

Organ Transplants at Cedars-Sinai Medical Center, Los Angeles, and the Third Industrial Revolution

Introduction

Cedars Sinai Hospital does not serve an everyday clientele. Situated in the West Hollywood neighbourhood in Los Angeles, the non-profit hospital caters to the rich and glamorous – a ‘hospital to the stars’. It was there that Madonna received hernia surgery and Frank Sinatra suffered a fatal heart attack. More recently, Kim Kardashian and Kanye West chose the hospital for the birth of their daughter. However, the hospital is famous for more than its celebrity patients. Cedars Sinai has a history of innovation and has often sought to be a world leader of medical research.

In 2010, Tom Priselac, the long-time Chief Executive Officer of the Cedars Sinai Health System was presented with the opportunity to add to this history of innovation and establish a prestigious center for heart transplants at Cedars Sinai. To do so would position Cedars Sinai at the forefront of cardiac research. On the other hand, to establish the specialisation would require a huge investment which Priselac might better use elsewhere in the medical center. The decision required Priselac to consider the competitiveness of the hospital within the Los Angeles healthcare landscape, the logic of creating a specialisation, and the future of healthcare within a global economy.

The Local Setting

Medical research was certainly a fruitful sector of the economy in the first decade of the twenty-first century. The Third Industrial Revolution is often called the ‘Digital Revolution’ – a revolution in computing and information technology. However, the ramifications of the revolution went far beyond the world of computing. Biotechnology boomed and Los Angeles was the epicenter. At the start of the new millennium, almost forty percent of US biotechnological research and manufacturing was in California. In Los Angeles alone, the biotech companies such as Cetus, BioGrowth, and Cal*Bio were providing jobs for some fifty thousand people. With its biotech industry, Los Angeles positioned itself as a city blazing a trail into the future.

Americans have always viewed Los Angeles as the city of the future, and not without some basis. Angelinos pioneered industries such as aviation and oil, not to mention the film industry. This image of Los Angeles was so pervasive that a report published in the face of an economic crisis in Los Angeles in 1992 asserted that the city, and California more generally, had always functioned best when it functioned as “a trendsetter, a pacemaker, a creative alternative”. To recover, the Ueberroth Report argued, the city must embrace the possibilities of the future.

But there was more to the Third Industrial Revolution than new manufacturing industries such as biotechnology. The revolution transformed the shape of the economy: turning developed nations from industrial economies into service-based ones. The service sector – financial services, hospitality, health, and education, to name some of the largest parts of the economy – expanded dramatically. More people began working in the service sector than in all other sectors combined.

Whereas for-profit companies had led the previous industrial revolutions, in the new service economy,

This case study was prepared by Steven Yamshon. Case study editors: Dr. Oenone Kubie and Prof. Christopher McKenna, University of Oxford.



Figure 1: Hospitals Map of Los Angeles, California, City Maps Inc., (2006).

through providing credit for property purchases, allowing healthcare providers use of city eminent domain powers, and assisting in the development of parking facilities. To Tom Priselac in 2010, therefore, the future of the Los Angeles healthcare industry must have looked bright.

However, Cedars Sinai was just one of many major healthcare providers in Los Angeles in the first decade of the twenty-first century. The healthscape of Los Angeles in 2010 included some of the pre-eminent institutions in the country. UCLA and USC were both operating nationally renowned teaching hospitals, and the Children's Hospital in Los Angeles was the one of the most well-respected pediatric hospitals in the country. The competition for patients in Los Angeles in 2010 was intense. Would specializing in heart transplants differentiate Cedars Sinai from the rest of the market and keep patients coming to the hospital?

Specialising in Heart Transplants

Cedars-Sinai performed seventy-eight heart transplants in 2010. Nonetheless, Cedars-Sinai was not a leader in that area of cardiology. In Los Angeles itself, Cedars-Sinai faced the competition of UCLA, which had one of the largest heart transplant programs in the country and was at the forefront of heart transplantation research and technology. Furthermore, other local competitors included Loma Linda Medical Center, USC, and, although only performing pediatric heart transplants, The Children's Hospital of Los Angeles.

Despite its global reputation, between 2005 and 2009, UCLA was restricting funding for the Heart-Lung Transplantation Group. University priorities had shifted away from expanding specialty medicine to increasing the number of outreach facilities throughout the greater Los Angeles region to further the University's mission of community-based healthcare. Thus, even with the increasing numbers of transplants at the medical center, the university was failing to invest in much needed buildings to accommodate patients and improve patient care. Furthermore, UCLA sought to limit funding to research being conducted in the group.

It was UCLA's decision to restrict funding for its heart transplant group which presented Tom Priselac with the opportunity to invest in the procedure at Cedars Sinai. By 2009, Dr. Jon Kobashigawa, director of the UCLA group, world-renowned author and researcher, and former President of the International Society of Heart and Lung Transplantation, was frustrated and anxious about the future of the heart-lung transplant program at UCLA. Dr. Marban, founding Director of the Cedars-Sinai Heart Institute, recognized UCLA's

particularly in the areas of health and education, non-profit organisations were suddenly the sector leaders. In the quarter century before 2005, nonprofits had been growing at more than double the rate of businesses, and by the 1990s, nonprofits accounted for 10% of the US workforce. In 2005, political scientist, Jeffrey M. Berry wrote "We live in an age of nonprofits".

Los Angeles embraced the service economy. To fight the problems of sprawl and urban flight, and the political and economic needs of urban renewal, Los Angeles turned to universities and hospitals, popularly called 'eds and meds'. By 2011, educational services were the sixth biggest industry in terms of employment in Los Angeles County, while the healthcare sector had become the largest, employing 12.4% of the resident population. Together they accounted for a fifth of the local jobs. To encourage hospitals to remain in and expand in cities, the city and state governments worked with healthcare providers, offering incentives and means for hospitals to grow in city environments

reduced interest in transplantation. Certain that bringing over Kobashigawa's group to Cedars-Sinai would make the center a world leader in heart transplantation and transplantation research, Marban met with Kobashigawa, who was also looking to secure the future of his program. Marban convinced Kobashigawa that at Cedars-Sinai the doctor could be certain of funding and support for his research, thus enabling him to remain a world-leader in transplantation procedures.

Yet Tom Priselac, whose concerns lay with the future of the hospital as a whole was more wary, and rightly so. That hospitals compete to perform organ transplants at all may appear illogical. Hospitals themselves often view organ transfers as unprofitable or 'money-losing' ventures. Heart transplants are among the most complicated of procedures, with long and expensive preparation for surgery and considerable after-care. In addition, due to the ethical and repugnance constraints on the market, procurement of the organ is also expensive, around forty percent of the total cost of the treatment. Furthermore, research has demonstrated that comparable, alternative treatments, such as ventricular reconstruction and mitral repair are not only less expensive than heart transplants, but also yield comparable early outcome and long-term survival rates. Nor is heart transplantation a growth sector: the number of heart transplants in the world has not grown since 1994.

In the eyes of Priselac, therefore, heart transplants must have seemed a highly expensive, unprofitable, and perhaps even unnecessary service. Yet, the Heart Transplant Center did have one appeal – patients and doctors alike viewed organ transplants in general, and heart transplants in particular, as highly prestigious.

Profit, Patients and Prestige

Cedars Sinai hospital has never competed on cost. When the hospital was first created in the early twentieth century it provided a hospital for Los Angeles' growing Jewish population. Jewish patients were wary of hospitals where they feared they would be fed non-kosher food and would be vulnerable to Christianizing doctors and staff. On the other hand, endemic health problems (in particular tuberculosis) and the growing advantages of hospitals over homes as settings for receiving healthcare fed the demand for a Jewish hospital.

As the neighborhood changed and Cedars Sinai's clientele became increasingly heterogeneous, still it did not compete on cost. In fact, by 2010 Cedars Sinai had become the second most expensive hospital in the country. Despite the costs, patients, particularly the rich and famous, still came to the hospital, eager for treatment.

Only a tiny fraction of patients came to the hospital to undergo heart transplants, however. The hospital's primary business came from other areas: cancer treatment, plastic surgery and trauma for example. The demand for heart transplants was, thus, miniscule in comparison with other medical services. Providing a cutting-edge heart transplant service, however brilliant, then, surely made less sense than investing in other services.

Yet, while few patients ever receive heart transplants, the procedures gain national attention and, importantly, improve the overall reputation of the hospital. This has consequences both in terms of patients and doctors. The prestige of working at a leading hospital attracts a supply of labour. Famous doctors, wanting to work in a hospital which is renowned for research, come to the hospital which, in turn, brings further distinction to the center.

Famous doctors, who undertake pioneering research or experimental procedures, are covered by the media. This positive coverage is accessed by potential patients, improving the hospital's brand. Thus heart transplants, which have always received a large amount of attention, particularly for high profile cases, disproportionately add to a hospital's reputation.

Since the 1980s, a formalised system of accessing hospital reputation has emerged in the form of ranking tables. Audiences could, for the first time, quickly and concisely, discover which hospitals (and also universities) in their area provided the best overall service. Cedars-Sinai, in 2010, was ranked first in the Los Angeles Area. The ranking tables also, increasingly, differentiated between different departments, providing tables for best cancer treatment, best paediatric department and, of course, best cardiac center. Even the Heart Transplant Center was ranked, coming in at tenth in the nation in 2010, though bringing in Kobashigawa would certainly improve their standing.

Cedars-Sinai National Rankings in Medical Specialties, 2010

Specialty	Rank
Cancer	26
Gastroenterology	5
Cardiology	9
Orthopedics	9
Urology	10
Gynecology	14
Diabetes	14
Neurology	14

Table 1: U.S. News and World Report, Best Hospitals in 2010

Ranking tables didn't just enable patients to make informed choices between local hospitals; they formalised and, in fact, drove national competition between hospitals. Medical tourism within the USA spread, with patients travelling large distance to receive the best ranked treatment. They didn't stop there, however. Following the lead of university ranking tables, hospital ranking tables now often have an international element, where would-be patients can discover which hospitals are the best in the world.

The Global Third Industrial Revolution

'Eds and meds' were envisioned as the foundation for urban renewal, bringing jobs and money to city centers while serving the local community. Moreover, while manufacturing became global, the service was grounded in the local. Hospitals like Cedars Sinai may have had to compete for doctors and patients, but at most, this was within a national scale.

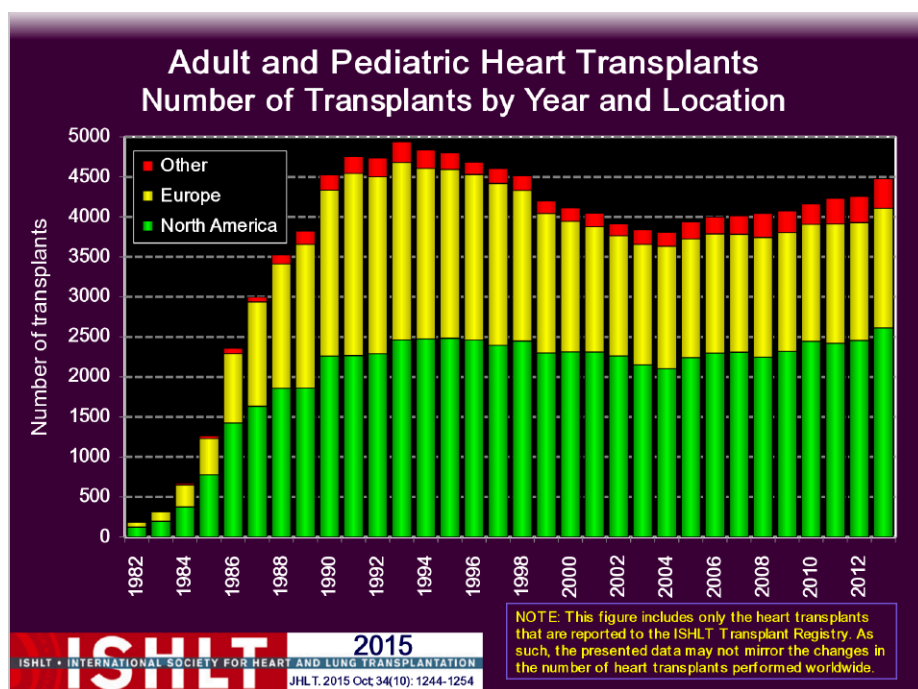


Figure 2: International Society for Heart and Lung Transplantation, 'Overall Heart Transplantation Statistics', 2015, www.ishlt.org, (accessed 08/08/2016).

By 2010, however, it was clear that service was becoming global. Health tourism wasn't just a national phenomenon but an international one. Patients were travelling around the globe looking for the best treatment for the most reasonable price. What this meant for the future of the service sector, non-profits, and the Third Industrial Revolution was unclear.

Patients looking for organ transplants were particularly ready to look abroad for treatment. A report by researchers at Mount Sinai Hospital in New York published in 2010 revealed that hundreds of US patients sought organ transplants abroad every year. Despite concerns over the ethics of transplant tourism as well as doctors' warnings over quality of care, many patients were eager to avoid the lengthy waiting lists and high prices common in the United States.

Transplant tourism posed a particular problem for the local healthscape of Los Angeles. Forty percent of transplant tourists in the first decade of the twenty-first century were from New York and California.

If Cedars-Sinai was to remain competitive, Tom Prieslac had to look beyond the Los Angeles market, to the global economy and work out how decisions like whether to invest in the Heart Transplant Center affected their position within the global health care marketplace.

Appendix 1: History of Cedars Sinai Medical Center

In 1902, Jewish businessman Kaspere Cohn donated a two-storey Victorian home in East Los Angeles to the Hebrew Benevolent Society. The society converted it into the first Jewish hospital in Los Angeles – a twelve-bed facility offering free healthcare to patients. In 1910, the Kaspere Cohn Hospital expanded. It acquired forty-eight more beds and had a specialised, outdoor tuberculosis ward designed specifically to serve the needs of the community. Twenty years later, in 1930, the hospital was renamed Cedars of Lebanon.

Meanwhile the Bikur Cholim Society had opened a second Jewish hospital in East Los Angeles in 1918, to function as a hospice. A small hospice, Mount Sinai Hospital for the Incurables had only eight beds. By the 1920s, as modern hospitals for the active cure of patients rose in prominence, hospices were increasingly unusual. Mount Sinai grew dramatically and became a general hospital, offering medical care as well as hospice care. While both Cedars of Lebanon and Mount Sinai were explicitly Jewish institutions, serving only kosher food, the institutions never treated exclusively Jewish patients, instead offering their services to Angelenos of all faiths.

In the 1950s, Los Angeles philanthropists Emma and Hyman Levine donated a piece of property in West Los Angeles to expand Mount Sinai. The facility moved in 1955 to the larger site. In 1962 the two Jewish hospitals merged to become Cedars-Sinai Medical Center. Cedars of Lebanon sold their hospital facility on Fountain Avenue to help raise funds for the building of a new and modern 1,000 patient bed hospital on the Beverly Boulevard Mount Sinai site. A lead gift provided by the Max Factor Family Foundations enabled Cedars-Sinai to begin construction of the main hospital in 1972, which has continued to serve as the principal facility for patients.

Large philanthropic donations allowed the hospital to continue to expand in the late twentieth and early twenty-first centuries. This expansion had been in terms of space – with the construction of the Marvin Davis Research building, the Saperstein Critical Care Tower, and 131,000 square feet Taper Imaging Center – as well as patient numbers. Some 500,000 patients visited the Imaging Center alone per year in the early twenty-first century. By 2010, Cedars-Sinai had developed into the largest non-profit hospital west of the Mississippi River with 2,155 doctors, 560 medical resident fellows and 10,971 full-time employees.

Cedars-Sinai capitalized on its West Hollywood location in a high income neighborhood bordering Beverly Hills, fundraising on a scale normally associated with top ten universities. In the early twenty-first century, Cedars-Sinai employed an internal group of fundraising professionals who helped community volunteers and support groups to raise large amounts of money for the Medical Center. In addition, the center continued to receive substantial donations from community members and grateful patients and families.

The growth of the medical center in the late twentieth century enabled a growth in research institutes (such as the Burns and Allen Research Institute opened in 1994) housed at the hospital. The Cedars-Sinai research program had 981 projects in progress by 2010, with \$41m in research grants from the National Health Institute. Research at Cedars-Sinai by the twenty-first century was focused, among other areas, on regenerative medicines (a branch of tissue engineering and molecular biology), genetics, and gene therapy. With a large income from donations and fundraising efforts, as well as insurance reimbursements, state Medicaid, and Medicare payments, Cedars-Sinai in the early 2010s sought to build and expand centers of excellence in the treatment of cancer, neurology, diabetes, urology, and cardiology.

Appendix 2: Cedars-Sinai Financial Condition Year 2010

Revenues

Contributions and grants	\$83,896,348
Program service revenue	\$2,532,516,582
Investment income	\$27,811,462
Other revenue	\$13,895,839
Total revenue	\$2,658,119,211

Expenses

Grants	\$36,294,304
Employee salaries and benefits	\$1,222,314,852
Professional fundraising	\$31,094
Other expenses	\$1,189,071,358
Total expenses	\$2,447,711,613
Total revenues less total expenses	\$210,407,598

Assets

Total Assets	\$3,688,621,903
Total Liabilities	\$1,711,865,848
Net assets or fund balances	\$1,976,758,055

Moody's Investment Service Bond Rating: **Aa3-stable**

Appendix 3: History of Innovations at Cedars-Sinai

1906	Sarah Vassen was the first female doctor in Los Angeles and become Superintendent of Kaspare Cohen Hospital, the predecessor to Cedars.
1920s	First electrocardiogram heart machine installed in Los Angeles.
1950s	Mount Sinai doctors used thrombolytic enzymes to dissolve blood clots.
1962	Milton Heifetz, a well-known neurologist created the Heifetz clip system which is widely used in in intracranial aneurisms.
1970s	Jeremy Swan and William Ganz invented the pulmonary artery catheter that is widely used in intensive care units, especially in heart transplant units.
1980s	David Ho, while as a resident, was one of the first physicians to encounter AIDS cases and has since become a prominent AIDS/HIV researcher. David Ramon discovered the enzyme responsible for screening Tay Sachs disease.
1990s	Phillip Koeffler was one of the leading researchers who developed the drug Rituxin that is widely used in combating Non-Hodgkin's Lymphoma and Rheumatoid Arthritis.
2000	Keith Black, a well-known neurological surgeon has completed over 4,000 brain surgeries that have led to advances in medical neurology.

Appendix 4: Heart Transplant Procedure

Before even being placed on the heart transplant list, patients must undergo exhaustive testing including: multi-discipline physician evaluations, blood tests, dental checks, imaging scans, psychological testing, a social work evaluation, and a complete cardiology workup. If the medical center's heart transplantation team decides that the patient is a candidate for a heart transplant, then they are placed on a national waiting list, sponsored by the United Network of Organ Sharing (UNOS). Donor hearts are distributed through UNOS and a regional donor procurement organization. For California, the heart donor procurement organization is called One Legacy. Donors need to have a suitable blood type and comparable size heart. For example, a 6'2" male would not be a suitable donor for a 4'11" female. A rating scale is used to determine the severity of a needed transplant.

The time to transplant can range from a few days to several years depending on status of the patient and availability of compatible organs. If there are no complications after transplantation, the patient spends one to three days in an intensive care unit and twelve to seventeen days in the cardiac section of the hospital. Once discharged, recovery is expected to take six months and patients are advised against returning to work within four months. Mandatory heart clinic appointments at the Cedars-Sinai Heart Institute are monthly in the first year, gradually decreasing to yearly after twenty-four months. Transplants are a high-risk and a high-cost operation. Primary among the risks is the risk of rejection where the patient's body rejects the foreign organ. Antigens, on the surface of organs, alert cells in the patient's body to the new organ, triggering an immune response leading to rejection. A technique developed by Cedars-Sinai physicians, surgeons and researchers greatly reduces the number of antigens or removes them. This has lessened the risk of rejection and improved recovery. The technique enabled Cedars-Sinai to perform many more heart transplants, as the need for close donor and recipient compatibility decreased.

The Heart Transplant Center also provides "bridge to transplant" programs in which a mechanical device

is transplanted before a donor organ heart is put in place. The center offers two mechanical devices. A less invasive device called the Ventricular Assist Device (VAD) is a mechanical pump implanted in a person's body that helps the heart pump blood through the body when the heart is weak. Ventricular assist devices can be used as a bridge to transplant or a longer-term solution for those who are not eligible for transplant.

A more invasive treatment for those who are waiting for a donor heart, too sick to be transplanted with a donor heart, or where a VAD would not be effective, is a total artificial heart. The total artificial heart is a mechanical device engineered to fully replicate a human heart. There are two types of mechanical heart. Syncardia is based on the Jarvik 7 developed by Dr. Robert Jarvik. The Syncardia mechanical heart is implanted within the body and has tubes extending through the body to the power pack. The power pack must be with the patient at all times and can run on electricity or portable battery packs. The second device maker is the Abbcor mechanical heart that is completely implanted within a patient's body. The lifespan of the Abbcor mechanical heart is approximately 19 months. Due to the longer lifespan of Syncardia, the Syncardia device is used more frequently. Dr. Jack Copeland performed the first mechanical heart operation in 1985 and since then, over 1,400 mechanical hearts have been transplanted worldwide.

Endnotes

- ¹ Kevin Starr, *Coast of Dreams: A History of Contemporary California* (London: Penguin Books, 2005), p. 279.
- ² Ibid., p. 283.
- ³ Ibid., p. 248
- ⁴ Thomas McCraw, 'Introduction' in Thomas McCraw, (ed.), *Creating Modern Capitalism: How Entrepreneurs, Companies and Countries Triumphed in the Three Industrial Revolutions* (Cambridge, Mass.: Harvard University Press, 1998).
- ⁵ Jeffrey M. Berry, 'Nonprofits and Civic Engagement', *Public Administration Review* 65:5 (Sep-Oct 2005), pp. 568-578; William T. Gormley, 'Review of Scholarship on Nonprofit Sector', *The American Political Science Review*, 87:4, (Dec., 1993), pp. 1015-1016. For a historical overview of the nonprofit sector see Peter Dobkin Hall, 'A Historical Overview of Philanthropy, Voluntary Associations and Nonprofit Organizations in the United States 1600-2000' in W. W. Powell and R. Steinberg (eds.) *The Nonprofit Sector: A Research Handbook (Second Edition)* (New Haven: Yale University Press, 2006), pp. 32-65.
- ⁶ Berry, 'Nonprofits and Civic Engagement'.
- ⁷ Christine Cooper, et.al, 'Industry and Labor Market Intelligence for Los Angeles County', (Economic Policy and Analysis Group, April 2013), available online at <http://laedc.org/> (accessed 08/08/2016).
- ⁸ Thomas Priselac (Chief Executive Officer), Cedars-Sinai Health System, interviewed by Steven Yamshon, December 11, 2015.
- ⁹ Kathleen W. Poussai and Michael Goetz, 'Scope, Learning, and Cross Subsidy: Organ Transplants in a Multi-Division Hospital', *Southern Economic Journal*, 60:3 (Jan., 1994), pp. 715-726.
- ¹⁰ J. T. Cope, et. al., 'A Cost Comparison of Heart Transplantation Versus Alternative Operations for Cardiomyopathy', *Ann Thorac Surg.* 72 (2001), pp. 1298-1305; Alvin E. Roth, 'Repugnance as a Constraint on Markets', *The Journal of Economic Perspectives* 21:3 (Summer, 2007), pp.37-58.
- ¹¹ Cope, et. al., 'A Cost Comparison of Heart Transplantation'.
- ¹² International Society for Heart and Lung Transplantation, 'Overall Heart Transplantation Statistics', 2015, www.ishlt.org, (accessed 08/08/2016).
- ¹³ Paul Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1982).
- ¹⁴ U.S. News Best Hospitals 2010-2012, "Overview and Honor Roll," *U.S. News and World Report*, October 12, 2010
- ¹⁵ Cope, et. al., 'A Cost Comparison of Heart Transplantation'.
- ¹⁶ Laurie Levin, 'Historical Perspective', <http://www.cedars-sinai.edu/About-Us/History> (accessed 08/08/2016)
- ¹⁷ Ibid.
- ¹⁸ Levin, 'Historical Perspective'.
- ¹⁹ Ibid.
- ²⁰ Jon Kobashigawa (DSL/Thomas Gordon Chair in Heart Transplantation Medicine), interviewed by Steven Yamshon, Cedars-Sinai Medical Center, September 11, 2015
- ²¹ Ibid.; Michelle Kittleson (Cardiologist), interviewed by Steven Yamshon, Cedars-Sinai Medical Center Heart Institute, September 11, 2015.
- ²² Kobashigawa Interview.
- ²³ Francisco Ariaba (Director of Mechanical Heart Support), interviewed by Steven Yamshon, Cedars-Sinai Medical Center, September 11, 2015.