as decision makers in the healthcare system. This was continued by his successors. In 1707 Peter the Tsar renamed the Aptekarskiy Prikaz to Aptekarskaya Kantselyariya[4] (Pharmaceutical Chancellery). In 1725 it underwent yet name change to Meditsinskaya Kantselyariya (Medical Chancellery).[6,7,17] In 1712 a large part of the Aptekarskaya Kantselyariya was moved to the new capital Saint Petersburg and the budget was also increased to cover the staff salaries and the higher prices of imported drugs. In 1716 Tsar Peter appointed by crown the first Arkhiyater of the Chancellery (synonymous for Minister of Healthcare). Thus, from that time the title "Arkhiyater" became reserved for the senior civil servant or politician with responsibilities for health care.
The first of these new style Arkhiyaters was the Scotsman Robert Erskine, who from 1713 had been court physician to Peter the Great. The Tsar elevated him to a privy councilor for his "many and most faithful services" - a mark of high distinction. Erskine had studied in Paris before moving to the Netherlands, where he graduated as *Doctor Medicinae* from Utrecht University in 1700. Erskine and his successors were tasked with the responsibility for all health care activities in Russia and all doctors, surgeons and pharmacists working for the state came under their jurisdiction.

Along with the renaming of the Aptekarskiy Prikaz to first Aptekarskaya Kantselyariya and in 1725 to Meditsinskaya Kantselyariya the title of governors also changed first from Arkhiyater to General Director in 1725.[6,18] From 1716 till 1763 Russia counted four Arkhiyaters and four General Directors of whom four were graduates of Leiden University. They radically transformed Russian medicine.

On the recommendation of the Portuguese António Nunes Ribeiro Sanchez, personal physician of Tsarina Anna Ivanovna (1730-1740), Herman Kaau-Boerhaave was invited to become the court physician of the Tsarina.[5,6,18] Sanchez was a graduate of Leiden and a pupil of Herman Boerhaave. Herman Kaau accepted the invitation and travelled to St. Petersburg with his family at the end of 1741. He was one of the four general directors of the Meditsinskaya Kantselyaria. His parents were, Margriet Boerhaave, sister of Herman Boerhaave and doctor Jacob Kaau. Herman became the heir of his uncle Herman Boerhaave, who had only a daughter, so he attached the family name Boerhaave to his surname.

[4] Historical meaning for 'Канцелария' is 'Chancellery' by the dictionaries of S.I. Ozhegov – N.Yu. Chvedova and V. Dal'.

In 1744 Herman Kaau-Boerhaave was appointed to the state council and on 7 December 1748 appointed by Tsarina Elizabeth the Great (1741-1761) as a member of the Privy Council, as first personal physician and General Director of the Meditsinskaya Kantselyariya. He died in Moscow on 7 October 1753 and on the express order of the Tsarina his body was interred in a vaulted crypt in the Old Dutch Church. His remains were moved to the Moscow cemetery on May 20, 1815 when the Old church was moved.
Herman Kaau-Boerhaave, like his uncle, had no male heirs and his younger brother Abraham Kaau became his only heir. In 1740 with the permission of the daughter of Herman Boerhaave, countess De Thoms-Boerhaave, Abraham also changed his surname to Kaau-Boerhaave. Both brothers had studied medicine in Leiden under their uncle Herman Boerhaave and both made successful careers in Russia.

Pavel Zakharievich Condoidi (1710-1760) of Greek roots travelled from Russia to Leiden to study medicine, where he graduated as a doctor in 1733.[6,17,19] On his return to Russia he initially worked as a military doctor, then as a general staff physician. As an honorary member of the Imperial Academy of Science he succeeded Herman Kaau-Boerhaave in 1753 as General Director of the Meditsinskaya Kantselyariya, a post he held until his death in 1760. During his tenure he introduced a seven-year's period of study, a new examination system and introduced in the curriculum of the medical schools teaching of physiology, obstetrics, women's and children's diseases. Another of his achievements was the establishment of the first Russian Library of Medicine in 1756.

Tsarina Elizabeth the Great (1741-1762) issued in 1756 a law that only doctors who had been examined and officially registered by the Meditsinskaya Kantselyariya were allowed to practice medicine.[5,6] It was expressly forbidden to provide any oral drugs without the signature of a qualified doctor. The practice of medicine was now forbidden to non-qualified doctors (folk healers). The Meditsinskaya Kantselyariya distinguished between scientifically trained foreign doctors (Doctor Medicinae) and empirically trained doctors. The first group were doctors who after their basic medical training had completed postgraduate studies and research culminating in the defence of a scientific thesis. The second group were referred to as barber/surgeons лекарь (lekar), and this distinction was also reflected in the level of salary.

Tsarina Catherine the Great (1763-1796) made significant changes in the management of medical affairs in Russia.[6,17,19,20] In 1763 the Meditsinskaya Kantselyariya was transformed into the Meditsinskaya Kollegiya (Medical Collegium) with extended powers. She installed a board of directors (Collegium) with a doctor medicinae as one of the members. In 1764 it was given the right to

confer the degree of Doctor Medicinae, although it rarely used this right. Provincial medical charitable councils were created in all provinces of the Russian Empire in 1775. The councils, which were formed to supervise rural medical affairs, included representatives of all sections of society. Their functions include organizing orphanages, alms-houses, hospitals and pharmacies. They fell under the supervision of the Meditsinskaya Kollegiya. The number of physicians (also those of Russian origin) steadily increased. (Table 1)

In 1801 Tsar Aleksander the First, who had succeeded his father Paul, instituted further far-reaching reforms in the management of health care and abolished the Meditsinskaya Kollegiya.[5,6,21] The management of civil medicine became the responsibility of the Ministry of Internal Affairs. Military medicine became the responsibility of the Ministry of Defence and the management of medical education was transferred to the Ministry of National Education.

Transformation to scientific medicine

The window to Europe

Peter the Great became Tsar of Russia at the young age of ten years, together with his handicapped half-brother Ivan Alekseevich (1682-1696); his half-sister Sophia acted as regent. This dual rule lasted until 1696, when Ivan Alekseevich died. [6,12,20,22]

One of their first acts of the two youngsters was to send a letter in Latin to the German emperor Leopold requesting him to search for two suitably experienced doctors who could take care of their health. Gregorius Carbonarius von Bisenegg [10,12] of Austrian roots and Jakob Pelarino[10,12] of Greek roots were found and arrived two years later.

As a child Peter the Great had many friends in the Slobodova, the foreigner's area, in Moscow. One of his closest friends was the family's court physician, Johan (Ivan) Termont, a skilled Dutch barber-surgeon and his first teacher on theoretical and practical medicine.[20,21] After the death of his brother Ivan, Peter made his first visit to Europe with the Grand Embassy (a diplomatic mission to strengthen Russia's alliance with a number of European countries) during1697-1698, which he again repeated in 1716-1717. His childhood friends and his travels abroad influenced Peters vision for the modernization of Russia.[5,6]

In the seventeenth century the centre of anatomical studies moved from Italy to France, England, and particularly to the Netherlands (Holland), because Papal edict excluded all non-Catholics at Italian universities; A consequence of the Reformation, which took place in the seventeenth century. The Leiden university, founded in 1575 by Stadtholder Willem the Silent, was open to all students

Fig. 2. Peter I provides medical care in Azov 1696, watercolour, artist V.I. Peredery, 1950, Image OF-35880. Military Medical Museum of Defence Ministry of Russian Federation, Saint Petersburg.

irrespective of race, nationality or religion and became famous for its anatomical and medical school.[23-25] In October 1698 Tsar Peter the Great visited by carriage Leiden university and the anatomical theatre. He was very interested in the establishment and laws of this university and Govert Bidloo, Professor-director of the university and president of the board of directors (Rector Magnificus), presented him with a Latin general description of everything concerning the university.[26-28] On March 17, 1717 Peter the Great visited, now by yacht, again Leiden and its university. The city welcomed him with cannon firing. He stayed two days. The Rector Magnificus, Herman Boerhaave, and the collective of professors received him. Peter wrote down the establishment of the university, the curriculum, and everything of use in his notebook. He examined the library and all kinds of mathematical and mechanical machines and tools. When leaving the University, Peter was told about its history and its didactic presentations. After that, Peter examined all the factories and manufactories in Leiden and talked into the most details with the masters [29].

Tsar Peter met with Herman Boerhaave, but it was tsarina Anna Joannovna (1730-1740), who invited him to become Arkiyater. In a letter to his former student Laurentius Blumentrost dated from 1730, Boerhaave officially thanked for the

invitation but refused the position.[30]

In Amsterdam Peter visited the anatomical theatre and attended lectures by Ruysch and even participated himself, carrying out anatomical dissections. Frederik Ruysch (1638-1731), was a Leiden graduate who became professor of anatomy to the guild of surgeons of Amsterdam and chief instructor of midwifes.[5,25,31,32]

He had accumulated a unique and famous collection of anatomical preparations. He had derived a technique for preserving specimens based on what he had learned when working with Jan Swammerdam, another Leiden medical graduate who made important contributions to the study of anatomy. Swammerdam injected blood vessels with coloured liquid wax to investigate the circulation and Ruysch introduced the use of the microscope developed by Antoni van Leeuwenhoek to enable him to inject the wax into the very smallest blood vessels.
Ruysch also taught Peter how to diagnose patients, prescribe medicines and carry out surgery. (Fig. 2) At Ruysch's home he admired his large collection of anatomical specimens and Ruysch presented the Tsar with a gift of 25 of his specimens. He also visited the city Delft. On his visit to Antoni van Leeuwenhoek the Tsar was fascinated by how the microscope of Van Leeuwenhoek allowed him

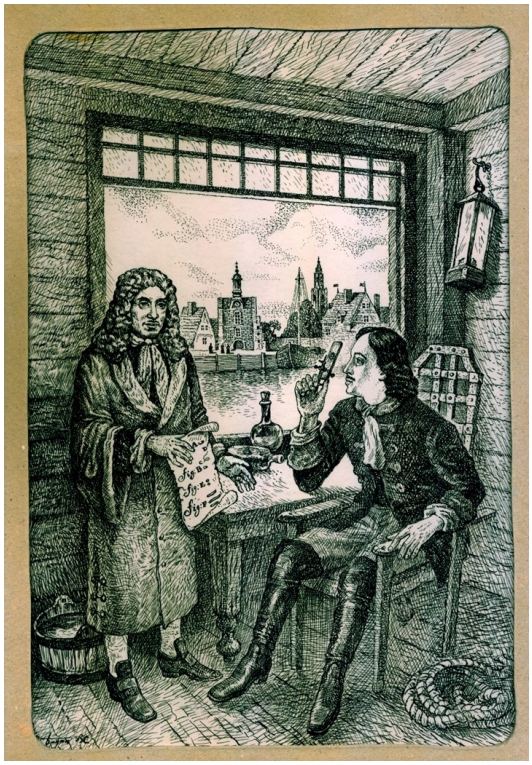

Fig. 3. Peter I and Antoni van Leeuwenhoek in the city Delft, pen-and-ink drawing, artist V.S. Bedin, 2004, Image OF-87224. Military Medical Museum of Defence Ministry of Russian Federation, Saint Petersburg.

'*...to see such tiny objects...*' and he took one of the microscopes back with him to Russia.[21,27] (Fig. 3) The Tsar had an above average interest in surgery and management of trauma. He was able to carry out post mortems, make surgical incisions, perform phlebotomy, suture wounds and extract teeth. After Peter's first Grand Embassy to Europe, he gave a series of lectures in Moscow in 1699 for the boyars (noble men) on anatomy, with demonstrations on cadavers.

What the Tsar learned and observed during his European Tour had a significant influence on the development of modern medicine in Russia. Tsar Peter's reign transformed the Russian economy, which also contributed to the development of medicine and the establishment of education.[5-7] He was well aware of the need for training of medical personnel for the Russian army and navy. Russia had an acute shortage of local *Doctor Medicinae* and barber-surgeons, most acute in the army and navy which was served almost exclusively by foreign doctors. Peter had two solutions for this problem; send Russians abroad for higher education and establish medical schools in Russia. Both solutions ran in parallel until the third quarter of the eighteenth century. He recruited several foreign doctors from the Netherlands, Germany and France, mainly because of the shortage of doctors in the army and navy.[6,12,21]
One of these was the Scotsman John Brock, a graduate of Cambridge University who had also studied in Holland. The personal physician of the Imperial family since 1668, Laurentius Alferov Blumentrost senior, considered Brock an empirical doctor and not a *Doctor Medicinae* because he could not converse in Latin, which at that time was the language of teaching in European and British universities. Nonetheless, because of his extensive medical experience, Brock was admitted to the Aptekarskiy Prikaz with the proviso that he maintained a diary with details of his patients.

Peter the Great also sent Russians to the universities of Padua, Gottingen, Haller and especially to Leiden in Holland. In the seventeenth and eighteenth century there were close relations between Russia and Holland in the medical field and many Dutch physicians came to practice and help to advance medical education in Russia.[6,19,22] The first two Russians sent abroad to study medicine on a scholarship were Pyotr Vasilievich Posnikov and Johann (Ivan) Deodatus Blumentrost. Both returned as Doctors of Medicine and Philosophy.
Pyotr Vasilievich Posnikov (1676 - 1716), a student of the Moscow Slavic-Greek-Latin Academy, was the first to benefit from the decision to send promising young Russians to be educated abroad at the states expense.[6,17,33] In 1692 he was sent to study medicine at the University of Padua, where after two years of intensive study he was awarded the degree of Doctor of Medicine and Philosophy. He then

further developed his medical expertise in Venice, Paris, Brussels and Leiden. In Leiden, he attended the clinics of Herman Boerhaave and studied with Fredrick Ruysch, the famous Dutch anatomist. Although he became the first Russian doctor to enrol with the Apthekarskiy Prikaz, he never practiced medicine. Instead, because he had mastered several languages, he spent much of his time as an interpreter and translator in the services of the Tsar. He died in 1716 at the age of 43. The second Russian to be sent abroad was Johann Deodatus Blumentrost (1692-1756), the third son of the old court physician Laurentius Alferov Blumentrost. After studying in Germany and France he completed his medical studies in Leiden in 1713. He succeeded Robert Erskine as Arkhiyater of the Aptekarskaya Kantselyariya (1719-1731), the supreme body for the management of medical affairs in Russia. [5,6,17,19]

The establishment of a hospital with a school and an anatomical theatre

Sending young Russians abroad to train as doctors did not solve the shortage of native Russian doctors. Until the time of Peter the Great there was no classical scientific medical school in Russia, only a school training barber-surgeons for the army and navy opened in 1654 by the Aptekarskiy Prikaz.[6,16,21,34] The first anatomical book used for medical education was "Epitome, Amsterdam 1642" by Andreas Vesalius, which was translated in 1658 by the monk Epiphany Slavinetsky and was named [*Vrachevskaya Anatomy*].[5] The development of medical education along European lines relied heavily on foreign physicians, in particular those from the Netherlands. At the beginning of the eighteenth century the Dutch University of Leiden was at the forefront in the development and implementation of the clinical method in Europe, mainly due to one man, Hermann Boerhaave (1668-1738), who was a convinced follower of Hippocrates and Thomas Sydenham, who believed that diseases should be studied and observed in a systematic and accurate manner.[35] Boerhaave was appointed as a lecturer in 1701 to cover for Govert Bidloo, professor of anatomy, medicine and practical medicine, during his absence as personal physician to King-stadtholder William III.[28,36] In 1709 Boerhaave was appointed as professor of medicine and botany and in 1718 also professor of chemistry.[35] Boerhaave emphasised the importance of visiting the patient at the bedside, combining a careful physical examination of the patient with a physiological and anatomically rational diagnosis, methods introduced earlier in Leiden by Johannes van Heurnius (1543-1601)[37] and Franciscus de le Boe Sylvius (1614-1672)[38]. [39] His lectures attracted not only students like A. Haller and G. van Swieten, but also Russians who played a prominent role in Russian healthcare. Among them was Tsar Peter the Great during his second visit to Leiden in 1717.[40,41] During the 18th century approximately 46 Russians and Russians with foreign roots studied in Leiden. Of this number 25% studied during the time of Herman Boerhaave.
(Appendix I)

Peter the Great sought another court-physician and invited Nicolaas Lambertus Bidloo (1673/4-1735). (Fig. 4) He accepted Peter's invitation in 1702 and became *physician in ordinary* to his Imperial Majesty in 1703. Before moving to Russia he held a successful medical practice in Amsterdam.[6,42]
His father was Lambert Bidloo a pharmacist in Amsterdam and brother of Govert Bidloo. He graduated and defended his thesis at the Leiden university in 1696. Among his teachers were Carolus Drelincourt (1633-1697), who was also a tutor of Herman Boerhaave, and his uncle Govert Bidloo since 1694 professor of anatomy, medicine and practical medicine and from 1696 also Rector Magnificus of the Leiden University. Govert Bidloo was the personal court physician of Willem III Dutch Stadtholder and King of England, who in 1691 appointed him superintendent of all civil and military doctors, pharmacists, surgeons, and hospitals in the Netherlands and England. Peter the Great became befriended with the Stadtholder and visited him in the Netherlands as well as in England. Govert Bidloo recommended his nephew Nicolaas as court-physician to the Tsar.[18,36]

As his personal physician Bidloo accompanied the Tsar on his campaigns and

Fig. 4. Nicolaas Bidloo standing at the table with a book, watercolor, artists of Lenfront Masterskie VSULF, December 1943, Image OF 7787. Military Medical Museum of Defence Ministry of Russian Federation, Saint Petersburg.

travels within Russia and on his trips to Europe. Peter was, however, a healthy individual so Bidloo had little to occupy him in a professional capacity and after some time became dissatisfied with his function and asked the Tsar to be relieved of his duties as his personal physician "... *due to my indisposition and weakness*...", although from his workload in subsequent years there was little evidence of "...*indisposition and weakness*..."[6,16,42,43] Peter agreed to his request and commanded him by a decree of 1706 to build a hospital near the German settlement on the banks of the Jauza river in Moscow with a school to teach students anatomy and surgery.[44] Bidloo was not only a renowned physician but also a talented architect and he himself drew up the plans for the hospital, medical school, a botanical garden and an anatomical theatre, where the Tsar regularly attended dissections.[6,17,43,45,46] (Fig. 5)
The medical hospital school was officially opened on November 21, 1707 by Peter the Great himself.

The curriculum at the hospital school included anatomy conducted on corpses in the anatomical theatre, surgery, internal medicine, autopsy, chemistry, drawing and Latin. Pharmacy was studied in the Botanical Garden. The hospital complex was the first for modern education in Russia.
Bidloo became the director of the hospital, professor of anatomy and surgery at the school and manager of the anatomical theatre until his death on March 23, 1735.
There were no textbooks and Bidloo taught the students using his handwritten books in Latin, including *Speculum anatomiae* [Mirror of anatomy] *Praelectoris thesaurus*

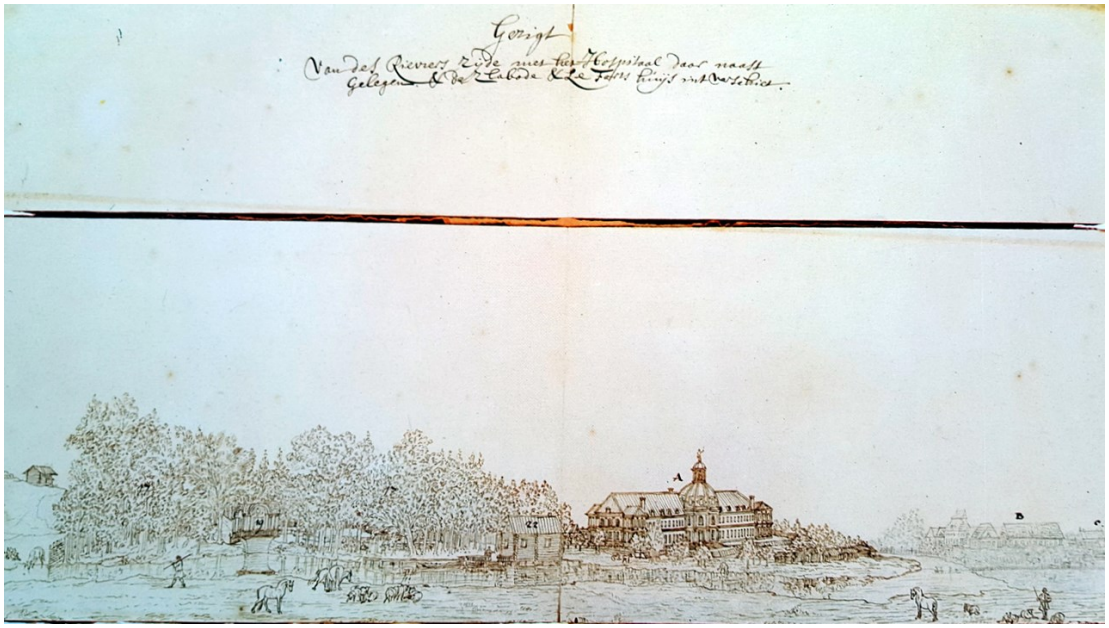

Fig. 5. A view of Nicolaas Bidloo's garden and the adjacent hospital, drawing by Nicolaas Bidloo, Moscow, beginning of the 18th century. In public domain.

medico-practicus [Treasure of medical and practical lectures], *Instructio de chirurgia in theatro anatomico studiosis proposita* [Surgical instruction in the anatomical theatre for students.] Only in 1976 the latter was for the first time translated to Russian and published.[34]
Bidloo also used the book of *Anatomia humani corporis, 1687* [Anatomy of the human body] by Govert Bidloo, that was translated especially for Peter the Great as well as the atlas *Outleding des menschlyken Lichaams, Amsterdam,1690* [Dissection of the human body].
The trainees, graduates from the Slavic-Greek-Latin Academy of the Holy Synod, were Russians and foreigners from all levels of the population. Their education was paid for by the State.[5,6]
After the death of Nicolaas Bidloo, Antonius de Theyls, a Russian of Dutch origin, who studied at Leiden university, became his successor.[6,17,19]

The budget for building the complex, purchasing of medicines, the salaries of the doctors, barber-surgeons and the apprentices came from contribution from the Holy Synod of the Orthodox Church based on a percentage of the weekly collections taken at the church services. This was specially arranged so Bidloo could govern independent from the Aptekarskaya Kantselyariya. The daughter of Tsar Peter, Tsarina Elizabeth the Great (1741-1762), continued this arrangement and also introduced a law whereby 1 kopeck was withheld from the salaries of civil servants for every ruble earned (1 ruble = 100 kopeks); this was used for the maintenance of hospitals and the care of the sick.[6]
Over a period of almost 70 years the school trained many barber-surgeons for the army and navy and prepared talented graduates for a PhD degree abroad. (Table. 1)

Peter the Great also paid special attention to the armed services, building hospitals for the army and navy in Moscow and Petersburg.[6,21] In Saint Petersburg in 1715 he established the Second Landforce Hospital and the Navy Hospital on the banks of the Neva along the lines of the medical hospital school in Moscow. In 1716 the Tsar himself wrote military regulations in Russian and Dutch stipulating the number of doctors, surgeons and pharmacists required for the army.[12,47] Every division had to have an academically qualified doctor and poddoctor (staff surgeon), every regiment a lekar (wound surgeon), and every company a feldsher/tsiryulnik (barber/ phlebotomist). Two military pharmacies were established for the army, one each for the infantry and the cavalry. Each to be staffed by one pharmacist, two assistants and four trainees. Graduates of the medical hospital school were mainly sent to the regiments, where after a certain period of practical work, they received the title of assistant barber-surgeon (podlekar) or barber-surgeon (lekar). The *doctor medicinae* appointed by the hospitals were supported by experienced surgeons and also assistant-surgeons and trainees.[5-7,12]

In an effort to increase the number of medical students Tsarina Elizabeth the Great (1741-1761) in 1748 instructed the church schools in Moscow to send more pupils to the medical hospital school.[5] The teaching was expanded and more surgical subjects were taught, a more appropriate curriculum for the surgical examination was introduced and subject-orientated medical textbooks were specially written in Russian. The first ethnic Russian to be appointed the chief doctor of the hospital was the Muscovite Martin Ivanovich Shein (1712-1762), who taught surgery at the hospital school.[6,17,19] He was a graduate of the Moscow medical hospital school. Another ethnic Russian, Konstantin Shchepin (1728-1770), also a graduate who had completed his postgraduate studies in Leiden, became the first Russian director of the medical hospital school in Moscow in 1762.

The medical hospital school of Bidloo in Moscow was initially a civilian hospital. In 1757 the hospital was renamed to the "General Moscow First Landforce Hospital" (now the Main Military Clinical Hospital named after N.N. Burdenko).[5] In 1786 both military medical schools (in Moscow and Saint Petersburg) were separated from the hospitals and converted into independent medical schools and were given the right to award their students a doctoral degree. Up to then that had been the exclusive right of the Meditsinskaya Kantselyariya. In 1798, 12 years later, the two medical schools were renamed Medico-Surgical Academies. The Moscow Medico-Surgical Academy existed until 1804, when its 45 students, and all the medical instruments, anatomical preparations and the library were transferred to the Medico-Surgical Academy in St. Petersburg.

Development of science in Imperial Russia

Academy of Science

In 1716-1717 Peter the Great again travelled to Europe, visiting among other countries, France and the Netherlands. Again he visited Fredrik Ruysch in Amsterdam, but this time he was more interested in purchasing Ruysch's anatomical collection for his Kunstkamera in St. Petersburg.[6,31,48] The sale was finally agreed for the sum of 30.000 Guilders, an enormous amount in the eighteenth century.[29] Peter also managed to worm out of Ruysch his secrets for embalming his specimens. The Tsar passed on this knowledge to his personal physician Johann D. Blumentrost as the chief supervisor of the obtained collection, so that he could care for and maintain the preparations. Blumentrost in turn passed on the secret to his successor as Arkhiyater, the Dutch Johan Ch. Rieger, who finally put it in writing and made the secret public. The Ruysch collection was placed in the first Russian museum of the former Academy of Science (now known as Kunstkamera, Museum of Anthropology and Ethnography) in Saint Petersburg. On Peter's orders, starting in February 1718 the Kunstkamera was extended to contain all examples of

birth deformations of both humans and animals in Russia. The Tsar also bought in 1716 the natural history collection of the apothecary Albert Seba. In 1721 a complete medical library and a rich collection of other rare items such as minerals and shells that had belonged to Peter's court physician Robert Erskine were added to the Kunstkamera.[5,6,31,32]

University education in Russia dates from 1724, when Peter the Great established the Academy of Sciences in Saint Petersburg along the lines of the French Academy, which he had visited in 1717. His idea was for the Academy to function both as a scientific and an educational institute. He donated his library and the Kunstkamera to the Academy. For the maintenance of the Academy Peter identified each year a proportion of the custom revenues from Dorpat, Narva and Ahrensburg. Unfortunately, Peter failed to see his creation as he died on February 1725, before it opened in 1726. After his death his widow, Catherine the First (1725-1727), continued the work of her husband. The first meeting of the Academy took place on 27 December 27, 1725 in the presence of the Tsarina and its grand opening was held on August 1, 1726. The Academy established a grammar school and a university with three faculties (medicine, philosophy and law). In 1726 the grammar school was opened and received 120 students in the first year; and in the second year 58.[5-7] Its university also admitted grand-aided students from religious institutes because of their knowledge of Latin, the language in which the education was given in the university. The university contained a library, curiosities, an astronomical observatory, an anatomical theatre and a botanical garden.

The court-physician of Tsar Peter, Laurentius Lavrentovich Blumentrost (1692-1755), the youngest son of Blumentrost senior, and like his brothers also a graduate of Leiden university, became the first president of the Academy of Sciences. In the years 1726 and 1727 several experienced doctors came to Russia and were admitted to the Academy. These included the president's older brother Johannes Deodatus Blumentrost, general director of the Meditsinskaya Kantselyariya, and Michael Burger, both alumni of Leiden University. The youngest of the two brothers Kaau-Boerhaave, Abraham, also became a member of the Imperial Academy of Science of St. Petersburg in 1744, when he was still a practicing physician in the Hague. He came to St. Petersburg in 1746 where he first got a position at the Admiralty hospital. In 1748 Abraham succeeded Josias Weitbrecht, who had died in February 1747 as professor of Anatomy and Physiology and left eight scientific manuscripts in Latin.[6] One night in 1736 Abraham suddenly became deaf and could only express himself with the help of sign language or by writing. Despite this handicap he was able to defend his thesis in beautifully written Latin and graduated as doctor of medicine in 1738. The curators of the Leiden university were so surprised at this feat that they had a special golden medal made and presented this gift to him in the

name of the university. He died in 1758 in Russia and the family name Boerhaave died with him.

Someone worth mentioning is Alexius Protassiev, who first studied medicine in Leiden and afterwards anatomy at the Imperial Academy of Science, where his teacher and mentor was Abraham Kaau-Boerhaave. Protassiev was one of the first native Russians to specialise in this subject and he was appointed Professor of Anatomy at the Academy.[6,18,22] The barber-surgeon Johan Friedrich Mautt, born in Saint Petersburg, was appointed as assistant and interpreter for Herman Kaau-Boerhaave at the Imperial Academy of Science. Mautt went on to study medicine in Leiden and graduated as doctor of medicine and philosophy in 1760.[6,17]

Other Dutch members of the Imperial Academy of Science were father and son de Gorter. Father Johannes de Gorter studied medicine in Leiden and discussed various physiological and pathological theories under the chairmanship of Bernhard Siegfried Albinus (1697-1770), professor of anatomy and rector of the Leiden university. In 1725 Johannes de Gorter became city physician and professor of medicine at the university of Harderwijk. His son David a student of Leiden but graduated from Harderwijk where he became professor of medicine and botany at Harderwijk. Both accepted the positions of second and third court physician to Tsarina Elizabeth and were also elected member of the Academy of Science. After the death of his Johannes returned in 1758 to the Netherlands, already an old man. He left 23 scientific manuscripts in Russia.[6,17] Another member of the Academy was the German Carl Friedrich Kruse who had also studied medicine in Leiden. He had for a long time served as the chief physician of the Imperial Lifeguards in St. Petersburg. During the reign of Catherine the Great he was appointed in 1770 as assistant personal physician and State Councillor by the court. His wife was the daughter of Herman Kaau-Boerhaave and heir to the Boerhaave heritage.[6,18,49] Other famous Dutch professors from Leiden were invited during the eighteenth century to Russia and not always accepted the offered position among others Bernard Siegfried Albinus[50] and Hieronymus Davides Gaubius[51].

The establishment of the first university for a further development of science

On January 24, 1755 Tsarina Elizabeth the Great (1741-1762) gave orders for the establishment of Moscow University headed by a board of Governors, that consisted of two curators Ivan I. Shuvalov of the Security Council and Laurentius Lavrentovich Blumentrost president of the Academy of Sciences, and the general director (later renamed to Rector Magnificus) Aleksei M. Argamasov a member of the city council.[5]

It was during the reign of Tsarina Catherine the Great, born a German princess, that

the medical improvements inside Russia made by her predecessor began to flourish. The first professor of the Moscow University was the native Russian, S.G. Zibelin, who studied at the Moscow medical hospital school of Bidloo and then at Leiden University graduated Doctor Medicinae in 1764. The university medical faculty in Moscow attracted many lecturers who contributed to a new batch of well qualified doctors. These included Mikhail à Skiadan, Theodor Kurika and Theodor Politkovsky who after completing their studies in Russia were sent to Leiden University to round off their studies and obtain a PhD.[17,19,22] Among the more important academic staff on the medical faculty was Professor Ephraim Mukhin, professor of anatomy, physiology and forensic medicine and Matheus Mudrov, professor of pathology and therapeutics.[5,17,21,52]

At the beginning of the eighteenth century Peter the Great and Nicolaas Bidloo in Moscow and Herman Boerhaave in Leiden in the Netherlands (re)introduced didactic teaching of medicine and surgery with practical, hands-on experience at the patient's bedside, and exposure of young students to scientific principles.

In Russia around 1800 a significant gap existed between the medically trained scientists using experimental research methods and the practicing doctors. The latter still relied on traditional folk remedies.[5,6] Nonetheless, the nineteenth century became the "*golden age*" of Russian scientific and medical schools with internationally renowned names such as the surgeon Nikolay Ivanovich Pirogov (1810-1881)[53] and Sergey Petrovich Botkin (1832—1889) who organized systematic studies in clinical pharmacology and experimental therapy, both novelties in Russian research at the time[54] and Ivan Petrovich Pavlov (1849-1936), a physiologist best known in psychology for his discovery of classical conditioning for which he was awarded the Nobel Prize in 1904[55].

At the end of the nineteenth century, two centres of medical science existed, the Medico-Surgical Academy in St. Petersburg and the Medical Faculty of the Moscow. Moscow University concentrated on general pathology, therapy and physiology, whereas the Medico-Surgical Academy occupied a leading position in the development of anatomy, topographical anatomy and surgery. As a former student of Moscow University, Nikolay Ivanovich Pirogov was appointed in 1841 as Professor of Hospital surgery and Applied anatomy at the Medico-Surgical Academy and became chief surgeon of the Second Landforce Hospital (with 1000 beds).[5,53,56] Pirogov initiated the move towards modern science based medicine in nineteenth century Russia.
His approach to medical education was very much in keeping with the teaching of the Dutch physicians such as Herman Boerhaave whom he most admired. As a surgeon Pirogov introduced experimental trends and transformed surgery from a

craft to a science. He was a founder of topographical anatomy, was the first to use anaesthesia on the battlefield and was one of the founders of military surgery, as well as an educator and a social activist.[52,53,57-59]

Quantitative contribution of Leiden University to healthcare in Russia through the ages

Based on the data from Richter.[4,6,12] Chistovich, the student register of the Leiden University and the catalogue of the Leiden University Library [7,17,19,20,22] we constructed a table detailing the origins of doctors medicinae and barber-surgeons over the period 1505-1796. A total of 962 healthcare workers was documented. We did not subdivide as barber-surgeons, barber-obstetricians, barber-stonecutters, but grouped them under the main heading of barbers.
Our data is not completely comparable to the data given by Dumschat for the period 1480-1696.[10] In contrast to Dumschat who grouped healthcare workers into decades we used the reigns of the tsars to document the presence of healthcare. We registered for each healthcare workers their presence during that reign thus avoiding in our data. This explains that we have significant smaller numbers of registered healthcare workers during the periods described by Dumschat.

Countries of birth and highest education attained by healthcare workers during the individual reigns are shown in table 1. For a minority, the country of birth (18%) and/or country where they obtained the highest education (20%) was unknown, whereas it was available for the majority of medical doctors (95%) and professors (96%). Of note is that Holland contributed significantly to the training of medical personnel but that the number of healthcare workers of Dutch birth was much lower (7%). Apparently 122 individuals were foreigners trained in Holland, contributing 13% to the healthcare force in Russia. Barbers studied in Germany, Holland and Russia, doctors medicinae were **in**frequently born in the Netherlands (35; 20%) but were trained foreigners particularly in the Dutch city Leiden. On the other hand, 239 (64%) doctors born and trained in Germany, worked as doctors in Russia. Of the Russian-born doctors (154) 64 had trained in the Netherlands, 58 in Germany and 20 in Russia, the remaining in other countries. Professors studied largely in Russia itself, but they also were trained in Germany and Holland. Seventy-five percent of the professors were Russia born.

We further studied the origin of the healthcare personnel during the various reigns of the Tsars over the ages. During the reigns of Peter the First, Anna Ivanovna, Elizabeth the Great and Catherina the Great a significant number of barbers worked in Russia. During the reign of Peter the Great they were largely trained in Germany and in particular the Netherlands (42%). During the reigns of Anna Ivanovna and Elizabeth the Great the countries of training were often not recorded. (Fig. 6) The

largest increases in the accredited doctors medicinae (PhD) occurred during the reigns of Anna Ivanovna, Elizabeth the Great and in particular during the reign of Catherina the Great. (Fig. 7) The percentage of doctors who had a PhD from the Netherlands gradually increased from 19% during Peter the Second to 33% during

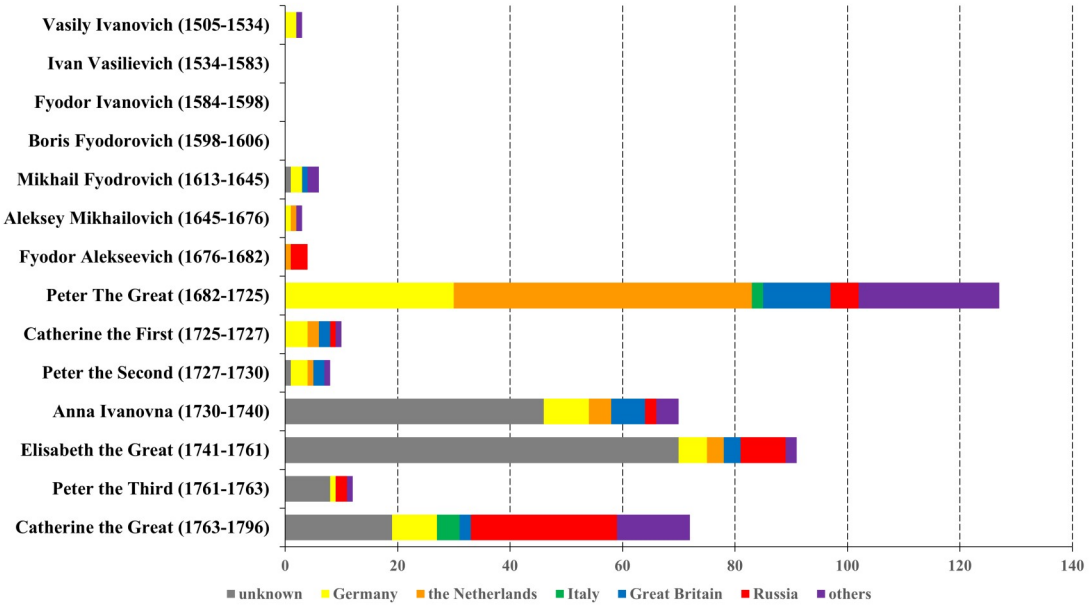

Fig. 6 (upper). Numbers of *barbers* and their country of the highest medical education during the reigns of the rulers of Russia.

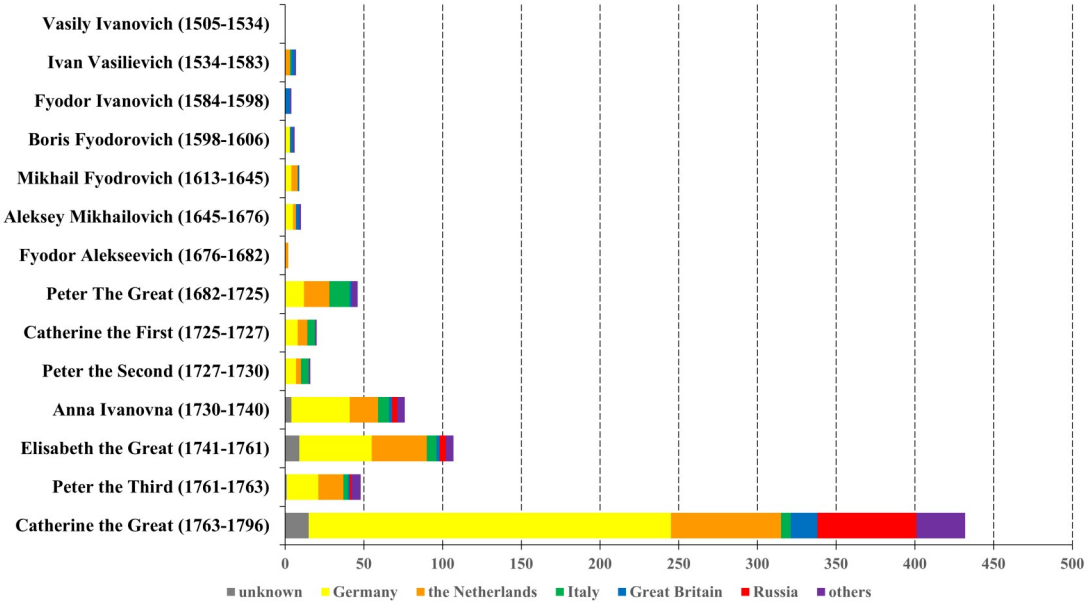

Fig. 7 (lower). Number of *doctors medicinae* (number of professors included) and their country where they obtained their highest education during the reigns of the rulers of Russia.

the reigns of Elizabeth the Great, Peter the Third and Catherina the Great. Meanwhile the doctors with a PhD from a German University decreased from 49 to 42%. During the reign of Catherina the Great a considerable number obtained their PhD in Russia (63; 15%). From the 61 professors 54 were appointed during the reign of Catherina the Great (including 4 so-called assistant professors). The professors appointed during the reign of Catherina the Great had studied in Russia (25), Holland (13) and Germany (8) Russia could now establish its own medical curriculum and was longer depend on other countries.

Based on the quantitative findings in the literature we conclude that, next to Germany, the Netherlands had a significant influence on the medical training of doctors medicinae from the reign of Peter the First on. This influence increased and became particularly pronounced during the reign of Elizabeth the Great. The influence of Holland on the training of barbers was evident during Peter the Great, who needed a massive number of barbers as a result of regulations within the army.

Conclusion

Between the eleventeenth and early nineteenth centuries Russia relied heavily on foreign doctors, barber/surgeons, pharmacists and other health care workers for the provision of medical care. They came mainly from Germany and Holland. The most significant advances in Russian health care occurred during the reign of Peter the Great and his successors. Peter stimulated young Russians to travel abroad to centres of medical excellence such as Padua, Göttingen, Halle and especially to Leiden in Holland. Perhaps even of greater long-term importance was the decision by Peter and subsequent Tsarinas and Tsars to establish institutes within Russia, where talented young Russians could get the highest level of training in their own country; institutes such as the Medico-Surgical Academy, the Academy of Sciences in St. Petersburg and the Moscow University. In the seventeenth and eighteenth centuries close relation existed in the medical field between Russia and Holland. A significant number of Dutch physicians came to practice in Russia and occupied very senior positions in Russian medical services and helped advance medical services and medical education. Leiden University in particular made an outstanding contribution to the advancement of medicine in Russia. In total six members of the Academy of Sciences, seven professors of medicine and sciences and more than thirty doctors of medicine were Leiden graduates or had trained in Leiden at some time during their career.

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Appendix I

Dutch and Russian students of the Leiden University, who played a significant role in the 17th and 18th century in the development of medicine in Imperial Russia

Nr.	Year	Surname - First name	Title dissertation
1	1695	Dohnell Joh.Just	Disputatio medica inauguralis de paralysi
2	1697	Bidloo Nicolaas	Disputatio medica inauguralis de menstruorum suppressione
3	1699	Brescius Zacharias	Disputatio physico-medica inauguralis de lumbricis
4	1712	Burger Michael	Dissertatio medica inauguralis de morbis ossium
5	1712	Gorter Johan de	Disputatio medica inauguralis de obstructione
6	1713	Blumentrost Laurentius	Disputatio medica inauguralis de secretione animali
7	1717	Hulst Arnoldus van der	Disputatio medica inauguralis, de circulatione sanguinis in foetu
8	1718	Ardinois Franciscus	Dissertatio medica inauguralis de fundamento totius medicinae anatomica
9	1724	Rieger Joh. Christiaan	Dissertatio medica inauguralis de anxietate
10	1728	Schreiber Joann Friedrich	Meditationes philosophico-medicae de fletu
11	1729	Kaau-Boerhaave Herman	Dissertation inauguralis de argento vivo
12	1732	Condoidi Panajota	Dissertatio medica inauguralis de morbis aetatum
13	1738	Barckhuysen Otto	Dissertatio medica inauguralis sistens considerationem terrori pathologico-therapeucitam
14	1738	Kaau-Boerhaave Abraham	Perspiratio dicta Hippocrati per universum corpus anatomice illustrata
15	1740	Gregory Joannes Godofr	Dissertatio medica inauguralis de parte medicinae consultatoria
16	1743	Fischer Johannes Benja-min	Disseratio osteologica de modo, quo ossa se vicinis accommodant partibus
17	1744	Theyls Johannes	Dissertatio medica inauguralis de sanguinis evacatione per inferiora, quam haemorrhoidem vacant: ut causu fistulae an
18	1745	Heister Lorenz et al.	Fasciculus disseratonum medicarum quarum Ima De tunica choroidea
19	1748	Lups Johannes	Dissertatio physiologico medica inauguralis de irribilitate
20	1749	Kruse Carulos Fridericus	Dissertatio medica inauguralis de causis acidi in primis viis
21	1749	Sevasto Andreas	Dissertatio medica inauguralis de lithogenesi

22	1750	Bacherat Henricus	Dissertatio medica inauguralis de morbis ligamentorum
23	1752	Klanke Franciscus	Dissertatio medica inauguralis, de usu venarum
24	1753	Staehlin Joann	Dissertatio chirugico-medica inauguralis, sistens partum cum haemorrhagia uteri conjunctum
25	1754	Poletyka Joannes de	Dissertatio medica inauguralis, de morbis haereditariis
26	1756	Rauschert Joachimus	Dissertatio chirurgico-medica inauguralis, de carie ossium
27	1757	Jever Rudolphus	Specimen medicum de causis haemorrhagiarum
28	1758	Scepin Constatinus	Schediasma chemico-medicum inaugurale de acido vegetabili, quod … cum annotationibus botanicus
29	1760	Mautt Johannes Fridericus	Dissertatio medica inauguralis de cortice Peruviano
30	1761	Melle Chritophoris Andreas de	Med.Doct. Dissertatio medica de vi vitali quoad medicinam et ex illa morbi oriuntes
31	1764	Thorvath Joannes Guilielmus	Dissertatio practico-medica inauguralis de lactis defectu
32	1764	Zibelin Simeon	Disseratio chemico-medica inauguralis, de saponibus medicis nativis, ex triplici regno petitis, eorumque a chemicis differentia, principiis, indole, ac usu in medicina
33	1765	Fialkouski Stephanus	Dissertatio medica inauguralis de actione ventriculi in ingesta
34	1765	Jagelski Cassianus	Dissertatio medico-practica inauguralis de passione hysterica
35	1765	Kruten Matthias	Spec.med. Inaug. De manducatione
36	1765	Mitrofanov Sila Mitrifanovic	Disp. Phys.-med. Inaug. De spontaneo aeris introitu in pulmonem
37	1765	Pogoretski Petr	Specimen chemicum inaugurale sistens aliqua de semimetallo nickel, cui accedit examen medicum modi, quo vulgus expilare ulcera solt
38	1765	Roschalyn Cosmas	Dissertatio medica inauguralis se scorbuto
39	1765	Timkousky Josephus	Dissertatio medica inauguralis de peripneumonia notha
40	1765	Tychorski Thomas	Dissertatio medica inauguralis de vera sive proxima caussa podagrae
41	1767	Knobloch Georgius Ludovicus	Dissertatio medico-practica inauguralis de entero mesocolocele suffocata
42	1771	à Skiada Mikhael	Specimen physico-medicum inaugurale de solidid artis salutaris fundamentis
43	1780	Kurika Theodos	Theses med. inaug
44	1780	Samoilowitz Daniil	Dissertatio medico-chirurgico inauguralis sistens compara-tionem inter sectionem symphyseos ossium pubis et sectionem caesaream
45	1781	Politkovsky Theodorus	Dissertation inauguralis, de pyogenia seu formatione puris
46	1790	Kolokolnikov Vasily	Theses med. inaug

43. **Pirogov NI**. [An Illustrated Topographic Anatomy of Saw Cuts Made in Three Dimensions across the Frozen Human Body. In four volumes. Volume I.] Petropoli, Yakobi Trey, 1853.
44. **Pirogov NI**. [An Illustrated Topographic Anatomy of Saw Cuts Made in Three Dimensions across the Frozen Human Body. In four volumes. Volume III, Abdominal and pelvic cavity.] Petropoli, Yakob Trey, 1853.
45. **Pirogov NI**. [An Illustrated Topographic Anatomy of Saw Cuts Made in Three Dimensions across the Frozen Human Body. In four volumes. Volume IV, Extrimitates.] Petropoli, Yakob Trey, 1853.