Cleveland Clinic

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18-URL-4051

CLEVELAND CLINIC | GLICKMAN UROLOGICAL & KIDNEY INSTITUTE | 2018 YEAR IN REVIEW

Glickman Urological & Kidney Institute

2018 Year in Review

Contents

ON THE COVER

Georges-Pascal Haber, MD, PhD, was appointed Chairman of the Department of Urology in September 2018.

AT A GLANCE

The Glickman Urological & Kidney Institute's activities encompass a unique combination of high-volume and challenging clinical cases, extensive basic and translational scientific efforts, and innovative laboratory research conducted in an environment that nurtures the future leaders of its specialties.

Glickman Urological & Kidney Institute

BY THE NUMBERS

(2017)

93,739
OUTPATIENT VISITS

9,742
SURGICAL CASES

19,618
DIALYSIS TREATMENTS

2,144
ADMISSIONS

8,862
PATIENT DAYS

VITAL STATISTICS & RANKINGS

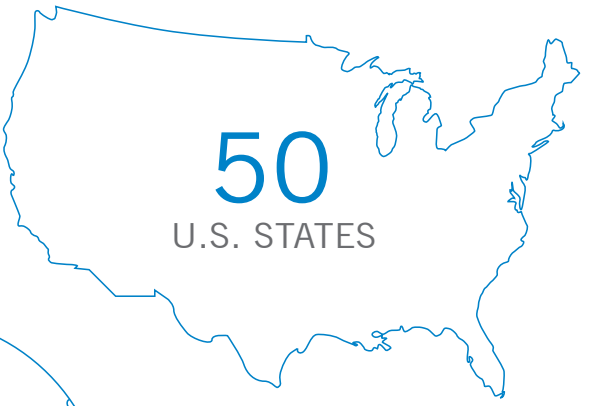
INSTITUTE VITAL STATISTICS (2017)	
58	Urologists
22	Nephrologists
33	Advanced Practice Providers
30	Urology Residents
15	Urology Fellows
9	Nephrology Fellows
277	Caregivers

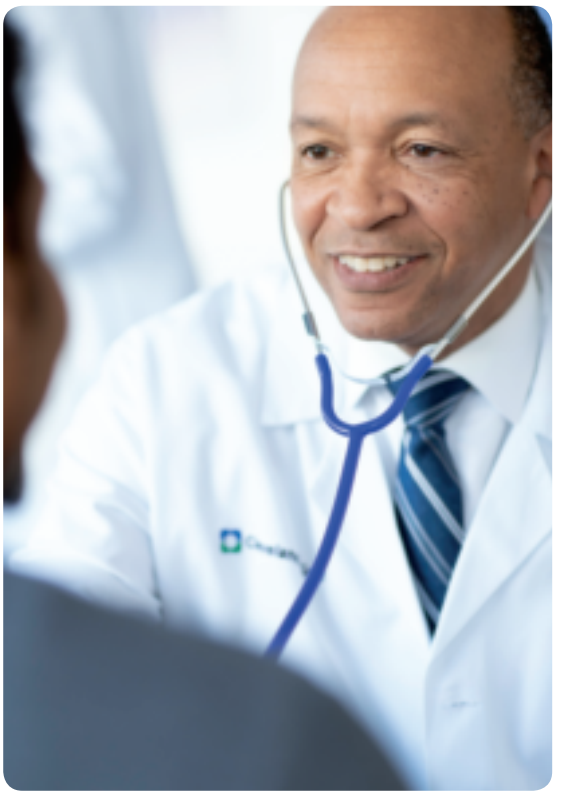
SURGICAL CASES (2017)	
512	Benign Prostatic Hypertrophy
1,229	Endourology and Stone Disease
1,157	Female Pelvic Medicine and Reconstructive Surgery
155	Male Fertility
537	Pediatric Urology
334	Genitourinary Reconstruction
217	Renal and Pancreas Transplant
2,704	Urologic Oncology

U.S. NEWS & WORLD REPORT RANKINGS		
YEAR	NEPHROLOGY	UROLOGY
2018	2	1
2017	2	1

U.S. News & World Report ranked Cleveland Clinic's urology program No. 1 and our nephrology program No. 2 in the nation in 2018. Urology has been ranked No. 1 or 2 for 18 years in a row, while nephrology has achieved No. 1 or 2 rankings for the past eight years.

PATIENT ORIGINS (2017)





CENTERS

DEPARTMENT OF NEPHROLOGY

- Blood Pressure Disorders
- Chronic Kidney Disease
- Dialysis
- Kidney Stones
- Renal and Pancreas Transplant
- Renal Diseases

DEPARTMENT OF UROLOGY

- Endourology and Stone Disease
- Female Pelvic Medicine and Reconstructive Surgery
- Genitourinary Reconstruction
- Male Fertility
- Men's Health
- Minority Men's Health
- Pediatric Urology
- Renal and Pancreas Transplant
- Robotic and Image-Guided Surgery
- Urologic Oncology


Eric A. Klein, M.D.

MESSAGE FROM THE CHAIRMAN

Dear Colleagues,

I am delighted to present Cleveland Clinic Glickman Urological & Kidney Institute's 2018 Year in Review. It always is gratifying to reflect on our team's accomplishments and discoveries.

For nearly three decades, we have received recognition for our commitment to excellence and innovation. We are proud this year to again be ranked No. 1 in urology and No. 2 in nephrology in the *U.S. News & World Report* survey of Best Hospitals.

Add to that, our nephrology fellowships (in general and transplant nephrology) and urology residency and fellowship programs, which continually attract outstanding young physicians. Our urology residency program has earned top rankings in Doximity's Residency Navigator survey and, in 2018, the director of our Robotic and Laparoscopic Surgery fellowship program received a No. 1 ranking from the Endourological Society.

Advances in technology continue to allow us to expand treatment options, add surgical precision and increase efficiencies. For example, holmium laser enucleation of the prostate (HoLEP) – only offered at a few centers around the country – is a noninvasive treatment for BPH that approaches from the outer edges of the prostate. It may offer shorter hospital stays, decreased bleeding risk and other benefits.

We have on our team one of the largest experiences in robotic surgery in the country with more than 4,600 robotic radical prostatectomies and nearly 2,300 robotic partial nephrectomies performed in the past decade. This year, we became the first institution in the country to perform prostate surgeries with Davinci's new Single Port SP Robot, which inserts surgical instruments through one small abdominal incision, improving surgical outcomes, reducing scarring and allowing quicker patient recovery.

Our nephrologists are working with a company that manufactures dialysis machines that can be monitored remotely. And our scientists are working on developing a wireless insertable pressure sensor for diagnosis and treatment of urinary incontinence in women. Further, we are conducting research into how molecules that drive prostate cancer growth are regulated. And we're leveraging self-scheduling, virtual visit capabilities and other technology to make life easier for patients.

Finally, we welcomed Georges-Pascal Haber, MD, PhD, as the new Chair of Urology, and have established a new GU Malignancies Research Center in collaboration with the Lerner Research and Taussig Cancer Institutes.

As always, we will put the patient at the center of all we do and remain committed to our values. Thank you for your continued interest and collaboration.

Sincerely,

Eric A. Klein, MD

Chairman, Glickman Urological & Kidney Institute
Professor, Cleveland Clinic Lerner College of Medicine

LEFT — ERIC A. KLEIN, MD

2018 HIGHLIGHT

Taking a Systemic Approach to Male Fertility Yields Great Rewards

Systemic diseases are often at the root of men's fertility problems, and the ability to help them improve their overall health while also helping them achieve their reproductive goals is what Sarah Vij, MD, says she likes most about her job as the new Director of the Men's Infertility Service.

"I get to see a lot of younger men, many of whom do not have a primary care physician, and I am able to use that as an opportunity to get them tied in to better overall healthcare," she says.

Caring for the whole patient

"Fertility specialists take care of the whole patient in a way that you don't often see in other subspecialties, and it is very gratifying to be able to help them improve their health at a younger age than they might otherwise present for care," she says.

With the promotion of former men's infertility Director Edmund Sabanegh, MD, to President of Cleveland Clinic's main campus, Dr. Vij has taken over his clinical duties. She officially started Aug. 1, following a Male Infertility and Andrology Fellowship with Dr. Sabanegh.

Full spectrum of diagnostic and therapeutic services

What sets the department apart, she says, is that it offers the full spectrum of diagnostic and therapeutic services in one location, maximizing patient convenience. Cleveland Clinic also has a strong reproductive endocrinology group for the female half of an infertile couple, offering assistive reproductive techniques including intrauterine insemination and in vitro fertilization. The groups coordinate their efforts to achieve the best outcome for each couple.

Also, Cleveland Clinic's Andrology Lab, run by Ashok Agarwal, PhD, is known for its extensive research and offers cutting-edge treatments, including specialized semen testing with DNA fragmentation, reactive oxygen species and oxidative reductive potential. Cryopreservation banking services are available for men who need to store semen for reasons such as undergoing chemotherapy or pursuing gender reassignment.

Active research projects

In addition to her clinical role, Dr. Vij is involved in men's infertility research. One area her team is examining is the link between obstructive sleep apnea and male infertility. Does the apnea lead to a hypoxic state in the testicles, reducing sperm production? And can bariatric surgery and weight loss improve sperm counts?

"These are early studies, but they are tied to the same idea, which is taking an overall view of health as a way to improve male fertility," she says.

Our commitment to taking a systemic approach to managing urological symptoms led to development of a men's health phenotype, ACTIONS, in conjunction with Daniel Shoskes, MD, Director of the Men's Health Center, last year. It classifies men according to presence and severity of seven conditions: Anxiety/alarm falsification, Cardiovascular disease, low Testosterone, Insulin deficiency resistance, Obesity, Neurologic disease and Sleep apnea.

"It is a way of quantifying the burden of systemic disease that can impact urologic conditions," Dr. Shoskes explains. "The ACTIONS phenotype is a useful tool in educating patients and informing treatment decisions in a way that can significantly improve overall quality of life for patients," he says.

LEFT — SARAH VIJ, MD


Cleveland Clinic
Alvin Wee

2018 HIGHLIGHT

Kidney Transplant Program: Improving Outcomes and Experience

A focused and dedicated team of healthcare professionals in Cleveland Clinic's Kidney Transplant Program continues to witness improvements in outcomes of transplant patients. In 2018, the program had a record year, transplanting 187 kidneys with excellent outcomes.

"From the very first contact with our patients, our team is focusing on every aspect of their care," says Alvin Wee, MD, MBA, Surgical Director for the program. "Each of our patients receives an enhanced level of care through frequent visits before and after the transplant procedure."

"Pre-transplant preparation begins with a comprehensive evaluation, which is performed in one day and includes meetings with the multidisciplinary transplant team, followed by laboratory testing and imaging," explains Emilio Poggio, MD, nephrology staff. "Furthermore, our virtual visit program is available before the procedure to out-of-state transplant patients or those who live far from our campus."

Enhanced level of care improves outcomes

The continuity of care provided in the scope of the program has proven critical to transplant success.

"If patients see a large number of doctors throughout their transplant journey, important details may be overlooked, and the patient may fall through the cracks," says Dr. Wee. "In order to ensure continuity of care, our patients see a limited number of physicians. This way, we are allowing those physicians to become very familiar with the unique aspects and challenges of each case."

The dedication and meticulous attention to detail of the transplant team have led to decreased length of hospital stay.

"Our average length of stay after living donor transplants is three days, which is considerably lower than the national average of five days," says Dr. Wee. "For deceased donor transplants, the average length of stay at Cleveland Clinic is three to four days. We know that there is no better place to recover from surgery than home, and our aim is to get the patients discharged as soon as they are ready."

Dr. Wee further explains that delayed graft function (DGF) is a prognostic factor for the longevity of the allograft and is defined as dialysis requirement within one week after transplant.

"The national average for DGF is approximately 30 percent, while at Cleveland Clinic we had a 4 percent DGF rate in 2018," he says.

Readmission rate kept at an all-time low

The low incidence of DGF and the enhanced level of care ensure that the readmission rate for kidney transplant patients at Cleveland Clinic remains low.

"Our readmission rate in 2018 reached an all-time low of 14 percent, which is approximately 50 percent lower than the national average," he continues. "Because we see the patients often, we are able to correct little problems before they turn into big, difficult-to-manage medical issues."

In the follow-up period, transplant patients are managed by post-transplant coordinators and the transplant surgeon according to a predefined care plan.

"For the first month, the patients are seen twice a week, after which their care is transferred to a transplant nephrologist," says Dr. Poggio. "As the patients continue to improve, they are seen less frequently."

LEFT — ALVIN WEE, MD


Cleveland Clinic

2018 HIGHLIGHT

Collaboration Focuses on Practice-Changing Discoveries in Genitourinary Malignancies

A cross-institute partnership among members of the Lerner Research Institute, Taussig Cancer Institute, and Glickman Urological & Kidney Institute is positioned to bring translational insights to the diagnosis and treatment of prostate, bladder and kidney cancer.

The Center for Genitourinary (GU) Malignancies Research is led by Nima Sharifi, MD, who holds appointments in each of the three institutes. He co-directs Cleveland Clinic's Center of Excellence in Prostate Cancer Research with Eric Klein, MD, Chair of the Glickman Urological & Kidney Institute, and directs the GU program of the Cleveland-wide Case Comprehensive Cancer Center. He also holds the Kendrick Family Endowed Chair for Prostate Cancer Research.

Leveraging clinical strengths

"We hope to leverage clinical strengths and a diverse patient population for translational and clinical studies, and to attract additional leading urology and cancer researchers who will help bring discoveries to our patients," says Dr. Klein.

"We are specifically looking to recruit physician-scientists and scientists to complement existing strengths we have in prostate cancer hormone therapy resistance mechanisms," Dr. Sharifi adds. "Additionally, we want to expand and complement our expertise in the epigenetics of prostate and bladder cancer and explore new areas of kidney cancer science."

Dr. Sharifi is an expert in cancer endocrinology and metabolism, especially in prostate cancer. He has published landmark studies linking a specific genetic variant to a deadly form of advanced prostate cancer. The work has won him numerous awards, including the national Top 10 Clinical Achievement Award from the Clinical Research Forum. He is a member of the Association of American Physicians and was recently elected a fellow of the American Association for the Advancement of Science.

Making practice-changing discoveries

"Our overarching goal is to make practice-changing discoveries in GU cancer," Dr. Sharifi explains. "Combining the expertise of our medical oncologists, urologists, pathologists and radiation oncologists with that of disease-focused basic scientists will help us rapidly bring transformative changes to clinical practice at Cleveland Clinic and around the world."

GU cancers are prevalent around the world, and prostate cancer is the leading cancer in American men. "The center will help streamline and focus our clinical and research efforts in GU malignancies," says Brian Bolwell, MD, Chair, Taussig Cancer Institute.

"By bolstering our research in this area, we hope to also shine a light on the need to better understand these diseases," adds Serpil Erzurum, MD, Chair, Lerner Research Institute.

Stan Gerson, MD, Director, Case Comprehensive Cancer Center, says this research expansion solidifies the remarkable accomplishments of investigators focused on GU malignancies.

"This center will further link disease-based research to the critical questions of prognosis and treatment decisions that impact lives," Dr. Gerson says.

LEFT — NIMA SHARIFI, MD

Nov. 2nd, 2016

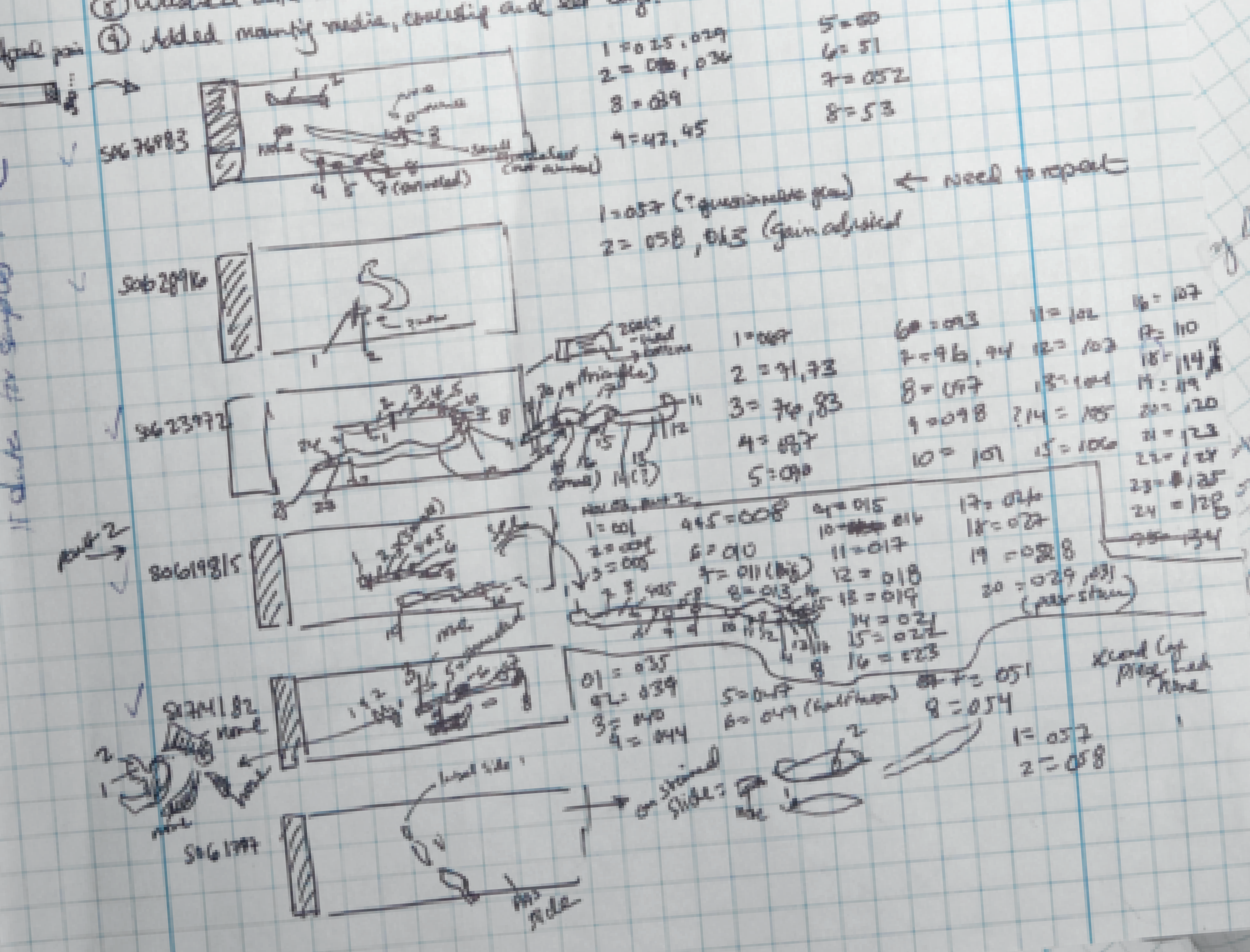
Continued IF staining for transplant study (4-9)

Samples done = S0628916 (21915), S06-76983 (23713), S06 23972 (22780), S06 19815 (21039)
S07 14182 (21670), S061977 ( ), PC, NC (from tox1 sample, 3 um)

Used same protocol as previous.

1. Baked O/N at 40-42°C and cleared with xylene
2. Hydrated in EtOH → H_2O as previously described
3. Antigen retrieval done using pressure cooker and 10mM citrate buffer (pH 6.0)
4. Let cool ~1.5hrs before adding 10% NGS to block for 1hr at RT
5. Add 1° Ab: WT-1 (rabbit) in 5% NGS diluted 1:250; 150ul/slide
   Leave O/N in 4° in humidified chamber
6. Remove, let equilibrate and wash with PBST using dropper 20 times
   Wash in PBS, 15min x2
7. Add 2° Ab: AF488 α-rabbit (donkey), 1:600 in PBS, Leave at RT for 1hr
8. Washed with PBST and PBS as in step 6.
9. Added mounting media, coverslip and let dry.

Images = 11/03/16



NC - 018, 019

2018 HIGHLIGHT

Active Research Programs in Urology and Nephrology Pave the Way to New Treatments

Our research program continues to attract funding for research initiatives aimed at discovering new diagnostic and treatment options for kidney disease.

"We have 29 studies enrolling patients and $10.8 million in combined funding for urology research from the National Institutes of Health, the National Kidney Foundation and corporate pharmaceutical sources," says urologist Daniel Shoskes, MD.

"Our research program in urology and nephrology spans from basic science to translational science to clinical trials," he continues. "Focus areas include research in bladder and prostate cancer, the impact of the microbiome on renal stone formation, and the development of new ambulatory techniques for urodynamics, as well as potential new treatments for kidney transplant rejection."

Focusing on kidney and urologic cancers

Dr. Shoskes adds that the new Center for Genitourinary Malignancies Research, headed by Dr. Nima Sharifi, aims to advance urologic cancer research through cross-institutional partnership. These research initiatives are expected to advance both the diagnostics and the treatment of kidney and urologic cancers.

"We are actively developing a new diagnostic blood test for prostate cancer called IsoPSA™, which correlates unique structural changes in prostate-specific antigen (PSA) protein with the presence or absence of cancer," Dr. Shoskes explains. In addition to improving diagnostic precision, IsoPSA has also been shown to differentiate patients at risk for high-grade disease.

The current research focus in urology extends to men with prostatitis and problems with premature ejaculation.

"One project is looking at molecular testing for non-culture-detectable bacteria using next-generation sequencing in men with chronic prostatitis/chronic pelvic pain syndrome, and another is testing low-intensity shockwave therapy for the treatment of erectile dysfunction and premature ejaculation," says Dr. Shoskes.

A precision medicine approach to kidney disease

On the nephrology side, we are one of a select number of U.S. institutions involved in the National Institute of Diabetes and Digestive and Kidney Diseases Kidney Precision Medicine Project (KPMP).

"The main goal of the KPMP is to do deep molecular phenotypes of kidney biopsy tissue from patients with chronic kidney disease (CKD) and integrate this information with clinical data with the hope of finding new strategies for the management and treatment of kidney disease," says John Sedor, MD. "We're focusing on patients with CKD due to diabetes and hypertension."

Together, Dr. Sedor, Emilio Poggio, MD, and John O'Toole, MD, lead our arm of the KPMP, which started in late 2018 and is expected to last at least 10 years.

The *APOL1* gene and its association with chronic and progressive kidney disease in African-Americans remains another active area of interest. Dr. Poggio and his colleagues are examining the impact of *APOL1* genetic variants present in organs from living and deceased kidney donors on kidney transplant recipient outcomes. This work complements the ongoing basic investigations in the Lerner Research Institute to identify the mechanisms by which *APOL1* causes progressive kidney diseases, in the laboratories of Drs. Sedor and O'Toole and Leslie Bruggeman, PhD, another faculty member working in this area.

2018 HIGHLIGHT

Building an Effective Safety Culture to Transform Dialysis Facilities

Close to 10 million people worldwide have kidney failure. Despite the critical nature of dialysis and the vast numbers of individuals who receive it, treatment methods have not changed much over time, and infection-related deaths remain a problem.

To help counter this trend, the American Society of Nephrology (ASN) partnered with the U.S. Centers for Disease Control and Prevention (CDC) to develop the Nephrologists Transforming Dialysis Safety (NTDS) Project to target zero infections in outpatient dialysis facilities.

Leading cultural change

Leslie Wong, MD, Vice Chair, Nephrology and Hypertension Department, Glickman Urological & Kidney Institute, chairs the Quality, Assessment, Improvement and Education (QAIE) Working Group of the NTDS. The goal is to engage nephrologists to take the lead in the cultural change necessary to transform the current state of infection prevention in dialysis facilities.

Studies have shown that advanced age, diabetes mellitus, hypertension, cardiovascular disease and higher body mass index are associated with chronic kidney disease. The five-year survival rate for dialysis patients is 35.8 percent, compared with 85.5 percent for transplant patients.

Among patients undergoing hemodialysis, hospitalizations for infection increased 43 percent since 1993. Only half of all patients who start hemodialysis are still living three years later, and infections cause or contribute to many of these deaths. In 2017, six of the top 10 citations given to dialysis facilities were related to infection control practices.

An effective safety culture is lacking

"The biggest problem is lack of an effective culture of safety in many dialysis facilities," says Dr. Wong. "Poor safety culture influences the level of commitment by nephrologists and dialysis staff to prevent dialysis infections.

"This is frequently manifested by deviations from infection prevention policies, staff taking shortcuts in infection control tasks, and fear of punishment that discourages reporting of behavior or errors leading to infections."

Dr. Wong's QAIE working group spearheaded several educational initiatives, including the first national webinar, and infection prevention symposia at the ASN Kidney Week meetings in 2017 and 2018. Additional initiatives involve developing educational tools and engaging national dialysis organizations about medical director leadership training and preparedness, applying the Virtual Mentor Dialysis Curriculum, and obtaining support from the CDC Making Dialysis Safer for Patients Coalition.

Cleveland Clinic treats about 560 chronic dialysis patients in 10 hemodialysis facilities and two home dialysis programs. Cleveland Clinic's dialysis program is managed by Fresenius Kidney Care through the Ohio Renal Care Group and participates in the 5-Diamond Patient Safety Program. The safety program is an online, national educational resource consisting of 18 modules to help dialysis facilities increase awareness of, promote and build a culture of patient safety.

LEFT — LESLIE WONG, MD

2018 HIGHLIGHT

Training the Next Generation of Urologists and Nephrologists

Our top-ranked residency and fellowship programs provide challenging clinical and research experiences, as well as a broad array of specializations.

The six-year Urology Residency Training Program integrates one year of general surgery/pre-specialty training, four years of clinical urology training and a dedicated research year. There is an emphasis on clinical and operative urology. Residents in each level participate in surgery — including open, laparoscopic, robotic and reconstructive surgery – gaining experience in prostate, bladder and kidney cancer surgeries. Residents also are integrated into the kidney transplant experience.

"The Urology Residency Training Program is among the few in the country to offer a dedicated year of research, providing opportunity for resident and fellow collaboration on clinical and basic science research projects," says Steven Campbell, MD, PhD, Director of the Urology Residency Program. Residents participate in a variety of challenging clinical experiences spanning the breadth of the discipline, including opportunities for basic, translational, clinical and outcomes research.

According to the Doximity Residency Navigator survey which includes peer nominations from board-certified U.S. physicians, our Urology Residency Training Program is the top program by reputation, research output and program size.

Opportunities in virtually every subspecialty

The Urology Fellowship Training Program provides opportunities in virtually every subspecialty, including Robotic & Laparoscopic Surgery, Stone Disease and Advanced Endourology, Female Pelvic Medicine and Reconstructive Surgery, Kidney/Pancreas Transplant, Male Genitourinary Reconstruction and Prosthetics, Male Infertility/Microsurgery/Andrology, Urologic Oncology and Voiding Dysfunction. Each integrates research and clinical training.

At the forefront of progress

The fellowship program is at the forefront of progress, with strong programs in all subspecialty areas. The Urology Fellowship Training Program provides challenging clinical experiences, as well as opportunities for basic, translational, clinical and outcomes research. Fellows actively collaborate with residents in clinical, didactic and research endeavors that often result in publications and meeting presentations.

Fellows can participate in weekly and monthly resident teaching conferences, including case presentations, morbidity and mortality conferences, journal club and subspecialty clinical conferences.

The Nephrology and Hypertension Fellowship Program is a two-year program that provides a strong experience in clinical nephrology that sets it apart from other academic centers. "Cleveland Clinic's diverse patient population comes from its status as a worldwide referral center, providing unique exposure to rare nephrological disorders that few training programs can offer," says Jonathan Taliercio, DO, Director of the Nephrology and Hypertension Fellowship Program. The department also has a large clinical database for population-based and disease-specific clinical research.

The nephrology program uses the latest innovations in education and evaluation, including milestone-based evaluation systems, simulated procedural training, simulated patient experiences and case-based learning.

LEFT — RATHIKA RAMKUMAR, MD

2018 HIGHLIGHT

First Prostate Surgery Performed in U.S. Using Single Port SP Robot

Cleveland Clinic is the first hospital in the country to successfully perform surgeries using the daVinci Single Port SP Robot, which inserts all surgical instruments through one small abdominal incision, improving surgical outcomes and allowing quicker patient recovery.

Next-generation robot used in three surgeries

On Sept. 28, Cleveland Clinic surgeons used the SP Robot to perform three surgeries — two surgeries to remove cancerous prostates and one surgery to remove an enlarged prostate blocking the urinary system through the bladder.

Jihad Kaouk, MD, Director of the Center for Robotic and Image-Guided Surgery in the Glickman Urologic & Kidney Institute, was the first to perform and publish on robotic single-port surgery in 2008 using standard robotic systems and coined the phrase R-LESS (robotic laparoendoscopic single-site) surgery.

After completing and publishing the first ever clinical use for the SP Robot in Europe, Dr. Kaouk and his team also performed last year's radical prostatectomies and transvesical simple prostatectomy at Cleveland Clinic. The new purpose-built robotic SP system will allow the single-port approach to be more feasible.

Making the previously impossible possible

"We anticipate that this new generation of robots will allow for new and different routes for surgeries that haven't previously been possible," Dr. Kaouk says. "For example, we can now go through a patient's perineum instead of their belly to perform prostate surgery and avoid touching the bowel, or work through the retroperitoneal space to perform kidney surgery without entering the abdomen, allowing for quicker recovery time."

Currently, the SP Robot is only FDA-approved for urologic surgeries, with plans to expand to ENT and colorectal surgeries in the near future.

"We are proud to offer this surgical approach and be on the forefront of surgical innovation," adds Mark A. Taylor, MD, Chairman of Surgical Operations at Cleveland Clinic.

Dr. Kaouk worked with the Intuitive Inc. team of engineers to test and improve the new robotic system. Dr. Kaouk is a paid consultant, speaker or member of the advisory committee for Endocare Inc. and Intuitive Surgical Inc.

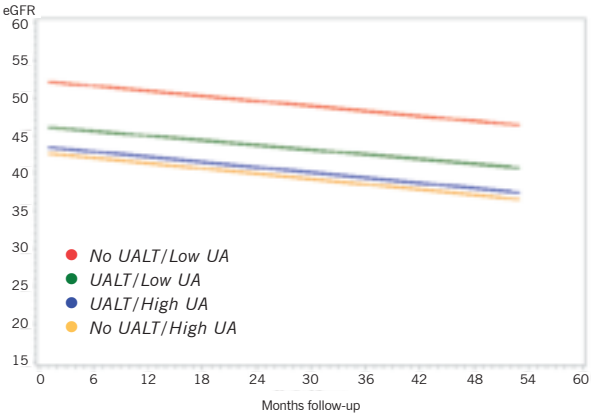
LEFT — JIHAD KAOUK, MD

2018 Achievements

Center for Blood Pressure Disorders

We are currently involved in a pilot project for remote home blood pressure monitoring in light of the new hypertension guidelines from the American College of Cardiology and American Heart Association. Instead of relying on a single snapshot of blood pressure during a clinic visit, the new guidelines note that managing hypertension optimally requires correct measurement of blood pressure and a reasonable knowledge of the patient's usual blood pressure trend. The guidelines also redefined hypertension as BP ≥ 130/80 mm Hg and revised the goal blood pressure to target BP < 130/80 in most patients. In addition, they strongly recommend out-of-office BP monitoring with either ambulatory blood pressure monitoring, the preferred method, or home blood pressure monitoring. Our project — which we plan to continue through 2019 and then review — provides patients with a home blood pressure device that automatically transmits home blood pressure readings to their Cleveland Clinic electronic health record and helps with ongoing assessment of blood pressure trends in the patients' usual environment. Changes in plan of care, including medication adjustments, can then be implemented sooner rather than having to wait until the patient's next scheduled clinic appointment. This approach brings more efficient and effective care for patients with hypertension.

Participating clinicians: Alison Heider, NP; Michelle Lard, NP; George Thomas, MD; Robert Heyka, MD



eGFR trajectories showing patients with low UA and UALT had a rate of eGFR decline similar to that of patients with high UA with or without UALT

Center for Chronic Kidney Disease

We successfully developed a patient navigator program and an enhanced personal health record to disseminate specific goals of care and education for patients with CKD. We then conducted a randomized clinical trial with 209 patients from six outpatient clinics in which we compared (1) enhanced personal health record only, (2) patient navigator only, (3) both and (4) usual care (control) group. There were no differences in eGFR decline and other outcomes among the study groups. We concluded that larger and long-term studies along with cost-effectiveness analyses are needed to evaluate the role of patient navigators and patient education through an enhanced personal health record in those with CKD. We also published a study looking at the impact of uric acid levels on kidney disease progression. Specifically, we examined the association of hyperuricemia — which is associated with the CKD progression although it is not known whether the relationship is causal — and uric acid-lowering therapy (UALT) with progression of CKD in patients with CKD 3 and 4. We found hyperuricemia is associated with increased risk of progression to ESRD in patients with CKD stages 3 and 4, but UALT does not ameliorate the risk, suggesting that the relationship is not causal.

Participating clinicians: Georges Nakhoul, MD; Hernon Rincon-Choles, MD; Stacey Jolly, MD; Susana Arrigain PhD; Michael Rothberg, MD; Jennifer Hyland, CNP; Priscilla Davis Dann, Joseph V. Nally, MD

Center for Dialysis

Infections are the second leading cause of death for patients on dialysis. To change this alarming statistic, the American Society of Nephrology created the Nephrologists Transforming Dialysis Safety (NTDS) initiative in 2016. Leslie Wong, MD, serves on the NTDS executive committee. The three-year CDC-funded program was designed to improve provider training, education, awareness and other factors that impact the dialysis infection rate. In its final year, the NTDS initiative is working with Virginia Tech scientists to investigate the role of human factors engineering in preventing infections. Dr. Wong presented on the NTDS initiative during two sessions at ASN Kidney Week 2018 in San Diego: "21st Century Killers: How Nephrologists Can Fight Back" and "Quality Is Job One: Improving Care for CKD and ESRD Patients." Also this year, Dr. Wong and Robert Heyka, MD, helped improve patient outcomes at eight dialysis centers in the Cleveland area. The table below shows the rating improvements, which are based on publicly reported quality measures.

CMS: Centers for Medicare & Medicaid Services. Full details of the CMS 5 Star Program can be found at medicare.gov/dialysisfacilitycompare/#.

Participating clinician: Leslie Wong, MD, MBA

Dialysis Facility Name	2013 CMS Star Rating (Baseline)	2014 CMS Star Rating	2015 CMS Star Rating	2016 CMS Star Rating	2014-2016 Average CMS Star Rating	Improvement Comparing 2014-2016 Average to 2013 Baseline
Cleveland Clinic Westside	2	4	5	4	4.3	2.3
Cleveland Clinic Eastside	2	4	5	4	4.3	2.3
North Randall	3	5	5	5	5.0	2.0
Euclid	3	5	5	5	5.0	2.0
Solon	3	5	5	3	4.3	1.3
East Cleveland	2	5	5	3	4.3	2.3
Westlake	2	3	3	3	3.0	1.0
Mentor	not available	not available	1	3	2.0	not available

Center for Endourology and Stone Disease

We have shown that noncontrast CT (NCCT) scan, obtained during a kidney stone workup, can contribute to a better understanding of patient comorbidities. This year we evaluated the impact of medical approaches to stone prevention — thiazides, citrates — on one of those comorbidities: bone mineral density (BMD). Our goal was to opportunistically utilize the NCCT scan used for stone detection to identify those with low BMD and follow the impact of potassium citrate and thiazides on longitudinal BMD measurements. We performed a retrospective analysis on 299 kidney stone patients treated with thiazides and/or potassium citrate for a minimum of one year. BMD was estimated at lumbar vertebrae L1 with CT attenuation measured in Hounsfield units (HU). A level of 160 HU was chosen to distinguish normal from low BMD.

Of the 299 patients, 186 (62.2 percent) had low BMD. After one year of treatment, 16.1 percent normalized, and 68 percent had an increase in HU. The mean change in HU was 8.6. Hydrochlorothiazide 50 mg was effective at improving BMD. Our study illustrated that stone health and bone health are synergistic and the impact of thiazides and citrates on BMD can be monitored opportunistically with the NCCT scan.

Participating clinicians: Nishant Patel, MD; Ryan Ward, MD; Juan Calle, MD; Erick Remer, MD; Manoj Monga, MD

Center for Female Pelvic Medicine and Reconstructive Surgery

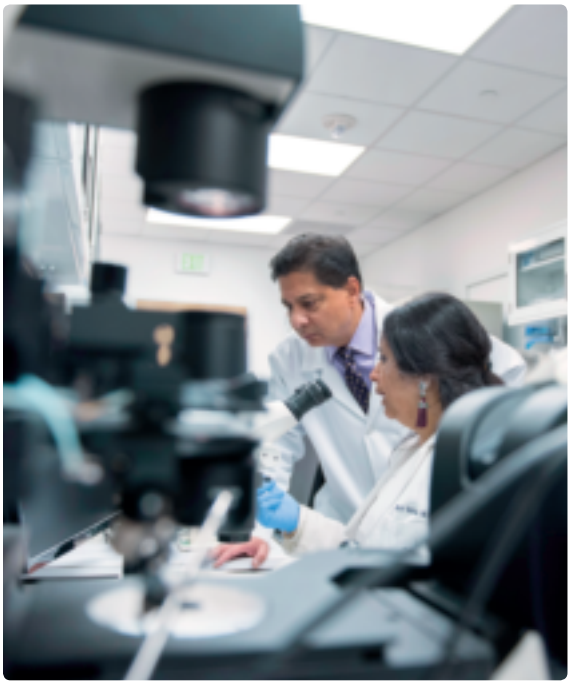
The Center for Female Pelvic Medicine and Reconstructive Surgery has been performing novel tibial neuromodulation therapies and is one of only a handful of centers performing an implantable tibial nerve treatment for refractory overactive bladder (OAB). The center is part of a multicenter study run by Bioness Inc. to evaluate this therapy in OAB patients. The aim is to see whether the treatment can help improve patient urinary incontinence and quality of life through an office-based intervention that carries better durability and compliance than currently available tibial nerve platforms.

Participating clinician: Sandip Vasavada, MD

Center for Genitourinary Reconstruction

At the 38th Congress of the Société Internationale d'Urologie in Seoul, Korea, Hadly Wood, MD, co-chaired a session on the basic tenets of the transition process in patients with congenital diseases, challenges surrounding care during adolescence, and long-term medical and surgical management. Also, this year our surgeons presented innovative surgical techniques for the treatment of prostatopubic fistula following laser photovaporization of the prostate for benign prostatic hyperplasia at the American Urological Association's annual meeting. Our experience in this area has now expanded to include a total of seven patients, the last five of whom have undergone surgical reconstruction with a robotic approach. This is one of the largest reported single-center series of this uncommon but very devastating problem. We also reported on our experience with cystectomy and urinary diversion for benign urological conditions and the impact of prior pelvic radiation therapy on outcomes. In May, we hosted international and national leaders from across the globe at the 1st Annual International Summit on Genitourinary Congenital Care. We also held our 14th Annual National Urology Resident Preceptorship in Adult and Pediatric Reconstructive Urology along with colleagues from Cleveland Clinic Children's and Rainbow Babies & Children's Hospital.

Participating clinicians: Kenneth Angermeier, MD; Hadley Wood, MD



Center for Male Fertility

Sarah Vij, MD, joined the professional staff, specializing in male infertility. She and Ashok Agarwal, PhD, evaluated the effect of antioxidant supplementation as a treatment of choice in patients with idiopathic male infertility. For a period of six months, they looked at the protein profile of sperm function proteins associated with fertility proteins before and after antioxidant supplementation. They found that antioxidant supplementation resulted in overexpression of key proteins responsible for spermatogenesis, sperm maturation, sperm binding, fertilization and normal reproductive function. In a different investigation, Dr. Agarwal found the impaired sperm mitochondrial function in varicocele patients is related to decreased expression of some key proteins (ATPase1A4, HSPA2, SPA17 and *APOA1*) responsible for proper sperm function. The antioxidant therapy targeting sperm mitochondria may be helpful in these patients. Finally, a study led by urology resident, Scott Lundy, MD, PhD, is examining the microbiome in the semen in men with infertility as compared with fertile controls. Since the underlying cause of male infertility is often unknown, this study may suggest the microbiome plays a role and can be targeted with therapy.

Participating clinicians: Sarah Vij, MD; Ashok Agarwal, PhD, Scott Lundy, MD

Center for Men's Health

This year we added more urologists, more technologies and more locations and hours. We have three new staff urologists. One treats BPH, erectile dysfunction and voiding dysfunction and is an expert on neuromodulation of bladder dysfunction in men. Another is an expert on stone disease and a laser treatment for BPH that allows the surgery to be done through the urethra without incisions in the abdomen for very large prostates. Finally, we have added a second surgeon who performs microscopic spermatic cord denervation for men with chronic testicular pain caused by the nerves supplying the testes.

In the area of BPH, we now provide the fullest range of surgical and minimally invasive therapies, including procedures done under local anesthetic in the office as well as those requiring the operating room. In the area of erectile dysfunction, we now offer low-intensity shockwave (LiSWL) therapy. This painless treatment stimulates the growth of new arteries within the penis, improves blood flow, and either eliminates the need for pills (such as Viagra®) or allows them to be effective again if they no longer work.

We continue to be national leaders in chronic prostatitis and chronic pelvic pain syndrome. Our unique multimodal approach to diagnosis and therapy continues to be highly effective. We currently have active clinical trials looking at the role of unculturable bacteria in producing symptoms and in using LiSWL to treat pelvic pain.

Participating clinician: Daniel Shoskes, MD

Center for Minority Men's Health

Health screenings, examinations and care that are both culturally competent and free can make a big difference in the lives of African-American and Hispanic men when it comes to chronic and advanced diseases. The Minority Men's Health Fair (MMHF) offers these services and has led to reduced healthcare costs and better outcomes for such patients. The health fair has helped uncover previously unrecognized cases of prostate, bladder and colorectal cancers, as well as diabetes, hypertension, hepatitis C, heart disease and other conditions.

In 2018, Waverly Willis, a Cleveland barber, served as an advocate for the MMHF. Mr. Willis credits the event with saving his life. In 2014, when he first attended the health fair, he took a free test that showed he had blood in his urine. That led to a diagnosis of large renal cell cancer, which was successfully treated with surgery. Mr. Willis' story highlights just one example of the significant impact of the health fair, a program sponsored each April by Cleveland Clinic's Minority Men's Health Center. Established in 2003, the health fair is now offered concurrently at three locations.

Participating clinician: Charles Modlin, MD, MBA

Center for Pediatric Urology

This year, using information gleaned from retrospectively evaluating outcomes from orchiopexy procedures in our center, we began to focus on a self-care approach to retractile testes cases. At least 33 percent of patients with retractile testes will eventually require orchiopexy due to what has been labeled a "gliding" testis or "secondary ascent." Therefore, all patients with retractile testes require annual follow-ups until puberty. During this time, there is a great deal of consternation, on behalf of both the primary care provider and the parents, regarding the location of the testis. With this in mind, we began focusing on the perception of the patients themselves. If a patient at 7 years or older presents with retractile testes, we ask the patient if he is aware of the location of his gonads. It is not uncommon for him to say that he does, indeed, know where they are and can demonstrate, in office, a brief testicular exam. If not, at this point, we will teach him how to do so. Within the next year, we ask that the patient check himself in the shower. If he is able to perform a testicular self-exam, then no surgical intervention is performed. If not, we then consider scrotal orchiopexy, given the low morbidity of the procedure. This is a practical approach and one we believe may, in fact, improve fertility potential if performed proactively.

Participating clinicians: Audrey C. Rhee, MD; and Jeffrey M. Donohoe, MD

Center for Renal Diseases

Cleveland Clinic continues its involvement in research into Alport syndrome, a rare genetic disease that causes kidney failure and hearing loss. After successful participation in the ATHENA trial, the department is currently enrolling in the CARDINAL trial, a phase 3 placebo-controlled trial using bardoxolone. James Simon, MD, is site principal investigator for all three trials.

Participating clinician: James Simon, MD

Center for Renal and Pancreas Transplant

The Kidney Transplant Program had a record year, experiencing a 27 percent increase in volume in 2018. A portion of that growth can be attributed to an increase in kidney swaps performed during the year. In February, our affiliate program in Charleston, West Virginia, performed its state's first kidney swap, and Cleveland Clinic kidney transplant surgeons completed the enterprise's first three-way kidney swap in May. Advocating living donor transplants and connecting patients with compatible donors benefited patients and supported program growth.

Participating clinicians: Alvin Wee, MD; Emilio Poggio, MD; David Goldfarb, MD; and Venkatesh Krishnamurthi, MD

Center for Robotic Surgery and Image-Guided Surgery

Jihad Kaouk, MD, Director of the Center for Robotic and Image-Guided Surgery, performed three surgeries at Cleveland Clinic using the daVinci Single Port SP Robot, a next-generation tool that inserts all surgical instruments through one small abdominal incision. This improves surgical outcomes and allows for faster patient recovery. Surgeons, for instance, can go through patients' perineums instead of their abdomens to perform prostate surgery and avoid touching the bowel. They can also work through the retroperitoneal space to perform kidney surgery without entering the abdomen, allowing for quicker recovery time. Currently, the SP Robot is only FDA-approved for urologic surgeries. Prior to this year's surgeries with the SP Robot — two radical prostatectomies and one transvesical simple prostatectomy — Dr. Kaouk had performed the first ever clinical use for the SP Robot in Europe in 2008, publishing a paper in 2014 in *European Urology*, describing the first clinical application of the SP Robot.

Participating clinicians: Jihad Kaouk, MD; Georges-Pascal Haber, MD, PhD; Ryan Berglund, MD; Khaled Fareed, MD; Amr Fergany, MD; Michael Gong, MD; Robert Stein, MD; and Andrew Stephenson, MD

Center for Urologic Oncology

Center physicians were once again very active this year at professional meetings. Eric Klein, MD, presented a late-breaking abstract at the American Urological Association (AUA) 2018 Annual Meeting, showing the IsoPSA test is more accurate for detecting high-grade prostate cancer than standard PSA tests — and could lead to substantially fewer biopsies. At the SWOG Cancer Research Network Fall 2018 Group Meeting, Steven Campbell, MD, PhD, presented a proposal on partial versus radical nephrectomy for localized kidney cancer with increased oncologic potential. And at the Society of Urologic Oncology 2018 AUA/Spring Meeting, Andrew Stephenson, MD, presented on risk stratification for active surveillance of prostate cancer. Dr. Stephenson was also a recipient of the Thomas Murray Family Endowed Chair. On the translational medicine front, Nima Sharifi, MD, continued as the principal investigator of a neoadjuvant trial of LHRH agonist therapy and apalutamide to assess for pathological response and molecular-histological endpoints based on a genotype of *HSD17B2* for men with high-risk prostate cancer undergoing radical prostatectomy. His lab also published several journal articles looking at the role of the *HSD3B1* gene in prostate cancer. Finally, Robert Abouassaly, MD, was awarded a Veterans Administration (VA) grant for which he will be the principal investigator for a study on establishing the quality of surgical care among VA patients with kidney cancer. Dr. Abouassaly also published a study looking at improved surgical outcomes following radical cystectomy at high-volume centers.

Participating clinicians: Steven Campbell, MD, PhD; Andrew Stephenson, MD; Eric Klein, MD; Nima Sharifi, MD; Robert Abouassaly, MD

Resources for Physicians

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Glickman Urological & Kidney Institute

The Glickman Urological & Kidney Institute is a world leader in treating complex urologic and kidney conditions in adults and children. It is ranked No. 1 in America for urology and No. 2 in nephrology by *U.S. News & World Report*. Our internationally recognized staff has pioneered laparoscopic and robotic surgical techniques and developed innovative procedures for urologic cancers and transplantation. We provide advanced management of kidney disease, hypertension, infertility and congenital malformations to help patients worldwide.

About Cleveland Clinic

Cleveland Clinic is a nonprofit, multispecialty academic medical center integrating clinical and hospital care with research and education for better patient care. More than 3,500 staff physicians and researchers in 140 medical specialties provide services through 27 clinical and special-expertise institutes. Cleveland Clinic comprises a main campus, 10 regional hospitals and more than 150 outpatient locations, with 18 family health centers and three health and wellness centers in northern Ohio, as well as medical facilities in Florida, Nevada, Toronto and Abu Dhabi, and opening in 2020, in London, England. *U.S. News & World Report* ranks Cleveland Clinic as the No. 2 hospital in the nation.

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Year in Review

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18-URL-4473

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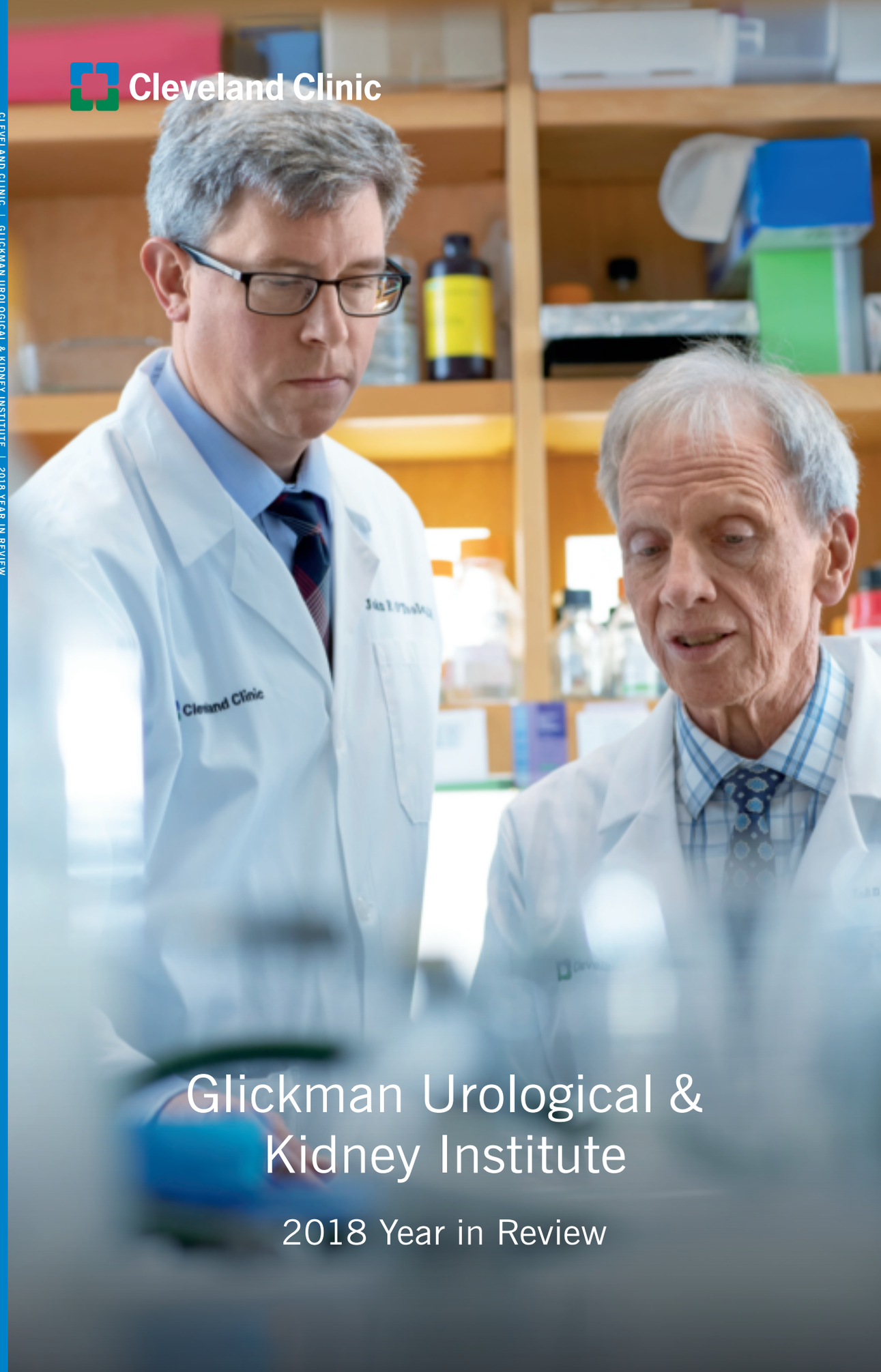

Glickman Urological & Kidney Institute

2018 Year in Review

Contents

ON THE COVER

John O'Toole, MD and John Sedor, MD.