THE ECONOMICS OF ORGAN HARVESTING IN CHINA

THE PART OF COMPANIES AND DOCTORS IN DECIMORATIC COUNTRIES IN THE ILLEGAL ORGAN HARVESTING IN CHINA

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1. INTRODUCTION TO THE ECONOMICS OF ORGAN HARVESTING IN CHINA

1.1 SUPPLY AND DEMAND

A lot has been written about the practice of involuntary organ harvesting in China, which is also supported by the many resolutions regarding this topic. The recent investigations have only served to make it obvious, that it is, indeed, currently happening as well. Many countries in the world may be supporting unethical transplants, but the illegality and inhumane aspect of it rests mainly on one country – communist and socialist China. As a result, it is one of the crimes of communism, which we are investigating in our institute, and is likely not only one of the worst crimes in the 21th century, but one of the most inhumane crimes in the entire history of humanity. The part of it taking place in China directly has already been officially condemned by many democratic countries thanks to several independent investigations and reports. However, this work presents the issue from a rather different angle. A perspective of whether, knowingly or unknowingly, companies or doctors (individuals) from democratic countries outside of China are participating in these unlawful acts.

This participation is made possible through both aspects of this issue, two sides of the coin – one is the supply of organs and the other is the demand for them. While it has been made clear who is taking part in the supply chain of organ harvesting within China, and what the horrendous source of these organs is, the demand is generated not only through Chinese citizens, but also transplant tourists from democratic countries. These tourists are not completely disconnected from the western doctors, medical agencies, and other means, to which they turn to, mainly due to the lengthy waiting times for organ transplant in the West. The various areas of possible participation are illustrated by the infographic below:

*Picture 1 The process of illegal organ harvesting*
The abhorrent crime of illegal organ harvesting cannot be carried out on the basis of a one-off decision. It is a rather complex issue. It needs to be carried out systematically, through several directives, policies and prior preparation. When we look at the process of illegal organ harvesting in China, the nature of the crime is first covered through the defamation of a selected group and its subsequent isolation from the means of calling upon any possible help in the future. Inevitably, the next step is then to create a bank of living organs, which creates the need to gather the selected group in labor camps and prisons. At this point in time, the facilities are to be supported with medical professionals in the facilities in order to manage the system of medical evaluation necessary for the organ harvesting. The last part, the illegal transplant procedure itself, requires not only doctors, but also the subsequent destruction of any evidence, and sometimes communication with the police, or army department, since in some cases it may still be necessary to confirm the death of the victim to his or her family. However, this whole loop is but one part of the crime.

The next part constitutes a system of its own as the process could not exist without the recipients of the organs. The invitation to transplant tourists is not limited to just online offers on a website, while the transplantation itself is also relatively often carried out in a third country – not the one of the recipient, and not the one which sourced the organ, an attractive option for anyone set on illegal organ harvesting. These transplant tourists may come from a country where medical tourism to China is not supported, but regardless of that, they still often need to come up with a way of how to leave their transplant waiting list, decide where they will receive their long-term transplant aftercare from, and perhaps prevent some state offices from finding out what they did.

Because of the business nature of the crime, many aspects are absolutely interconnected. A normal criminal would not record his own crimes, but when it comes to illegal organ harvesting on a large scale, it is inevitable. In order to create a functional business and maintain its scale and stability, the idea behind selecting a group, the first item on the infographic above, is not coincidental, nor is the defamation, or imprisonment in labor camps, detention center or prisons. The driving force behind this whole system is thus not the force visible to the public eye, but the think-tank that oversees the income and business side of it. All of that demands a structured, orderly list of past and present victims. We call this side the business offer. A lot of reports and studies have described this part.

And it is not only the prisons that are supported by the medical field. The medical field requires material support consisting of medical consumables, medicaments, and various devices, which is the part our western companies participate in. It cannot be said that they are isolated from the whole picture, since the Chinese doctors and hospitals are crucial not only for the recipients and the care provided after the transplant procedure, but also for the demand and the medical tests done on the donors. Even the testing of a product imported through a western company, and used by Chinese professionals, needs to take into account the detestably original methods of illegal transplantation in China, and from then on serves as a weapon in the deadly procedures. Arguably, the doctors may not be only Chinese, but it is hard to imagine a doctor from a democratic society, who could just allow their patient to die.

The right side of the infographic, called demand, illustrates the sale of human body parts, removed from donors against their will. The transplant tourists do register for these not only on the usual waiting lists in the hospitals in their country of origin, but also through various medical
agencies, doctors who may deal with the dilemma of organ shortage in their country this way, but also through transplant brokers, as is portrayed on the infographic above.

What follows is not only the long-term convalescence of patients in China, but also possibly after the return to their country, the subsequent treatment possibly needed due to complications, or another transplant procedure. We enclose below an actual order form for transplants in China:

**Picture 2** Still-functioning request form for organ transplantation in China

![Still-functioning request form for organ transplantation in China](https://medicaltourism.com/Forms/RequestMoreInformation.aspx)


**Picture 3** How to get an organ in China

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**How to get an organ from China**

The evidence found proves that brokers can get you an organ from China as well.

In Canada, patients were offered an organ by a third party just by being on the waiting transplant list. Some of them then went to China.

There still exist websites and agencies that can take you to China for a transplant procedure.
Some of the puzzle pieces are documented and published. The black market, brokers, or agencies and contacting patients on the transplant waiting lists, is not a focus of our work. But one of the examples of how it may work — without any direct evidence against this particular company — is the existence of the Chinese company Lemen Group, with branches in six other countries, including the US, which offers medical tourism, including transplantation tourism. Such companies may easily bypass the whole system and connect the patient and organ in a third country.

Our report focuses specifically on the doctors in the countries of origin of the recipients, their stance toward illegal organ harvesting and evidence of transplant tourists traveling to China. We have also investigated the western companies from the perspective of possible complicity in supplying the medical consumables and medicaments to China, which enables the organ harvesting on a massive scale, the reason being the massive import of these products into China. The annual reports and data from various business services make the profit and scale of participation obvious.

When it comes to the evidence, we work only with provable facts, so relatively speaking, even though the numbers in western doctors’ studies may sometimes look smaller than the expected scale of organ harvesting in China, it can be ascertained that the real numbers are much bigger. Especially since China does not have a thorough system of organ donation, a waiting list or even a correctly functioning transplant system. Chinese minister of health, Huang Jiefu, in 2015 claimed that China had only 130 cases of organ donation between the 1980s and 2009.

1.2 THE DEVELOPMENT BEHIND ILLEGAL ORGAN HARVESTING IN CHINA

The whole of China started to recover from the aftermath of the Cultural Revolution in the 1980s. The start of economic reforms significantly helped to alleviate the consequences of the Cultural Revolution while the ongoing changes in Europe and Russia contributed to the freedom of thought, as well as the freedom of minorities and ideas about the state of law of the students in China. This culminated in the push for change in 1989 at Tiananmen Square in Beijing, an effort to abolish the dominance of communism in China, which resulted in a flood of reports and solidarity about the violent suppression all over the world, despite the inevitable censorship. It was at this point that the world had the chance to see the true nature of the communist party of China. What followed was seemingly a period of time where the party “took it easy”, probably to reduce the external pressure and remove the various barriers to business which were imposed on it. At this time, in the 1990s, free thought still existed in China.

However, the atrocities were just being hidden behind the mask of an emerging production and economic superpower. One of them was the harvesting of organs from both political prisoners and genuine criminals. These would then be received by the communist officials higher up the ladder, in order to preserve their health. Starting as a solution for individuals, it has developed into one of the main goals of the communist party today. It was the reason behind the medical experiments in the 1990s, especially in the region of the Uyghurs, as well as in Tibet, where the population has been subjected to an assimilation process for dozens of years.
Chinese doctors came up with a medical study using the organs of executed prisoners as far back as in 1991, and it was not an isolated case. Dr. Ronald D. Guttmann, professor of McGill University, then published a paper in 1992 stating that after 1989, around 90% of kidneys transplanted in China came from executed prisoners. Thus, the Transplant Society already condemned these practices in the 1990s.

All of this points toward an absolute lack of organs, yet China was still commercially supplying them out to transplant tourists.

The question is: How did this come to be on such a massive scale? The context of the last few decades in China could perhaps provide an answer, as China already had an established model into which it put its organ harvesting strategy. The model is called the “class enemy”, a long-time practice of the Communist party of China. In the past, this label was put on farmers, rightists, intellectuals, workers in the financial and industrial sector, members of religious groups, students, but also various groups of loyal members of the communist party and others. The Chinese communist party had two reasons to continue this social practice. On the one hand, it silences any rebellious voices among the citizens, as nobody could guess who might be targeted the next time. And on the other hand, the psychological burden was diverting their focus from inner issues in the country and the mistakes of the communist party. Although everyone was still aware of them, the party went to great lengths to hide them.

What followed after the 1990s was a gradual ban of Falun Gong, a spiritual practice, due to its popularity. The official state estimation back then presented a number of 70-100 million Chinese citizens doing this exercise. That number included employees of the government, police, army, communist officials, judges and others, whose loyalty was crucial for the communist party.

What followed after the ban, supported by a massive defamatory campaign and public condemnation, was the 6-10 office. As a special office with extensive powers intent solely on the persecution of Falun Gong, it was brandishing the internal directives of the party to make its goal official. At this time, practicing Falun Gong became an anti-state activity. The outcome of these steps were mass arrests, the creation of membership lists and torture resulting in death, with the aim of having these practitioners renounce their faith.

The social practice of “class enemy” on Falun Gong intensified, and together with the fact that the practitioners were particularly healthy, and there was a good amount of them, they became the ideal target for illegal organ harvesting. The party utilized the media at its disposal, airing defamatory campaigns against Falun Gong through public television, resulting in a strong aversion between the group and the population, as it does to this day.

Once the party secured a stable and potentially endless source of organs, cut off from the compassion of the average citizen, the harvesting became more systematic. The previous experiments in the region of Uyghurs were transformed into a full-scale operation. The demand for good health may have only become more pronounced in the world, and the waiting times for an organ in many countries were far longer than that which was required, which gave way to an organ business operation targeting other countries. However, the other groups were not spared, and the people in Tibet, where organ transplantation is also taking place, are also persecuted. Uyghurs face enormous detention centers, and the excuse of suppressing terrorism is used to imprison them by the hundreds of thousands or millions. Based on recent information from the US, they are undergoing various medical tests, and witnesses say some of them are...
mysteriously vanishing, never to be seen again. While the medical experience for illegal organ harvesting was obtained earlier, and other groups are strongly suspected to be the target, the massive organ harvesting began with the start of the persecution of Falun Gong.

1.3 THE QUESTIONS WE ASK

As was described previously, the supply side of the crime is not the focus of our research. This was described thoroughly in the research by David Kilgour and David Matas, under the name Bloody Harvest\textsuperscript{17}, then in Ethan Gutmann’s book The Slaughter\textsuperscript{18} and then these authors came together to publish an updated report in 2016\textsuperscript{19}. Similarly, the investigation results by the World organization to investigate the persecution of Falun Gong over the years, as well as the recent research in 2018 through undercover telephone interviews with Chinese hospitals shows that the supply of organs is still being obtained from Falun Gong practitioners\textsuperscript{20,21}.

The demand side of this crime is no less despicable than the source of the supply. The practice of removing human body parts is one where people die as a side-effect of a business practice. The contributors are not just the doctors operating at the table, but any doctors in western countries aware of any crucial information as well as companies supplying China with all the medical necessities. From an individual perspective there are also all the brokers and middlemen, utilizing various means to invite a transplant tourist, who may be utterly unaware about the illegality of the whole process, and that someone innocent may have died just to give them a kidney, a heart, lungs, or a liver.

Our research does not focus on the issue of brokers and middlemen, although any findings might be valuable, as it is a rather extensive topic on which any information could be quite scarce. Our scope of research into the western companies and doctors contributes to a few possible leads into this issue.

Our concerns are as follows: Are western companies partaking in this crime against humanity? And if yes, is it consciously or unconsciously? And are they responsible for these crimes? If so, should the authorities in their countries of residence initiate an official investigation? Could the process of illegal organ harvesting from prisoners of conscience be stopped altogether, were these companies to cease to provide their goods to the Chinese market? Do all the doctors in the countries of transplant tourists know about the issue of illegal organ harvesting? Is it possible they silently accept the situation? Should the professional international organizations take a clearer stand? Can the western doctors who take part in this process knowingly be held criminally responsible?

For some of these questions, our research may provide an answer or at least hint at an answer. The others will require further research. These concerns should also be asked about by the relevant authorities in each state, as the dark business practice which operates based on the passive or active contribution of many individuals or organizations and companies in most of the democratic countries today constitutes a crime. It may seem that many medical, human rights, business or foreign policy institutions have nothing to do with it, but some of the participants are within the scope of their field of focus. The overall goal of our research is to more clearly define both the issue and the situation, so we can ask the official authorities in relevant countries the proper questions and ask them to act.
The issues and inconsistencies connected to this whole process are numerous; be it in the field of human rights, ethics, or morals. Just the official medical studies of the Chinese doctors themselves, researched in “Compliance with ethical standards in the reporting of donor sources and ethics review in peer-reviewed publications involving organ transplantation in China: a scoping review”\textsuperscript{22}, the short waiting times as reported in Bloody Harvest\textsuperscript{23}, point to quite lot of them, followed by numerous witnesses in the previously mentioned studies and supported by the result of an independent London tribunal, “Independent Tribunal into Forced Organ Harvesting from Prisoners of Conscience in China”\textsuperscript{24}. 
2. THE MEDICAL STUDIES OF DOCTORS

2.1 INTRODUCTION

The first half of our research examines the individual medical studies written by doctors from democratic countries, which serve as evidence of existing transplant tourists from certain countries traveling to China for their organs. The result is the number of at least 20 countries and regions affected globally. The analysis of these studies led us to the discovery that western doctors do know about a lot of inconsistencies and facts behind the transplantation procedures and tourism to China, but they do not publicly comment on its ethical issues, probably due to the pressing need to save a patient’s life or to maintain confidentiality. While traveling for a transplant – through official channels – can be alright, the mystery behind the source of the organ, if it was donated voluntarily, and if someone died for it, should not be, in the case of China, left unanswered. Professionals in any field should not support the lack of information and ignorance. The practice of illegal organ harvesting is equivalent to contract killing, even if the killers are hired without revealing their identities and not obviously stated as a part of the agreement.

While the nature of the crime says so, it can’t be approached as a conscious criminal activity, as many things, including the part some western doctors or individuals may play, would need an official government investigation. In the case of doctors, we presume that all doctors, when it comes to certain behaviors of their patients, are not in the know, and do cooperate when asked. In fact, they are not likely to know at all, as the brokers may ask them even before they visit the relevant transplant center in their country, which may even be before they are officially placed on the waiting list. To have these patients undergo the official procedure is definitely not something they would want, and so the process may be very swift. China then comes as the answer for these cases, as it has the largest black market for organs. Now we should ask – where do these brokers get the access to these registers from? It may be as shady as the communist justice these “executed prisoners” are getting in China, as we partially investigated later in the report.

On the following pages, we look into a part of the process of the organ harvesting business, which has existed, as the evidence points out, at the very least since the 1990s. In the second section of our report, we come to the conclusion that there are 20, and with more open criteria28, companies that do support this sort of business with their technology and products, and benefit from it financially, regardless of whether they are aware of it. They do take part in a business which can’t be said to be in any way legal if compared to the principles of the democratic legal system.

The crimes in China do stack up upon each other. At the very least, there is a crime against medical ethics and morality, enshrouded in a crime against humanity, and the western companies indirectly help the perpetrators to achieve more solid results.
2.2 THE SUBJECT

Whether it is the Declaration of Istanbul on Organ Trafficking\textsuperscript{25}, the Council of Europe Convention against Trafficking in Human Organs\textsuperscript{26}, or the WMA Statement on Organ and Tissue Donation\textsuperscript{27}, all of them support legal and ethical means in the field of organ procurement and donation, while being clear about their view on illegal organ harvesting.

Common sense would tell us that whenever a country has an issue with an organ donation system, or an issue with the organ removal practice, members of these organizations would know about it.

If even the individual doctors were to point out their experience with transplant tourism to China, and perhaps some strange occurrences, any medical association, like the mentioned WMA, or the Transplant Society, should know far more. Inevitably, individual doctors being in the know, then also means the major medical organizations being in the know.

2.3 CONTEXT

As is written above, illegal organ harvesting can be divided into two parts – the first one, where innocent people die during the harvesting itself, and the second one as the means of procuring and selling the organ, using illegal and unethical ways. The international medical community is seemingly aware of both of these.

The international medical community recognizes that Chinese doctors can use executed prisoners as a source of their organs which supports their whole organ procurement system. Two medical journals, The Journal of Clinical Investigation\textsuperscript{28} and The Journal of Heart and Lung Transplantation\textsuperscript{29} specifically refer in their statements to China, where the practice of transplantation significantly expanded in the last 20 years. One of these statements also notices the disproportionate situation of the demand and the supply, stating that “This disparity in the supply of organs is a particular problem in China, where rapid expansion of the capacity to perform transplants has not been accompanied by the development of a system for recovering organs from those who die in hospitals while on life support, as is international practice. There is almost no systematic recovery of voluntarily donated cadaver organs. No regional or national system exists for soliciting consent to donate organs in advance from those who die or their relatives after death. Unfortunately, the evidence is clear that some physicians in China, in an effort to perform more transplants, are engaged in a practice that violates basic standards of medical ethics and human rights, namely the use of organs from executed prisoners”. They could have taken an example from the Transplant Society, which published an article in 2006 entitled “The Transplantation Society's Policy on Interactions with China”\textsuperscript{30}.

However, the use of executed prisoners can perhaps even be agreed with. Both the professional and the general public can defend the logic of having a criminal, understood as someone who deserved such a high penalty, using his life for a human contributing to the society. But this kind of argument can’t be valid when it comes to the equivalents of lighter penalties – in our system imprisonment for a certain number of years – or political prisoners. Yet publicly available evidence shows us another possibility – that perhaps, in China, some of the death penalties, were handed out unfairly. Below are a few cases we have found.
In 2012, China executed a few Taiwanese citizens for drug smuggling. Three years before that, in 2009, China executed a female businesswoman who was organizing a false fundraising campaign. And perhaps the most appalling is the case in 2008 – China executed a medical scientist for sharing state secrets with Taiwan. We can only guess if it was related to illegal organ harvesting. All of the cases hint at the fact that death sentences in China may not easily comply with the logic of “deserving it,” and no organ coming from executed prisoners is an organ from a proper source. Not to mention the insufficient means of preserving the quality of it – if we were to believe the official process of procuring the organ from an executed prisoner, it is obvious that nobody is motivated to preserve such people in healthy conditions before the procedure takes place. They would need to check them thoroughly for illness, as the prisoners would give their “willing” consent for organ procurement perhaps a short time before their death, and would have represented no value before that time, which would result in no medical tests having been done until that time. On top of that, the harvesting of organs after execution can be difficult.

As was mentioned at the beginning, the illegal organ harvesting in China has a different avenue for organ procurement as well, harvesting organs from executed prisoners of conscience, or political prisoners. Credible reports, which have shed light on this issue, are affirmed on the government level. That is supported by many other research studies, for example one by Schiano and Rhodes, revealing that the transplant numbers in China do not match even the number of executed prisoners based on the database on the death penalty. Both the USA and the European Union have condemned these atrocities. The Chinese regime therefore uses quite unusual organ sources, different from those in the official narrative.

How it can be possible that the medical professionals themselves have not yet attempted to get to the bottom of this crime, or are not engaged more in public talks about it? One of the reasons for this could perhaps be the nature of the crime, which not only has to do something with human rights, but also the economy, and is not limited to just the field of medical ethics. The other reason could be the perspective of a doctor, as it consists of the Hippocratic Oath, which is practiced as a part of the tradition at many universities even today, and places great importance on a doctor’s conscience. It takes into account the possible threats of poison and others, but there is no clear answer what to do, if you come to know about incorrect medical practice related to a different medical professional, or which even happens in a different country under a different legal system.

The oath also places importance on keeping the patients’ secrets private – which can mean in this situation not revealing the country of destination they went to for an organ, if there is at least a small chance it could compromise the patient. The other logical view, which could be relevant to any transplant professional, could sound like this: “I will send a patient to China, even if it could be unethical, because otherwise, someone will have to die for sure – my patient.” The following pages thus do consist of research done with the belief that many doctors know much more than they let on, but are not actively spreading this information. A belief, which was somewhat confirmed by the results of this chapter.

It is also important to note that while the medical studies do mention sometimes cases of, for example, only 20 transplant tourists to China, and the number looks small in comparison to any kind of estimation of the scope of illegal organ harvesting in China, the results are based on just
one study alone. From just one or a few years, for one type of an organ, and perhaps only one transplant center. In reality, the numbers – going through official channels like this – are therefore likely to be far higher.

### 2.4 METHODOLOGY

The methodology of a scoping study was used, as defined by Davis and others. The framework implemented was performed by Arksey and O’Malley, going from identifying the research questions and relevant studies, proceeding next with the selection of studies and then summarizing the data. No consultation with any stakeholders was done prior to the research.

### 2.5 DATA SEARCH STRATEGY

The relevant studies were identified through the medical NCBI PubMed database. The search was done at the beginning of 2019 and the studies were then archived in October 2019. The inclusive criteria were based on the combination of search words, variations on “Transplantation in China”, regardless of their placement – be it in the text, abstract, or headline. If a study provided enough relevant data in just its abstract, then, even if the content was not publicly available, it was considered as a relevant result.

The exclusion criteria were:
- Studies in a language other than English;
- Studies, or their parts, available to medical professionals only;
- Studies describing patients traveling to China for something other than an organ.
2.6 THE MEDICAL STUDIES

*Picture 4* Countries with proved transplant tourism to China
NETHERLANDS

Three medical studies in total were found for this country.

The first one we will mention is from 2016, titled Interviews With Patients Who Traveled From Macedonia/Kosovo, The Netherlands, and Sweden for Paid Kidney Transplantations. It is focused on transplant tourists and reveals a case of a patient from the Netherlands who travelled to China for an organ. He states that the people in China are used to pay for everything and that the business (with organs) is still going on, as long as you can pay. His operation cost him EUR 25,000.

The second study, titled On Patients Who Purchase Organ Transplants Abroad went on to analyze information about transplantation tourism in general. Published in 2016, it uses the data of 45 patients, who travelled to foreign countries for an organ, one of which was China. The third study from 2007 was done as research on 290 Dutch citizens. The forms they filled out say that 34% of these patients travelled both outside of Western Europe as well as to North America for an organ.

A well-prepared publication entitled Organ Trade by Frederik Ambagtsheer also provides information about the transplantation situation in the Netherlands.

UNITED STATES

A medical study titled Transplant tourism: Outcomes of United States residents who undergo kidney transplantation overseas, from 2006, focuses on 10 patients seeking an organ abroad, where one of them went to China.

The study Transplant tourism in the United States: a single-center experience, put together by… then reveals more information. Just one transplant center – The University of California, Los Angeles (UCLA), came to know about 33 transplant patients who went on to obtain a kidney outside of the US. 14 of them went to China, over 40% of the total number.

The medical study, Transplants in Foreign Countries Among Patients Removed from the US Transplant Waiting List, from 2008 is a research report that observed the number of patients withdrawing from the waiting list on account of getting an organ abroad. They came to the conclusion that there were 97 patients in total that went to China between 2000 and 2006. However, the criteria for counting patients were quite narrow and the research was based on waiting list removal records. While the study is more or less thorough, the results do not make sense in comparison with the relatively massive number of transplant centers in the US and the fact that just one transplant center from an earlier study had 14 transplant tourists to China.

Moreover, the last study mentioned below indicates that some transplant tourists skip the step of seeking help within their country. However, the major, inevitable flaw of this research is that patients who gave the reason for withdrawal from the waiting list as “becoming too well” for a transplant are not counted, as that is what everyone would feel after getting an organ abroad. This concludes that even if doctors in a given country were to do their best, and do a very good job, to ascertain the transplant tourism numbers, the end result is still inconclusive, possibly very far
from the reality, and a much larger investigation would have to be carried out. Another study, Transplant tourism – a dangerous journey? 48, from 2010, mentions three cases of transplant tourism to China.

The last study, Transplant Tourism in China: A Tale of Two Transplants 49, then gives a critical piece of information – that some people would actually first seek a transplant in China, without ever consulting the professionals in their country. In this case, a family of a 12-years old girl contacted Chinese doctors and when it was confirmed that they could receive an organ they contacted a team in the US to see if they were willing to fly with them over to China and carry out the transplant procedure there. This happened in 1998 – when the online and other means of securing a transplant abroad were arguably more difficult than today.

CANADA

The medical study Opportunities to deter transplant tourism exist before referral for transplantation and during the workup and management of transplant candidates 50, from 2012, mentions about 93 patients from British Columbia in Canada that were waiting for an organ. It took 2 years on average before they withdrew from the waiting list and travelled abroad to resolve their situation. A portion of them never even completed a medical examination before leaving the country. A total of 40 of these travelled to China for an organ, over 40%. But the next finding this study confirms is quite crucial: “We recognize that some of the individuals who underwent a transplant evaluation in British Columbia may have been trying to obtain test results or medications to facilitate transplantation abroad“, and also that „We found that a significant proportion of transplant tourists had potential living donors contact our program. This was somewhat surprising and in contrast to the fact that 45% (41/93) of transplant tourists never had any contact with the transplant program in British Columbia before pursuing transplantation through tourism.“

The obvious question then is, how could potential living donors, or their representatives, know that somebody is waiting for an organ? The only possible conclusion is that they somehow acquired access to the whole system and that the data of patients are not safe – and also the fact that the number of patients contacted in this way and then withdrawing from these lists due to various reasons could be enormous. The study observed cases between 2000 and 2008. These organ tourists were identified through an electronic database which every patient who wants to have his or her immunosuppressive drugs paid for by the state, has to sign into.

A medical study titled Commercial renal transplantation: A risky venture? A single Canadian centre experience 51, mentions 10 Canadian citizens who went abroad for a kidney transplant between 2001 and 2007. While the abstract does not specify the country, another study confirms four of them went to China 52.

A study called Outcomes of Commercial Renal Transplantation: A Canadian Experience 53 observed 22 transplant tourists that travelled to various parts of Asia for an organ 54. An interesting item of information is the date range of observation – from 1998 till 2005. Due to the popularity of China in a study mentioned above (40%), there is quite a high chance that some of these in Asia actually went to China as well, and Canadians could have been traveling there since 1998. The last study from 2012, Kidney transplant tourism: cases from Canada 55, reports on three cases.
SOUTH KOREA

A study called Changing Donor Source Pattern for Kidney Transplantation over 40 Years: A Single-Center Experience found altogether 66 patients who went to China for an organ, based on the findings from one transplant center.

A second study, Trend and Outcome of Korean Patients Receiving Overseas Solid Organ Transplantation between 1999 and 2005, goes deeper. The authors did a survey across Korean hospitals in 2006. The results indicate that the first transplant tourism occurred in 1999, when a patient went to China for a kidney. It also found that 966 patients traveled to China between 1999 and 2005, of which 462 obtained a kidney and 504 lungs.

A third study from 2011, Long-term outcomes of kidney allografts obtained by transplant tourism: observations from a single center in Korea, mentions 87 patients. While it is not apparent that they went to China, another study uses this one as a source for that, and confirms China as the country of destination. It also points out that the organs available there are of a lower quality.

A study by Yosuke Shimazono, The state of the international organ trade: a provisional picture based on integration of available information, published in 2007 in the bulletin of the World Health Organization, is quite informative. It says that 12,000 kidney and liver transplants took place in 2005 in China, which already exceeds the official number – particularly when we consider that other organs were transplanted as well. WHO indirectly admits this way that the official numbers published by China are not exactly accurate. It also mentions 73 and then 124 transplant tourists that went from South Korea to China for an organ.

Some interesting information is also provided by the medical study, Trend and outcome of Korean patients receiving overseas solid organ transplantation between 1999 and 2005, from 2010, which proves that the number of transplant tourists to China from this country rapidly grew between 2001 and 2005.

TAIWAN

A study Clinical analysis of 100 renal transplant recipients back from the People's Republic of China to Taiwan, from 2000, reports on 100 patients who sought an organ in China. Another study, Caring for overseas liver transplant recipients: Taiwan primary family caregivers' experiences in mainland China, from 2010 then refers to 19 patients who needed a liver transplant and saw China as the solution as well.

Similarly, the study Motivations and decision-making dilemmas of overseas liver transplantation: Taiwan recipients’ perspectives found 14 patients in the same situation and looked into what their motivation to do so was.

The next one, De novo malignancy is associated with renal transplant tourism, also from 2011, then focuses on the quality of the organs that 215 patients obtained in China and in another one, Outcome of foreign residents undergoing deceased donor liver transplantation in China: a single-center experience in Taiwan, a total of 64 such cases were found. The last one, titled On
Patients Who Purchase Organ Transplants Abroad, from 2016, conducted similar research, and found a study mentioning 643 and then 183 patients who went to China.

**UNITED KINGDOM**

A medical study, On Patients Who Purchase Organ Transplants Abroad, from 2016 mentions 12 patients who went from Britain to China for a transplant.

**SINGAPORE**

As is the case with United Kingdom, the data is not publicly available for Singapore either. However, another study, On Patients Who Purchase Organ Transplants Abroad, mentions 4 patients that received a transplant in China.

**EGYPT**

The study, Clinical outcomes for Saudi and Egyptian patients receiving deceased donor liver transplantation in China, mentions 28 Egyptians who traveled to China from three transplant centers between 2003 and 2007. It also concludes that the end result is worse for these patients than if they had obtained an organ in their own country.

A report from an institute in Egypt, Patients seeking liver transplant turn to China: outcomes of 15 Egyptian patients who went to China for a deceased-donor liver transplant, from 2008 observed 15 such patients. Two of them actually died after their transplant while still being in China. Finally, a study, Problem of living liver donation in the absence of deceased liver transplantation program: Mansoura experience, from 2014 found 7 such transplant tourists.

**SAUDI ARABIA**

A study by a nephrology unit, Commercial kidney transplantation: trends, outcomes and challenges-a single-centre experience, from 2012 in Nigeria mentions 1 patient who visited China for a transplant.

Another study, Clinical Outcomes for Saudi and Egyptian Patients Receiving Deceased Donor Liver Transplantation in China, from 2010 speaks about 46 such cases, and then another one from 2016 reveals two of them.

The interest in transplant tourism from Saudi Arabia is also confirmed by the bulletin of WHO that in its article, Dilemma over live-donor transplantation, from 2007 mentions China as a destination for patients seeking an organ.

**AUSTRALIA**

When it comes to Australia, a study, Outcome of overseas commercial kidney transplantation: an Australian perspective, from 2005, mentions 7 patients in total who travelled to China for an organ. The fact that the first of them went to China already in 1993, marking Australia as one of the earliest countries to have transplant tourists to China, is rather interesting information.
MALAYSIA

A study in the bulletin of the World Health Organization from 2007 mentions 132 patients who went to China and India for an organ transplant. But most notably, it reveals transplant tourism to China as a trend which has been going on since 1992. Another study from 2012 by Jacob A. Akoh, general consultant and transplant professional mentions 126 such cases and a final study, On Patients Who Purchase Organ Transplants Abroad, from 2016 actually discovered 515 transplant tourists – divided between China and India.

HONG KONG

There is no doubt that citizens of Hong Kong can travel to China for an organ. The study, Follow-up of Chinese liver transplant recipients in Hong Kong, from 2009 mentions 177 patients and points out the organs were of quite a bad quality. Another study, Experience of Hong Kong patients awaiting kidney transplantation in mainland China, then mentions 12 patients.

NIGERIA

A study, Commercial kidney transplantation: trends, outcomes and challenges-a single-centre experience, from 2012 found patients who traveled outside their country for an organ transplant, with China being one of the destinations.

OMAN

One of the studies we found during our research mentions transplant tourists from Oman to China, titled Transplant tourism and invasive fungal infection, and published in 2018.

JAPAN

WOIPFG, a non-profit organization focused on the investigation of the persecution of Falun Gong in China, reveals an archive of a webpage of a transplant center in China in their report, which says that most of the patients come from Japan.

ISRAEL

A doctor named Jacob Lavee said that he first came across organ harvesting in 2005, when actually his very own patient, who was placed on a transplant waiting list, came to him, and revealed that he could go to China for a heart transplant – after two weeks. The patient knew the exact time of the transplantation procedure.

MACAO, THAILAND, VIETNAM, INDONESIA

Evidence from these four countries and regions is featured in a report by Gutmann, Kilgour and Matas from 2016. A hospital in Yunnan Kunming for kidney disease, based on the official data, attracts patients from over 10 countries, including Macao, Thailand, Vietnam and Indonesia.
2.8 THE RESULTS

The evidence featured above indicates that 20 countries and regions in the world, at the very least, send transplant tourists to China for organ transplants. In some cases as early as 1992 (Malaysia) or 1993 (Australia), a time during which the transplant business in China was still in the making.

A significant portion of the studies point out the inadequate quality of the transplanted organs in China and toward an increasing trend in transplant tourism to this country (Malaysia, Korea). The data from the US reveals that patients may sometimes skip the step of seeking professional help within their country altogether. Although we have only one such case, it is a significant find, since it makes it obvious that a lot of transplant tourists are absolutely beyond any possible means of tracking them.

The case in Canada then hints at the existence of a systematic illegal organ trade on an international scope. The patients were contacted beforehand, even before they came for an examination to the transplant center\(^88\). The approach of the doctors indicates that it was not the doctors themselves leaking the information, and so it was proactively gathered using other means. This calls for an official investigation by medical associations and societies.

Context is then finally provided also by a certain study from 2016\(^89\). While it’s not only focused on China, it provides a valuable picture of who receives money from transplant tourists. The research found that 158 patients paid the donor directly, 22 of them a broker, 5 the hospital and 2 a private company. The global transplantation landscape already suffers from such a practice and there is no reason to think that when it comes to China it will be any better.

The Chinese media also published news in 2016 that airports in China opened an express lane for transporting human organs\(^90\). All of this paints a picture of an international transplant business since 1992 in a minimum of 20 countries in the world.

Doctors Delmonico and Budiani-Saberi in their study, Organ Trafficking and Transplant Tourism: A Commentary on the Global Realities\(^91\), mention that it’s possible for a transplant to happen in a third country – not the one of the recipient or the one of the donor.

That means the final scope of any such business is not limited to just the country sourcing the organs, and for the reasons mentioned above, the official methods are never enough to ascertain the actual numbers of transplant tourists, although any investigation would be very valuable, as non-transparent transplant procedures enable any criminal activities to go unpunished.

Be it the testimony of Enver Tohti\(^92\) who said that he harvested organs from a still-living person in China in 1995, or the reports about the illegal organ harvesting from Christians, Uyghurs, Tibetans and Falun Gong, there is no doubt that the need to change the situation is pressing.
2. THE COMPANIES

3.1 PRESENTATION OF THE TOPIC

The second half of this research consist of data from companies which potentially link the western pharmaceutical and medical companies with the crime of illegal organ harvesting in China – be it from executed prisoners or prisoners of conscience. The crime of using organs from executed prisoners in China for transplant tourism is conducted by state-owned entities such as the army and hospitals. Several reports and research studies were done on this, by WOIPFG, ETAC and others. But the transplant procedure does not need just a donor, recipient and a doctor. Each and every one of them needs the right medical tools. And these, along with drugs and immune-suppressants, need both manufacturers and distributors, which supply the Chinese entities with large quantities of the products to match the number of transplants.

Third-party research says that most such products are actually imported to China, which is also confirmed by the amount of revenue from companies which we found on the following pages. In 2018, the Chinese national medical committee published a plan for the import of new medical devices to China, and the numbers indicate that the amount of some of the devices in China will almost double in comparison to the current situation.

The graphs showing the revenue of the companies also point out increasing income year after year, with some perhaps stagnating in years where most of the evidence on illegal organ harvesting was globally released, and then accelerating in the following years – which could be an unconfirmed correlation with the massive medical tests on Uyghurs. After all, in China, things are quite simple – there is no company the Chinese communist party can’t use and no place it can’t reach.

There is not enough evidence to know if it’s done consciously and willingly by both parties, under threats or by using a fake Chinese company, but the Chinese communist party has to maintain a wide network of suppliers for the crimes. Are the western companies guilty, or are they taking part in all of this unconsciously?

3.2 CONTEXT

Investigating the western companies, who could be knowingly or unknowingly taking part in the illegal organ harvesting in China, requires us to pose a question – what might the total scope of their participation be?

The Sweden Council for Business and Investments believes that up to 92% of the medical technology devices in China come from foreign companies, which is documented in their report “The market with medical devices, business Sweden – China”, published in 2016. China Briefing also reported that “China is very dependent on imports from the outside, when it comes to medical devices and supplies”. This summarizes that most of the medical devices are obviously being imported, and are not made in China – perhaps if we put aside the possibility of manufacturing them in the ventures of Chinese and foreign companies. It may not be limited to just the medical equipment, as both drugs and general medical supplies can be helpful as well.
Our findings on the following pages also confirm that the sales of imported medical products has been happening, in some cases, for over 20 years. While that is long enough to obtain a business foothold, it is also long enough to get to know about the illegal organ harvesting in China and its corresponding evidence. It is also important to note that these companies went to do business in a country which had already without a doubt been using executed prisoners since the late 80s and where the first cases of commercial transplant tourism from abroad were official since the early 90s. The illegality of forced organ harvesting itself then became widely known in 2006, over 13 years ago. All of these aspects are by no means some recent, hidden topic, which the western companies have no knowledge of, even more since they should care about the security and integrity of their businesses.

The Chinese regime itself acknowledged the use of organs from executed prisoners, and a law from 1984 enables them to harvest organs without a prisoner’s consent. It is hard to imagine that any western company would actually willingly and knowingly take part in the illegal organ harvesting in a country where even the definition of human rights by the state is quite different from the one that we know. However, there are ways how a state can use their products without them being aware, or giving consent for that, and it may be hard – or in some cases even impossible – to track down the use of the products sold, as some of the Chinese companies even have connections to the People’s liberation army of China, or the National Security Commission. These Chinese companies do have a chance of being part of any illegal activity, if the said activity was run by the state, and, by extension, they may indirectly make any of the western companies cooperating with them complicit. Any Chinese company can also be directly used by the state, secret police, or any other entity used for human rights abuses – such as the 6-10 office.

The legal system of communism has its own way of making sure anything can be investigated, misused or controlled. An interesting law is the one from 2015, the National Security Law, which stipulates that everyone, including citizens, state officers, public institutions, social organizations and others, should “maintain national security”, which is also defined as “social development” or “people’s welfare”. A company can then be investigated or given new directives for the reason of “social development”, and nobody would know the real reason for any of that.

The western companies in China have to be subservient to Chinese laws. China also wants them to have members of the communist party organization, accept various beliefs of the state, or not to acknowledge Taiwan as an independent country.

Good faith and a presumption of innocence make us think that all the western companies conducting business in China in the field of transplantation, which is full of executed prisoners, brokers and human rights abuses, are absolutely not in the know of anything even remotely illegal. But China has a state-sanctioned group of people which have 70 years of experience with executing people, sometimes based on dubious reasons (see the first chapter), 30 years of experience with brokers and commercial transplant tourism, and based on multiple sources also 20 years’ worth of experience with profiting from the persecution of certain groups and suppressing their human rights and harvesting organs from them.

Members of these groups have a lineage of careers and life-goals based on the abuses. It is their motivation to make it big in the area of inhumane crimes so as to secure themselves better financially, and they naturally want to spread their influence.
Such information has naturally prompted us to ask the research question – Do western companies face the possibility of taking part in the illegal organ harvesting in China? We decided to focus on two indicators – the first of them being the list of companies conducting transplant business there. But that alone would not suffice, as the results would be too general. That’s why we also focused on the second indicator – their connection to the Chinese transplant industry in the form of evidence and profits.
3.3 RESEARCH METHODOLOGY

The research was done using the methodology of scoping studies as defined by Davis and others, as was the case with the previous chapter. We have used various internet search keywords to find a list of companies that were in the transplant business – or have the possibility of being in it. The total number amounted to several dozen companies. From then on, we looked into their products, and through keyword searches tried to confirm if they are useful for transplantation. The same was repeated for their relation to China.

Similarly to our previous research, we used the framework by Arksey and O’Malley. First we identified the research question and relevant studies – these were filtered through a keyword search – and then we proceeded with the summary and so on. However, we did no consultation with stakeholders, as any questions – and possible answers – from the western companies could provide biased data and results.

The list of companies, as stated before, was created through an online search. The keywords used (with small variations) were: organ preservation company; organ transplantation company; medical companies in China; western medical companies in China. Next came the other part, where we searched for these companies on the SEC (U.S. Securities and Exchange Commission) and on Bloomberg. For companies outside of SEC, we briefly tried to look into the relevant SEC counterparts of their countries, but either the data was not available, or the difficulty of procuring such data was abnormally high due to both the lack of the system’s simplicity and our understanding of the language.

Some of the companies indicated profits only in Asia, without a specified country. Such companies were included in the final results as well, since the other types of evidence confirm China.

The next process consisted again of online search, with the keywords being [the name of the company] + China, or [name of company] + Chinese revenues, with slight variations. We also looked into the annual reports of these companies, if available, and generally into the stock market reports.

The Chinese evidence comes from the online search as well, which was conducted through the search engines Baidu and Google. The keywords used were “[name of company/product in English] + 器官移植”. We did not use a VPN service which made certain websites unavailable.

The criteria for exclusion from the list were a lack of evidence, either the earnings in Asia, especially in China, or the lack of any traces of online sources. Sometimes the first reason simply occurred because the company was not listed on the SEC or Bloomberg. However, we have still included a small number of companies where we were not able to get a direct report on their profits in China, since their connection to the transplant industry was obvious. We also summarized the relevance of the connection at the end of every company’s data.
3.4 INDIVIDUAL COMPANIES

Lifeline Scientific Inc
Itasca, USA

Bought in 2016 by:
Shanghai Genext Medical Technology Co., Ltd, China

Product for transplantation

Lifeline Scientific mainly has a “box for kidneys”, an organ preservation solution which maintains the healthy conditions of an organ for some time before it gets transplanted into the recipient. As a company, it fully focuses on products and services related to cell, tissue and organ transplants. It was established in 1998, as was its subsidiary company, Organ Recovery Systems – also focused on organ preservation. Lifeline Scientific was bought in 2016 by a Chinese company.

An article from 2015 says that the “LifePort Kidney Transporter is currently used in many of China's largest transplant hospitals under clinical observation research protocols funded by China Health Ministry grants.”

It is known that before Lifeline was sold to SGM, in 2013, China was their third largest market, and the company made “significant investments” in China. This means the back-then still US company was operating in China for three years. These “boxes” are also in at least the 13 biggest Chinese hospitals, as the company reported already in 2014.

A year after, in 2015, Lifeline sold so many units of the Kidney Transporter in China that the revenue went up to 3.3 million dollars and the plan was to supply these boxes to 169 transplant centers.

Chinese doctors also mention the LifePort Transporter in their medical study.

Findings from Chinese sources

The use of this product for transplantation is also confirmed by medical studies written by Chinese doctors. One of them speaks about 52 cases where the “box” was used, another about 26 cases, and a different one about 64. The last one then mentions 309 cases.

Stock market & other information

The company is delisted from public trading on the market which makes the amount of revenue in China it receives unknown. The reason for this is its sale to the Chinese SMG in 2016.

Relevance

Proven revenue in China, and the use of the Lifeline Scientific product for organ preservation in the biggest Chinese hospitals, including probably all official transplant centers. It was bought by a Chinese company in 2016.
Veloxis Pharmaceutical A/S

Copenhagen, Denmark

Was recently, in November 2019, bought by Japanese company Asahi Kasei

Product for transplantation

Veloxis is focused on the improvement of the quality of life of transplant patients. One of its products is the immunosuppressive drug Envarsus XR, which finds its use in transplantation.

In 2017, Veloxis reported an agreement with the Chinese company Chiesi Farmaceutici on the sales of Envarsus XR in China and Taiwan. Chiesi distributes its products in China, and the Chinese revenue for Veloxis for 2017 amounted to EUR 81 million\textsuperscript{120}.

While it could seem feasible to count the amount of transplantations per year based on the sale of immunosuppressive drugs in China, it is quite impossible, as while we know for example that the immunosuppressive drug market had a volume of 10 billion yuan in 2016\textsuperscript{119}, an objective comparison would require us to compare it with the volumes of other big countries in the world. That is why we do not use this, or similar data in this report to arrive at any such conclusions.

Findings from Chinese sources

A Chinese doctor published a study about the use of Envarsus XR in 2015\textsuperscript{121, 122}.

Stock market & other information

It was not possible to find direct revenue from China as the business side is seemingly fully in the hands of Chiesi Farmaceutici.

Relevance

Proven distribution and sales of a transplant-related product in China.
Roche Holding AG

*Basel, Switzerland*

**Product for transplantation**

Roche is also known partially for its immunosuppressive drugs, like Zenapax (also known as Daciluzumab$^{123}$) for the prevention of the acute rejection of a transplant, and Cellcept (also known as mycophenolate mofetil), used for the same purpose.

The findings from English sources revealed that Roche Holding has quite a successful business presence in China. A report from Q1 of 2019 for investors lets us know that the international revenue went up by 17%, particularly because of China$^{124}$. A year before that, Roche opened a research center in China$^{125}$.

Roche may also have lost a bottom line when it comes to testing its products, as Cellcept was tested on the organs of Chinese prisoners$^{126}$. But it’s quite reasonable to imagine that more western companies did similar tests – or, inevitably, that’s probably how China tested their products before approving them.

**Findings from Chinese sources**

Chinese sources tell us the price of Cellcept in China$^{127}$ and confirm its usage through a medical study from a Chinese doctor, published in 2016$^{128}$. Zenapax is confirmed by a study from 2005$^{129}$, and for the second time – under its other name, Daciluzumab – also by a study from Symposium in China from 2010$^{130}$. Lastly, an article in a medical journal from 2013 mentions it as well$^{131}$. This evidence makes it clear that immunosuppressive drugs from Roche have been used in China for a long time.

**Stock market & other information**

*Table 1 Revenue of Roche based on the country of origin*  

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
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<td>1335</td>
<td>1468</td>
<td>1474</td>
</tr>
</tbody>
</table>

*Source: compiled based on data from Bloomberg*
Roche gets 7.9% of its total revenue in China, in other words EUR 4.5 billion in 2018.

**Graph 1 Increasing revenue of Roche in China**

Source: Bloomberg Terminal

**Relevance**

Roche used Chinese prisoners for testing its transplant product, despite the fact that Chinese doctors do not uphold medical ethics in this area, and it’s unclear if these prisoners really gave their consent. The Chinese doctors may have actually tested all the products of western companies in China this way.

It was also demonstrated that Roche gets a significant portion of its revenue from China and takes part in the transplantation business there.
Pfizer Inc

New York, USA

Product for transplantation

Pfizer makes an immunosuppressive drug called Rapamune which is used in organ transplantation\textsuperscript{133}. Its other name is Sirolimus\textsuperscript{134}. Sirolimus is manufactured in China by Hisun Pharmaceutical\textsuperscript{135}, a company cooperating with Pfizer.

Findings from Chinese sources

No valuable information was found.

Stock market & other information

Articles\textsuperscript{136} point out that China is Pfizer’s biggest market, and the company itself is seen as a leader of western pharmaceutical companies conducting business there. In 2019, Pfizer also hired 600 new salespeople\textsuperscript{137}. A subsidiary company of Pfizer, Upjohn, also had revenue totaling 2.4 billion dollars in China in 2018\textsuperscript{138}.

More accurate revenue of Pfizer is known from 2017, where China makes up 6.8\% of the total revenue of Pfizer (in other words 3.9 billion USD from a total of 57.2 billion USD). The amount of Chinese revenue went up by 26\%, in comparison with the previous year.

When it comes to Rapamune, it can be found that its global market revenue is 283 million USD, and Asia (in general) is in third place when divided by regions, amounting to 100 million USD.

Relevance

Proven increasing revenue in China and sales of an immunosuppressive drug used for transplantation there.
Cryolife, Inc

*Kennesaw, Georgia, USA*

**Product for transplantation**

Cryolife has a product called BioGlue, which, in simple terms, is a “glue for medical operations“. It is also used for heart transplants\(^{139}\). The company has been trying to get approval in China for BioGlue since 2014\(^{140}\). In 2017, it was discovered that BioGlue was being tested\(^{141}\) in China in multiple clinics for the purpose of future sales. BioGlue is already being sold in the Asia-Pacific area, where its revenue in the first half of 2019 also increased in comparison with 2018\(^{142}\).

**Findings from the Chinese sources**

No valuable information was found.

**Stock market & other information**

Bloomberg Terminal revealed in 2018 that Cryolife gets 55% of its revenue from the US. The rest of it, without being divided country by country, increased from 18 billion USD in 2009 to 118 billion USD in 2018. Cryolife thus has an expansive approach to global business, which should be increasingly evident in China once BioGlue has been approved.

**Relevance**

Long-term plans to sell a product used in heart transplantation in China, and a proven record of it being tested at several Chinese clinics.
**Intuitive Surgical**

*Sunnyvale, California, USA*

**Product for transplantation**

Intuitive Surgical makes Da Vinci robots, which facilitate the performing of medical operations for surgeons. These robots can be used in transplantation as well, which is proven by a medical study about a kidney transplant.\(^\text{144}\)

Just one of the robots costs around 2 million dollars.\(^\text{145}\) The first one was sold to China in 2014, and today there are more than 70 such robots in mainland China and 10 in Hong Kong. The use of Da Vinci robots in China repeatedly breaks world records – the yearly average usage of one robot was 394 times in 2017.\(^\text{146}\)

The company plans to sell 154 more such robots in China by the end of 2020, which would bring in over 300 million dollars.\(^\text{147}\)

**Findings from Chinese sources**

The hospital gynecology and birth department in China did its first uterus transplant using a Da Vinci robot in November 2015.\(^\text{148}\)

There were 42 such robots in total in China in 2015, of which 4 were in Beijing.\(^\text{149}\) While uterus transplantation can be said to not directly relate to the illegal organ harvesting in China, a Zhongshan hospital mentions that in 2009 they did the first successful kidney extraction using a robot in China, right behind an article sub-section titled “Da Vinci and kidney transplantation.”\(^\text{150}\)

Another Chinese hospital also indicates the use of Da Vinci for transplantation. They mention that using this device, they were able to do almost 600 operations, and then in the next sentence that all kidney transplantations were done with a minimally invasive surgical operation.\(^\text{151}\)

**Stock market & other information**

Da Vinci robots have been distributed in China by Chindex since 2011.\(^\text{152}\) Four years later, the Chinese company Shanghai Fosun Pharmaceutical and Intuitive Surgical went in on a joint venture for Da Vinci products and the related services. Fosun and Intuitive also plan cooperation on medical device manufacturing, where Fosun should have 40% of the shares and Intuitive 60%.\(^\text{153}\)

Intuitive Surgical has at least three types of Da Vinci systems. Their “Xi” system was approved in China in 2018 and since their robots were already there, it signifies a plan to expand their business operations in this country. They should be the leader when it comes to medical robots in China, as in 2018 the Chinese national health committee published plans on its website to import a lot of medical devices by the end of 2020, wherein a large number of device types are set to have their number in China almost doubled. It relates to Intuitive Surgical as the plan for surgical robots is 154 new units – the same amount the company plans to supply China with, as mentioned above.\(^\text{154}\)
The Da Vinci systems are also “heavily used” in China and have been in operation there at the very least since 2015, as the company revealed that in that year, the amount of operations conducted using this robot went up for Asia, mainly due to China, Japan and South Korea.

Bloomberg stated that the revenue outside of the US and European Union is growing, up to 1.2 billion USD in 2018. A portion of this is for China, where the sales may also not be limited to the robots themselves, but also to the “related services” as mentioned.

Graph 2 Increasing revenue of Intuitive Surgical outside of the US

![Graph showing increasing revenue of Intuitive Surgical outside of the US.]

Source: Bloomberg Terminal

Table 2 Revenue of Intuitive Surgical divided by countries of origin

<table>
<thead>
<tr>
<th>Revenue in 2015 – 2018 (in the millions of USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
</tr>
<tr>
<td>USA</td>
</tr>
<tr>
<td>Other countries</td>
</tr>
</tbody>
</table>

Source: compiled based on the data from Bloomberg
**Picture 5** Indicated growth of Intuitive Surgical revenue in China

![Intuitive Surgical up 6% on potential upside in China](https://seekingalpha.com/news/3403394-intuitive-surgical-6-percent-potential-upside-china)

- Intuitive Surgical (ISRG +5.8%) is up on average volume as medical stocks try to rebound from the recent selloff. Helping matters is the recent announcement from the Chinese Ministry of Health that it will issue licenses for 154 new surgical robots between now and the end of 2020.
- Leemik says robot utilization in China is one of the highest globally at over 400 procedures per unit each year and expects ISRG to close 90% of the orders.


Intuitive Surgical is also a part of a joint venture with the Chinese company Fosun – called Intuitive Surgical Fosun Medical Technology (Shanghai) Co., Ltd. Fosun is quite a successful company, with its revenue going up from around 60 million USD in 2000 to 2.7 billion USD in 2018. It focuses on pharmaceuticals, healthcare, general medicine and diagnostics. Its revenues in China are consistently around 85%.

**Graph 3** Increasing revenue of Fosun Pharmaceuticals since 2000

![Increasing revenue of Fosun Pharmaceuticals since 2000](https://example.com/graph3.png)

Source: Bloomberg Terminal
Relevance

By 2020, Intuitive Surgical should have so many medical robots in China that it should be within their capacity to complete 100,000 medical operations per year, some of which should be organ transplants, as evidence confirms their product finds its use in transplants as well. It has a joint venture with a Chinese company Fosun.
Hologic, Inc.

*Marlborough, Massachusetts, USA*

**Product for transplantation**

Hologic, as a company, is focused on diagnostics and tools for procedures related to female diseases. But it also has two connections to transplantation. The first one is its subsidiary company Gen-Probe Transplant Diagnostics, Inc., which provides diagnostic tool for transplantation. But this lead is not confirmed as a certainty, as while Hologic has several companies in China, and it is highly probable that one of them does diagnostics for transplantation, it has not been proven.

The second connection is dual-energy X-ray bone densitometer, which measures the density of bones after transplantation, as confirmed by one Chinese study which reveals its use after kidney transplantation. This device thus helps the patient to bear the consequences of a transplant procedure, and indirectly supports the prosperity of the transplant business in China – and may be used to measure the bone density of commercial transplant tourists that come from abroad.

**Findings from Chinese sources**

Dual-energy X-ray bone densitometer by Hologic is mentioned in a Chinese medical study where the doctors use it to measure the bone density after kidney transplantation. It is a sometimes a pressing topic, since as one Chinese hospital points out, one of the reasons for bone density loss can really be transplantation. Another Chinese hospital is of the same opinion, and confirms the ownership of said product.

**Stock market & other information**

The revenue of Hologic in the Asia-Pacific region mainly comes from China, Australia and Japan, which signifies the importance of China for this company. The Asia-Pacific region is a part of their global revenue, and in 2016, 2017 and 2018 consisted of 8% of the total, as is revealed by the table from the U.S. Securities and Exchange Commission:

**Table 3 Revenue of Hologic, Inc**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>75.1%</td>
<td>77.6%</td>
<td>78.9%</td>
</tr>
<tr>
<td>Europe</td>
<td>11.7%</td>
<td>10.0%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>8.6%</td>
<td>8.1%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Rest of world</td>
<td>4.6%</td>
<td>4.3%</td>
<td>3.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

*Source: https://www.sec.gov/Archives/edgar/data/859737/000085973718000020/holx_q4-2018.htm*
Hologic, however, is slowly declining in their presence in China to a certain extent. In 2017 it closed down its production line for mammographs which it supplied the Chinese market with. In China, Hologic owns a few companies: Beijing Hologic Technology Co. Ltd; Hologic (China) Enterprise Management Consulting Co., Ltd; Beijing Century Aikang Technology Co. Ltd., and then Hologic Asia, Limited in Hong Kong. The Asia revenue for 2018 amounts to 276 million USD, which signifies 8.6% of the total revenue, as is visible on the table above.

It marks a 5 time increase in comparison with 2009, where the Asia revenue was at 57.1 million USD. Hologic in general gets most of its income from diagnostics and mammographs.

**Table 4 Revenue of Hologic, Inc., divided by country of origin**

<table>
<thead>
<tr>
<th>Revenue in 2018 based on the region (in USD)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>2.4 billion</td>
</tr>
<tr>
<td>Europe</td>
<td>377.9 million</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>276.1 million</td>
</tr>
<tr>
<td>Rest of the world</td>
<td>147.2 million</td>
</tr>
</tbody>
</table>

*Source: compiled based on data from Bloomberg*

**Relevance**

Hologic has several companies in China. Its main area of revenue is diagnostics and one of the subsidiary companies is focused on diagnostics for transplantation, which brings the possibility of one of the Chinese ones doing the same. But the main connection lies in their product which has a proven use for transplantation and is in China. Their revenue in China is growing.
Danaher

Washington, D.C., USA

Product for transplantation

Danaher owns the company Beckman Coulter, which manufactures a device with uses for stem cell transplantation\(^{166}\). Another company under Danaher is HemoCue, whose product has a proven use in liver transplantation\(^{167}\), for blood diagnostics after the transplant procedure and helps to control anemia in some recipients afterwards as well. Chinese doctors put this device to use for liver analysis during transplantation\(^{168}\) and other doctors from two Chinese hospitals also used the FC500 MPL device in their medical study about kidney transplantation\(^{169}\).

Beckman Coulter also distributes immunosuppressive drugs from Thermo Fischer\(^{170}\), but we were unable to confirm through research if the distribution takes part in China as well. Another device used for transplantation for diagnostics during, or after it, is the Beckman AU5800. Both of these devices are mentioned in a medical study written by Chinese doctors\(^{171}\).

Findings from Chinese sources

Searching through Chinese sources paradoxically helped us find the English medical studies written by Chinese doctors mentioned above

Stock market & other information

A search through the information of the U.S. Securities and Exchange Commission (SEC) revealed that in 2017 the increasing revenue of the company was significant in “Asia, especially China”\(^{172}\) and “Geographically, year-over-year core revenue growth in the analytical instrumentation product line was driven by increased demand across all major geographies, led by China” in 2016 and 2017\(^{173}\).
China is one of the six countries in the world where the company has a strong presence outside of the US. As the table below, featured in SEC, shows, the revenue in China makes up more than 10% of the total revenue:

**Table 5 Revenue of Danaher based on the country of origin**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>$7,374.4</td>
<td>$6,837.9</td>
<td>$6,377.4</td>
</tr>
<tr>
<td>China</td>
<td>2,357.3</td>
<td>2,011.6</td>
<td>1,799.1</td>
</tr>
<tr>
<td>Germany</td>
<td>1,247.0</td>
<td>1,161.6</td>
<td>1,084.6</td>
</tr>
<tr>
<td>Japan</td>
<td>918.7</td>
<td>872.1</td>
<td>844.7</td>
</tr>
<tr>
<td>All other (each country individually less than 5% of total sales)</td>
<td>7,993.6</td>
<td>7,445.5</td>
<td>6,796.6</td>
</tr>
<tr>
<td>Total</td>
<td>$19,892.0</td>
<td>$18,329.7</td>
<td>$16,882.4</td>
</tr>
</tbody>
</table>

*Source: https://www.sec.gov/Archives/edgar/data/313616/000031361619000035/dhr-20181231x10xk.htm*

Increase in the demand for the clinical lab devices was in one year caused mainly by China and it is also China who is mentioned as the main reason for demand for histology devices and medical consumables. The total income from China for Danaher is 2.37 billion USD in 2018, or in other words 11.8% - with part of it from Hong Kong. The China revenue itself therefore
went up from 700 million USD in 2009, and we see a 350% yearly increase there during the last 9 years. In comparison with the total revenue, we see growth from 6% to the present 11.8%.

**Table 6 Danaher revenue as divided by the country of origin**

<table>
<thead>
<tr>
<th>Country</th>
<th>Revenue (in USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>7.4 billion</td>
</tr>
<tr>
<td>China</td>
<td>2.4 billion</td>
</tr>
<tr>
<td>Germany</td>
<td>1.2 billion</td>
</tr>
<tr>
<td>Japan</td>
<td>918.7 million</td>
</tr>
<tr>
<td>Rest</td>
<td>8.0 billion</td>
</tr>
</tbody>
</table>

*Source: compiled based on available data from Bloomberg*

The total revenue in 2018 amount to 19.9 billion USD for the whole corporation, of which diagnostics consist of 6.25 billion USD (31% total) and they actually started from zero in 2009. The earliest data we could found about it are from 2014 where its revenue was 4.6 billion USD – possibly due to the acquisition of a company. It concludes, then, that the revenue in China till 2014 must not have been from diagnostics. Life science also appears in its revenue by 2014.

**Table 7 Revenue of Danaher in China**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (in millions of USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>1552.9</td>
</tr>
<tr>
<td>2016</td>
<td>1799.1</td>
</tr>
<tr>
<td>2017</td>
<td>2011.6</td>
</tr>
<tr>
<td>2018</td>
<td>2357.3</td>
</tr>
</tbody>
</table>

*Source: compiled based on data available from Bloomberg*

Danaher, based on the SEC (U.S. Securities and Exchange Commission), has over 20 subsidiary companies in China\(^{177}\). Lastly, a presentation for investors from 2013 reveals that Danaher plans expansion in China\(^{178}\).
Relevance

Danaher has confirmed revenue in China, where it plans to solidify its business position. It has a lot of subsidiary companies in China as well, and two of its companies manufacture products for transplantation. Medical studies by Chinese doctors prove devices used for transplantation are being used in China.
Abbott Laboratories

Chicago, Illinois, USA

Product for transplantation

Abbott Laboratories is mentioned as a key player in the area of transplantation diagnostics\(^\text{179}\). The main products of the company for success in this area are seemingly the Architect products. The Architect i2000 is used by Chinese doctors in a medical study about the consequences of transplantation\(^\text{180}\), mainly to measure the level of tacrolimus, an immunosuppressive drug used for transplantation\(^\text{181}\). Architect i1000SR is used for immunoassay, a test done mainly after transplantation, and is being used in China\(^\text{182}\).

Until 2013, Abbott also owned AbbVie, a company which had Gengraf\(^\text{183}\), an immunosuppressive drug used for transplantation. In 2003, before splitting, a published medical study by Hong Kong doctors shows the use of Gengraf on Chinese patients\(^\text{184}\).

Findings from Chinese sources

A Chinese medical study again confirms the use of the i2000 device for measuring the level of tacrolimus in China\(^\text{185}\).

Stock market & other information

Abbott’s revenue in China is said to be around 3 billion USD per year\(^\text{186}\), but our evidence suggests it is closer to 2 billion USD. A look into SEC records shows that Abbott has a research and development facility in China, and among mentioned devices also sells the Alinity C and Alinity I there\(^\text{187}\). The sales in 2017 were driven mainly by double digit growth in China\(^\text{187}\) and in 2017 and 2018, it was China who brought this company income of over 2 billion USD, 7% of the yearly total\(^\text{188}\).

\[
\text{Table 8 Revenue of Abbott Laboratories based on the country of origin}
\]

<table>
<thead>
<tr>
<th></th>
<th>2018 (in millions)</th>
<th>2017 (in millions)</th>
<th>2016 (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$10,859</td>
<td>$9,673</td>
<td>$6,485</td>
</tr>
<tr>
<td>China</td>
<td>2,311</td>
<td>2,146</td>
<td>1,728</td>
</tr>
<tr>
<td>Germany</td>
<td>1,619</td>
<td>1,366</td>
<td>1,044</td>
</tr>
<tr>
<td>India</td>
<td>1,333</td>
<td>1,237</td>
<td>1,114</td>
</tr>
<tr>
<td>Japan</td>
<td>1,226</td>
<td>1,255</td>
<td>924</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1,005</td>
<td>841</td>
<td>785</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>930</td>
<td>929</td>
<td>830</td>
</tr>
<tr>
<td>All Other Countries</td>
<td>11,215</td>
<td>9,843</td>
<td>7,961</td>
</tr>
<tr>
<td>Consolidated</td>
<td>$30,578</td>
<td>$27,390</td>
<td>$20,853</td>
</tr>
</tbody>
</table>

Source: https://www.sec.gov/Archives/edgar/data/1800/000104746919000624/a2237733z10-k.htm

A search of SEC records proves that the global business with diagnostics has been affected over the last 3 years by the continuing penetration of lab products in the US and China\(^\text{189}\).
Table 9 Abbott Laboratories’ revenue based on the country of origin

<table>
<thead>
<tr>
<th>Country</th>
<th>Revenue (in USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>10.8 billion</td>
</tr>
<tr>
<td>Other countries</td>
<td>19.7 billion</td>
</tr>
</tbody>
</table>

Source: compiled based on data available from Bloomberg

Reported income from China for 2017 amounts to 2.15 billion USD, or 7.8% of the total. The China income may have started in 2012, as that is the earliest year it was reported, at 859 million USD (4.5% total). The pace of growth is significant, as it tripled over the last 5 years.

Table 10 Abbott Laboratories revenue in China in recent years

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (in USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>1421 million</td>
</tr>
<tr>
<td>2016</td>
<td>1728 million</td>
</tr>
<tr>
<td>2017</td>
<td>2146 million</td>
</tr>
<tr>
<td>2018</td>
<td>Not reported</td>
</tr>
</tbody>
</table>

Source: compiled based on data available from Bloomberg

Graph 5 Growing revenue of Abbott Laboratories in China

Source: Bloomberg Terminal
Abbott Laboratories has the following subsidiary companies in China:

- Abbott (Guangzhou) Nutritionals Co., Ltd.
- Abbott Laboratories Trading (Shanghai) Co., Ltd.
- Guidant International Trading (Shanghai) Co. Ltd.
- Shanghai Abbott Pharmaceutical Co., Ltd.

**Relevance**

Abbott Laboratories is a key player in the area of diagnostics for transplantation. It sells at least one of these products in China and has a growing presence with increasing revenue there.
Novartis

Basel, Switzerland

Product for transplantation

Novartis is a manufacturer and developer of drugs and the biggest part of its revenue is brought in by pharmaceuticals. In relation to transplantation, it has the immunosuppressive drugs Sandimmun Neoral, Myfortic (Mycophenolic Acid) and Simulect.

Findings from Chinese sources

Chinese doctors prove the use of the immunosuppressive drugs of Novartis in a lot of their medical studies. Three Chinese doctors featured Myfortic in connection with kidney transplantation, as do six others, or another one from Tianjin, and two others mentioning this drug under its different name – mycophenolic acid. Finally the last medical study reveals this drug as well, with over 20 doctors being the authors of it.

Simulect is then written about by a doctor from Shanghai and a second study presents it in relation to dozens of transplant cases. Another one mentions it in relation to transplantation as well. Lastly, a fourth study has Simulect in China already in 1999.

Neoral was in a study by two Chinese doctors about kidney transplantation, with it also being in another one written by six doctors, and then as well from a third one published in 2002.

Stock market & other information

Lutz Kaufmann in his book “China Champions“, from 2005, states that Neoral is one of the most-sold drugs in China.

Novartis’ main competitors are other major international players such as Pfizer, Johnson & Johnson, or GlaxoSmithKline, especially in the innovative high-end market. Here, Novartis sells Sandimmun Neoral, an immunosuppressive agent, which ranks among China’s best-selling drugs (see Table 4) and a range of cardiovascular and oncology products. Local competitors, on the other hand, are especially strong in the OTC and generics field.

The accurate revenue of Novartis in China is unknown, but it can be found that in 2018, 35% of the revenue comes from the US. Some of it then consists of Japan, Canada, Great Britain, Austria, Switzerland, Germany and France. The rest of the world outside of these countries generate 44% of the revenue – including China.
**Table 11 Revenue of Novartis based on the country of origin**

<table>
<thead>
<tr>
<th>Region</th>
<th>Revenue (in USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>19.1 billion</td>
</tr>
<tr>
<td>USA</td>
<td>17.6 billion</td>
</tr>
<tr>
<td>Canada and Latin America</td>
<td>4.0 billion</td>
</tr>
<tr>
<td>Japan</td>
<td>2.4 billion</td>
</tr>
<tr>
<td>Rest of the world</td>
<td>8.8 billion</td>
</tr>
</tbody>
</table>

*Source: compiled based on data available from Bloomberg*

**Relevance**

Long-term sales of immunosuppressive drugs in China which are directly used for transplantation.
XVIVO Perfusion

Gothenburg, Sweden

Product for transplantation

XVIVO is a company focused on medical technologies, and has been the “market standard for lung preservation for more than 15 years,” as is stated on their website. It was founded in 2012 and before that existed as a part of VitroLife. XVIVO has sold in China since 1998 Perfadex, a solution for lung preservation in transplantation – approved by the Chinese FDA (Food and Drug Administration). The CEO of XVIVO describes China as the fastest growing market for lung transplantation in the world and an important market for the company.

Findings from Chinese sources

A Chinese study mentions Perfadex already in 1997 and then two years later. In 2014, the XVIVO XPS system was approved in China, and has uses for lung transplantation as well.

Stock market & other information

The revenue from 2016 and 2017 in Asia and Oceania amounted to over 1.6 million USD.

Table 12 The revenue of XVIVO based on the country of origin

<table>
<thead>
<tr>
<th>Income divided by region in 2016 and 2017 (in millions of Swiss francs)</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>American continent</td>
<td>86.8</td>
<td>87.9</td>
</tr>
<tr>
<td>EMEA without Sweden</td>
<td>42.4</td>
<td>49</td>
</tr>
<tr>
<td>Asia and Oceania</td>
<td>7.7</td>
<td>8.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>1.3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: compiled based on data available from Bloomberg

Relevance

XVIVO has proven revenue in China and sells devices there for transplantation as well.
Bridge to Life

*London, United Kingdom*

**Product for transplantation**

Bridge to Life, based on their official website, conducts business operations in China, and supplies the country with their solution for organ preservation[^210], which is basically the only product line of the company. A medical study of four Chinese doctors mentions it, under the abbreviation UW (derived from “Belzer UW”) in 2008[^211]. This solution was originally created at the University of Wisconsin in the US, from whose foundation the company got the license and developed the products Belzer UW and Belzer MPS using that[^212].

**Stock market & other information**

The product Belzer UW, used for the preservation of abdominal organs, is distributed in China by two companies[^213] – Beijing Hui Xin Qing Yuan Pharmaceutical Science and Technology Co. Ltd. and also Sichuan Wanji Imp Exp Trading Co., Ltd.

**Relevance**

The sales of organ preservation solutions in China, which has as close a use for transplantation as possible.
Astellas Pharma, Inc

_Tokyo, Japan_

**Product for transplantation**

Astellas is a Japanese company, earlier known under the name Fujisawa Pharmaceutical Co., Ltd. It was founded through the fusion of Fujisawa and Yamanouchi Pharmaceutical Co., Ltd in 2005. For transplantation it has an immunosuppressive drug Tacrolimus – in other words Prograf. Import of this drug to China was approved already in 1998 for the Fujisawa company. Astellas also doubled their China revenue in 2015 and came to the decision of hiring 300 new salespersons.

**Findings from Chinese sources**

Tacrolimus is mentioned by a Chinese medical study in 2009 and by another one written by seven Chinese doctors from 2008. A third one from 2013 features the drug as well.

**Stock market & other information**

*Graph 6 Growing revenues of Astellas Pharma in Asia*

*Source: Bloomberg Terminal*
Note:

The connection between transplantation in China and Astellas was pointed out to us by an archive of a presentation by David Matas in 2012 in Singapore\textsuperscript{219}, for which we are grateful.

Relevance

Proven sales of an immunosuppressive drug in China.

One Lambda

\textit{California, USA} \\
\textit{Owned by company: Thermo Fischer}

Product for transplantation

This company has a product called “Lambda Antigen Tray“, a device used for organ compatibility match tests, which is also supported by a study from eight Chinese doctors\textsuperscript{220}, and another one by six doctors from Hangzhou\textsuperscript{221}.

Stock market & other information

No relevant data was available or found

Relevance

Proven sales of a medical device used for transplantation in China.
OrganOx

Oxford, United Kingdom

Product for transplantation

OrganOx, as is hinted upon by its name, is focused on products for organ preservation for transplantation. OrganOx is running clinical tests of its organ preservation products, where their founder or technical director is participating as well, with doctors of Chinese origin who are active in the Chinese medical community and publish research papers with Chinese doctors.

One of them is Ma Y of King’s College. She has participated\(^{258}\) in clinical study of OrganOx Metra product, also attended by Peter Friend, founder of OrganOx. (confirmed by another study\(^{259}\) referencing this one)

Yet Ma Y, of King's College, has published in 2011 a study\(^{260}\) with Chinese doctors, using Chinese patients. And notably Prof. Feng Wu, of Oxford University, has received his medical training at Chongqing Medical University in China. He is highly likely still retaining his Chinese citizenship, as he was in 2002 just “invited”\(^{261}\) over. He has participated in clinical trial of OrganOx product published in The Lancet\(^{262}\), also attended by Coussios, who is technical director for OrganOx. Yet Feng Wu, of Oxford University (as ResearchGate\(^{263}\) headline shows), has done multiple medical studies with Chinese doctors over the years, and they are the ones he publishes with the most. While both Mr. Wu and Ms. Y may be personally enormously kind people, the Chinese medical community - based on evidence given by other researchers and organizations - is participating in illegal organ harvesting.

The company also has patented\(^{264}\) its product in China, and attended conference about transplantation in Hong Kong in 2016, where it had a stand\(^{265}\) and its product was discussed\(^{266}\). The conference was quite problematic\(^{267}\).

China seems to be interested in OrganOx, as The British Chamber of Commerce in China, residing in Beijing, has published an article about this company, in Chinese\(^{268}\).

There are also multiple articles in Chinese about their product, let us share a few\(^{269}\).

It should also be noted that CEO of OrganOx, in a widely cited contract cooperation with ITL, is mentioning ITL's presence “in China”\(^{270}\) in a context of something they can benefit from.

Stock market & other information

No valuable information was found or available

Relevance

Since OrganOx shows signs of trying to get on the Chinese market, and the doctors, who are part of the Chinese medical community, are already working with OrganOx for its organ preservation product trials, we are listing this company among the companies supporting organ transplantation in China.
Sanofi

Paris, France

Product for transplantation

Thymoglobulin, an immunosuppressive drug used against kidney rejection during transplantation.

A medical study of Chinese doctors from 2019 mentions Thymoglobulin in relation to organ recipients in China. Another study from 2013, also by Chinese doctors, features the drug as well, also for China organ recipients. Another fifteen Chinese doctors also mention it in a study from 2015.

Stock market & other information

Graph 7 Growing revenue of Sanofi in China and the rest of Asia

Source: Bloomberg Terminal

Relevance

Proven sales of an immunosuppressive drug in China.
3.5 OTHER COMPANIES FOCUSED ON ORGAN PRESERVATION

Organ Recovery Systems (USA)
Organ Assist (Netherlands)
Organ Transport Systems (USA)
Waters Medical Systems (USA)

Products for transplantation

Medical devices for organ transplantation.

A media report from Beijing in 2019 mentioned four companies related to the market of devices for organ preservation in China – pointing out that this field is dominated by mainly western companies, and then proceeded to mention the four above.

Relevance

The addition in the article of “At present, there are no enterprises in China that have obtained the registration certificate for organ transplant perfusion instrument products, and mass production cannot be achieved. Most enterprises and research institutions are still in the stage of technology development and testing.

Therefore, the current market demand for organ transplant perfusion devices in China is dependent on imported products” is quite alarming. In the context of the date of the article, 2019, it is important to notice that China has long been dependent on imported products, and any unethical, or illegal transplantations in China just have to use the products available – the products of western companies.
3.6 OTHER COMPANIES

When it comes to the evidence of the companies’ profits and relevance for transplantation business in China, we made effort to include only the highly important ones, and highlighted that in the “relevance” section of their data.

But there are far more companies conducting a business in the field of transplantation, actually also in China, and are considered to be the key players in that area. Yet, we were unable to prove what kind of specific product or service they offer in this country.

In spite of that, since the evidence about the companies below makes it extremely likely they are supporting the transplantation business in China, we decided to include a list of them as well, as the prime examples of other companies where we had a certain lack of very specific evidence. To be precise, these companies are thought to be the leaders in the area of transplant diagnostics on the global field by a report on transplant diagnostics focusing mainly on China, Europe, North America and rest of the world. Any kind of simple online search then also confirms their presence in China, and the conclusion for them is that key leaders of transplant diagnostics conduct a business in China:

- Thermo Fisher Scientific, Inc. (USA)
- Bio-Rad Laboratories, Inc. (USA)
- Becton Dickinson and Company (USA)
- Qiagen NV (Netherlands)
- Immucor, Inc. (USA) (Through distributors)
- BioMérieux S.A. (France)
- Illumina, Inc. (USA)
- Affymetrix, Inc (USA)

If we were to abandon the need for a specific evidence and had to create a list of companies based on their existence of profits in China and products for transplantation in general, there would be included more of them in this report. There are at least tens of such companies, as China is, as many companies in this report themselves point out, a highly profitable region when it comes to the transplant business. The income, just by providing medications, could be staggering. One medical study mentions that the cost of a kidney transplant procedure in China is overall 10,531 USD for the hospital, where 69.2% make up the medications and 2% miscellaneous medical services. Which means that for every transplant procedure in China, the potential profit for western companies amounts to 71.2% of the cost – not counting any of the medical devices and equipment used during that. Some of the other companies we found also actually play, as far as we know, certainly a good role, and we have therefore not included them in this report. For example Medtronic provides China with “artificial hearts”, which reduce the need for a transplant, or in other words, reduce the demand for any organs coming from the illegal organ harvesting in China. Altogether, we present in this report 20 companies with very direct connection to transplantation in China, and then another 8 where we were unable to find evidence of the specific product name they offer. It should be also taken into account that, since the illegal organ harvesting is quite unofficial, a lot of medical devices, medications and consumables may travel to China unofficially – to smuggle in a medical device should be even easier than to invite a transplant tourist, since the state itself would approve of it.
### Picture 7 Overview of the companies based on products

<table>
<thead>
<tr>
<th>HOW 28 WESTERN COMPANIES SUPPORT ORGAN TRANSPLANTATIONS IN CHINA</th>
</tr>
</thead>
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www.theircc.org/organharvesting
CONCLUSION

The evidence about illegal organ harvesting has been surfacing for more than 13 years. From phone recordings with the doctors; witness testimonies; discovering the truth about the abnormal number of transplant centers, with over 700 of them, surpassing the official number of 169; the issue went further when the non-existence of a functional donor system in China became known; the testimonies about the 2-week-long waiting times; Chinese doctors’ medical studies using unexplainable sources of organs; and all of that on top of the fact that 300,000 Chinese citizens per year are in need of an organ.

All of means that China is heavily falsifying its transplant data as if to cover up for something, and that something seems, by all evidence possible, to be a large, black market business built on human rights abuses. The state already engages in large labor camps and the persecution of human rights groups, which can provide a source for any illegal, hidden operations anywhere. The Chinese communist party also has an absolute disrespect toward its citizens through a fake transplant waiting list system – since it obviously gives more preference to rich transplant tourists than its own citizens.

China, by all known information, imprisons more than 1.5 million people, but just the number of Uyghurs in the labor camps is around 1 million. These persecuted groups are thus outside of any analysis of the prison system, and the number of prisoners of conscience in China could easily go up to hundreds of thousands. The Communist Party of China already shuns these people from the society, ruins their lives, and the only value it sees in them is working in the labor camps, or singing the communist songs and being constantly re-educated. In short, it does not see any value in them – making them ideal as a source of organs, since from the perspective of the communist party, it would be using people of no value to preserve valuable people. Even though the information about these groups became known at large in the 20th century, the fact that China uses organs coming from executed prisoners – executed by the communist view on justice - is old news.

At least 28 western companies supply China, in some cases for over 20 years, with the materials, drugs and devices supporting the development of the transplantation business, and must be fully aware of the facts and evidence mentioned above, and also that the crimes of China have been recognized through resolutions by many countries worldwide. Directly, or indirectly, their global business pulls their employees from their branches in Europe, America, or other parts in the world into this awkward situation. It’s not like the murderous doctors in China have any other choice than to use the imported western equipment – as China is not self-sufficient at all when it comes to medical devices, and even in 2019 is dependent on the import of devices for organ preservation.

The western companies in the area of medical business therefore support transplantation in a country where patients from at least 20 countries and regions in the world travel for an organ which was supplied to them outside of the waiting list for Chinese citizens, has a dubious source, and somebody might have been killed for it.

The current global policies enable western companies to conduct business in China where their products could very easily be used in crimes against humanity, as in many cases they are, or were at some point in time the only available of their kind. These companies, including their employees globally, are without any institution checking for their vulnerability in cases like this.
one, or an institution which would investigate the whole situation. It is quite pressing, as the
criminals in China have all the motives needed to make these companies as much a part of these
cri mes as possible. Belief in good will will lead us to believe that these companies, even though they
have been part of the transplant business in China sometimes for over 20 years, and know all the
evidence, must be completely innocent. But their business field in China, and the Chinese regime,
is anything but that.

FAQ

Information reported by doctors, researchers, investigative journalists, and the Transplant
Societyprove, that China has used executed prisoners as the source of organs for over 40
years. These prisoners are judged and convicted based on the communist principles of justice.
From the view of the democratic legal system, which we have in the West, we would perhaps
convict the sometimes-biased judges instead of the prisoners. In other words, from the
perspective of our legal system, just using executed prisoners at large like this would be illegal in
a democracy and possibly constitute a crime against humanity.

For over 13 years, there also keeps surfacing evidence that the transplant procedures in China are
illegally done on the groups of persecuted groups, due to their ethnic or religious status. There are
no doubts about the fact that the transplantation in China not only does not abide by medical
ethics, but also suffers from a lack of professionalism. The results of the research among medical
studies show that there are brokers and other entities facilitating transplant operations in China.
The western patients are contacted by a third-party soon after they are on the waiting list, and the
results the recipients get after getting an organ transplant are not of a quality comparable to the
western countries. The situation is unacceptable both from the medical and human rights point of
view.

Our research into western companies reveals that 20 companies, and with relaxed criteria 28 of
them, are not only supporting such transplant business in China, but also have enabled it to get to
a massive scale.

Do western companies in some way take part in this crime against humanity?
The above-mentioned facts ascertain that they do, indeed.

And if they do, is it knowingly or unknowingly?
That is a question the companies themselves are best suited to answer or the state offices capable
of investigating international criminal activity. The way to stop these crimes and the vulnerability
of companies should come from them both.

If they take part in it, are they responsible for these crimes?
Yes, they are.

If that is so, should the offices in the countries of residence conduct an official investigation?
Yes, as it is necessary to impartially investigate this through the official channels and to stop
involuntary organ harvesting. The companies can react on their own and remain ethical, or the
offices may force them.
Could the process of illegal organ harvesting from prisoners of conscience be restrained or even be completely put to a stop, if these companies were to cease supplying their products to the Chinese market?
Yes, absolutely. Based on the evidence found, their business presence in China is crucial for this process.

If the western pharmaceutical and medical companies make an ethical stand and cease to support these crimes in any way possible, would that influence their economic results?
Yes, inevitably. Their market results will be influenced, at first negatively, as they cut down on part of their revenue, but in a long-term positively, as they will have more revenue in the democratic countries thanks to their behavior. We suppose that the shareholders in the democratic countries would accept this.

Do the doctors, in the country of origin of the transplant tourists, know about the illegal organ harvesting?
The seeming global passivity of professional institutions – in comparison with the severity of the issue – and the restraint of the doctors, makes hard to confirm the extent of information they are aware of. But our research results suggest they know more than what is known, and since some of the evidence was published in the medical journals the issue is not new to any of them.

Is it possible that they silently accept what is going on by not acting against it?
As it’s hard to assume something like this without directly asking them, this would require the investigation of the following question – do the doctors prefer prolonging the life of their patient at the cost of a possible murder abroad?

Should professional international organizations take a clear stand on this issue?
Certainly. The professional organizations should look into it and give suggestions to the relevant offices, as the practice of illegal organ harvesting is similar to contract killing.

Should doctors engaged in the process of transplant tourism be held criminally responsible?
That is a question which should be answered by the authorities in their relevant countries.

Should the authorities focus on the issue of brokers and agencies in the field of transplant tourism?
Absolutely, as the evidence gathered through medical studies points toward the existence of a systematical international business in the field of transplant tourism – which however uses organs even from China, and so the authorities’ investigation could help to stop or restrain the large-scale crime of illegal organ harvesting.

Should the authorities conduct research to know how much the doctors know about the illegal organ harvesting in China?
Yes, as the evidence confirms that doctors in democratic countries should be aware of significant information, but it is probably not being put together systematically.

Should the authorities also investigate how many transplant tourists there are in their country which did seek an organ in China, or another non-democratic country?
Yes, the scope of these crimes and therefore the impact it has on democratic countries should be known.
Should the impacted countries support solid legislative steps against illegal organ harvesting?
Indeed, as once the countries forbid it, or are more in control of transplant tourism, there will be less room for tourists to ask for organs from the countries harvesting these organs illegally. In other words, it can have a direct impact on saving innocent lives. For example Italy, Spain, the European Union, Norway, United Kingdom, Israel, Taiwan, the USA, Australia and Canada have either already taken those steps, or are currently looking into it.

Will the investigation of these crimes have future consequences on the geopolitical situation in the world?
It will, as the non-democratic regimes will realize that democratic countries are capable of defending basic human rights, the right to live and religious freedom all over the world, and that these values and the countries defending them are strong.

If the democratic countries won’t bow before the possibility of economic gains at the cost of supporting the narrative of non-democratic countries, then a similar message will come across to their citizens as well.

The questions relevant to illegal organ harvesting are not dependent on the answers from the regime or criminal group in China. A lot of these questions can be answered by the third parties partaking in transplant tourism, the doctors, the companies and others. In other words, it’s a crime which can be fully investigated, and therefore stopped, and no research or investigation would be done in vain.

The evidence in this report reveals that the illegal organ harvesting in China is not a criminal offense limited to just that one country, but inevitably depends on many factors outside of China. This makes it all the more pressing for the relevant authorities to look into it, such as medical, human rights and foreign policy associations, business organizations, chambers of commerce and others. There are many questions these organizations can ask and would easily be able to find answers, some of which we have tried to present in this report.

No country or any other entity should abandon their bottom line and support illegal organ harvesting in any way or not investigate their possible part in it. This crime enables China to support a crime against humanity, conduct genocide, and lower itself to the level of primitive, barbarian societies. The criminals in China became financially dependent on the organ harvesting abuses, and the regime, if it’s not the main source of the issues itself, could have actually became dependent on it as well.

This crime is not the medical solution the democratic countries require, it is the only solution that the socialist and communist criminals in China were able to come up with for us. That is to say, it can be done in a better way, as communist groups have a very bad historic record when it comes to win-win long-term solutions for the betterment of people.
ABOUT AUTHORS

The IRCC, or in other words the Institute to Research the Crimes of Communism, is focusing on the communist crimes of today, by exposing and investigating them. Out of all these, we look into China the most, as it’s the biggest communist regime in the world, as well as the penetration of communist influence into democratic societies.

Pavel Porubiak is a senior analyst at IRCC. At present he is researching the persecution of various groups in China in relation to transplant tourism.

Lukas Kudlacek is a director at IRCC, and professionally dedicated to economic and stock market environments, and conducts analyses in the areas of security, geopolitics and the economy. Senior equity trader.

For more information, please contact us at: info@theircc.org

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All of the sources of evidence below were archived and are available upon request.


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[106] Alexandra Ma. *Dior groveled to China after it used a map that didn't show Taiwan as part of the country. Here are other times Western brands caved after offending the Communist Party.* [online]. Business Insider, 2019 [Accessed 22 October 2019]. Available at: https://www.businessinsider.com/western-companies-apologize-china-communist-party-list-2019-10


[138] Tom Hancock, Wang Xueqiao. *Pfizer focuses on regional China after price cuts hit sales* [online]. Financial Times, 2019 [Accessed 22 October 2019]. Available at: https://www.ft.com/content/40f496ee-82be-11e9-b592-5fe435b57a3b


[159] SUBSIDIARIES OF HOLOGIC [online]. UNITED STATES SECURITIES AND EXCHANGE COMMISSION [Accessed 22 October 2019]. Available at: https://www.sec.gov/Archives/edgar/data/859737/000119312512482840/d393079dex211.htm


[177] Beijing Chang GI Service Station Equipment Co., LTD; Beijing Dianyan Electronic Instruments Co. Ltd.; Beijing Fluke Shilu Instruments Maintenance & Service Co. Ltd.; Beijing Raytek Photoelectric Technology Co. Ltd.; China Safu Machinery Hardware Co. Ltd; Danaher Tool (Shanghai) Ltd.; Danaher Setra-ICG (Tianjin) Co. Ltd.; Danaher Tool Shandong Co. Ltd.; Fluke Shanghai Corporation; Ireland Meter Electronics Zhuhai Co. Ltd.; Jacobs Chuck MFG. Co. Ltd. (Suzhou); Jacobs Chuck Trading Co. Ltd. (Shanghai); Leica Instruments Ltd Shanghai; Leica Microsystems Trading Ltd Shanghai; LEM Instruments & Meters Co. Ltd.; Radiometer Medical Equipment (Shanghai) Co. Ltd.; Setra Sensing Technology (Tianjin) Co., LTD; Shanghai Safa Plating Co. LTD; Shanghai Safe Plastic Cement Co. Ltd.; Shanghai Safu Machinery Hardware Co. Ltd.; Shanghai Sata Tools Machinery Manufacturing Co. Ltd.; Shanghai Shilu Instrument Co. Ltd.; Tianjin Kollmorgen Industrial Drives Corp., Ltd.; Veeder-Root Petroleum Shanghai; Videojet Guangzhou Packaging Equipment Co LTD; Videojet Technologies Trading Co. Ltd. (Shanghai); Zhuhai FTZ Videojet CIJ TTechnologies CO. LTD and also Zhuhai S.E.Z. Videojet Electronics Ltd.


IRCC | THE ECONOMICS OF ORGAN HARVESTING IN CHINA | 77.


[261] Feng Wu’s profile at Oxford University. [online]. Available at: https://www.nds.ox.ac.uk/team/feng-wu

[262] Prof Feng Wu, PhD et al. Safety and feasibility of ultrasound-triggered targeted drug delivery of doxorubicin from thermosensitive liposomes in liver tumours (TARDOX): a single-centre, open-label, phase 1 trial [online]. Available at: https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(18)30332-2/fulltext#%20

[263] ResearchGate search [online]. Available at: https://www.researchgate.net/scientific-contributions/14534286_Feng_Wu

[264] Google patents. [online]. Available at: https://patents.google.com/patent/GB201119420D0/en

[265] Twitter. [online]. Available at: https://twitter.com/search?q=%40organ_ox%20hong%20kong&src=typed_query


[268] British Chamber of Commerce in China. 突破性的创新将改变肝脏移植领域的现状 (Integrated Electronic Systems (Shanghai) Limited) [online]. Available at: https://www.britishchamber.cn/en/%E7%AA%81%E7%A0%B4%E6%80%A7%E7%9A%84%E5%88%9B%E6%96%B0%E5%B0%86%E6%94%9B%E5%8F%98%E8%82%9D%E8%84%8F%E7%A7%BB%E6%A4%8D%E9%A2%86%E5%9F%9F%E7%9A%84%E7%8E%B0%E7%8A%B6-integrated-electronic-systems-shang/

[269] Examples of Chinese articles related to OrganOx: http://www2.ccpit.org/Contents/Channel_1172/2016/0427/637286/content_637286.htm https://t.co/w6a3vyXveb?amp=1 https://t.co/H7eDARs5nx?amp=1
