Measuring Outcomes Promotes Quality Improvement
Measuring and understanding outcomes of medical treatments promotes quality improvement. Cleveland Clinic has created a series of Outcomes books similar to this one for its clinical institutes. Designed for a physician audience, the Outcomes books contain a summary of many of our surgical and medical treatments, with a focus on outcomes data and a review of new technologies and innovations.

The Outcomes books are not a comprehensive analysis of all treatments provided at Cleveland Clinic, and omission of a particular treatment does not necessarily mean we do not offer that treatment. When there are no recognized clinical outcome measures for a specific treatment, we may report process measures associated with improved outcomes. When process measures are unavailable, we may report volume measures; a relationship has been demonstrated between volume and improved outcomes for many treatments, particularly those involving surgical and procedural techniques.

In addition to these institute-based books of clinical outcomes, Cleveland Clinic supports transparent public reporting of healthcare quality data. The following reports are available to the public:

- Joint Commission Performance Measurement Initiative (qualitycheck.org)
- Centers for Medicare and Medicaid Services (CMS) Hospital Compare (HospitalCompare.hhs.gov), and Physician Compare (medicare.gov/PhysicianCompare)
- Cleveland Clinic Quality Performance Report (clevelandclinic.org/QPR)

Our commitment to transparent reporting of accurate, timely information about patient care reflects Cleveland Clinic’s culture of continuous improvement and may help referring physicians make informed decisions.

We hope you find these data valuable, and we invite your feedback. Please send your comments and questions via email to:

OutcomesBooksFeedback@ccf.org or scan here.

To view all of our Outcomes books, please visit clevelandclinic.org/outcomes.
Dear Colleague:

Welcome to this 2014 Cleveland Clinic Outcomes book. Every year, we publish Outcomes books for 14 clinical institutes with multiple specialty services. These publications are unique in healthcare. Each one provides an overview of medical or surgical trends, innovations, and clinical data for a particular specialty over the past year. We are pleased to make this information available.

Cleveland Clinic uses data to manage outcomes across the full continuum of care. Our unique organizational structure contributes to our success. Patient services at Cleveland Clinic are delivered through institutes, and each institute is based on a single disease or organ system. Institutes combine medical and surgical services, along with research and education, under unified leadership. Institutes define quality benchmarks for their specialty services and report on longitudinal progress.

All Cleveland Clinic Outcomes books are available in print and online. Additional data are available through our online Quality Performance Report (clevelandclinic.org/QPR). The site offers process measure, outcome measure, and patient experience data in advance of national and state public reporting sites.

Our practice of releasing annual outcomes books has become increasingly relevant as healthcare transforms from a volume-based to a value-based system. We appreciate your interest and hope you find this information useful and informative.

Sincerely,

Delos M. Cosgrove, MD
CEO and President
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Prefer an e-version?
Visit clevelandclinic.org/OutcomesOnline, and we’ll remove you from the hard copy mailing list and email you when next year’s books are online.
Chairman’s Letter

Dear Colleagues,

The Respiratory Institute is pleased to present the 11th edition of our Outcomes book. This book provides a concise overview of our clinical activities and programs, with a focus on patient outcomes.

At Cleveland Clinic, patients with respiratory diseases and allergic disorders benefit from the expertise of a multidisciplinary team consisting of clinicians who specialize in pulmonary medicine, critical care medicine, and allergy and clinical immunology, all working in close collaboration with thoracic surgeons, thoracic radiologists, and pulmonary pathologists. In 2014 we experienced continued growth in our clinical programs, research funding, and application of innovative technologies. The collaboration among clinicians and researchers helps close the gap between the laboratory discoveries of today and the patient care of tomorrow.

Recent innovations that are already enhancing clinical practice include:

• 3-D printing to manufacture customized airway stents
• Mass spectrometry to analyze patterns in exhaled breath ("breathprints") to diagnose and monitor systemic diseases, such as liver dysfunction and heart failure

Furthermore, our research finding that inhibition of TRPV4 (a calcium channel-permeable ion channel in the cell membrane) reduces pulmonary fibrosis in an animal model suggests future therapeutic approaches to a currently life-threatening condition, idiopathic pulmonary fibrosis.

We welcome your feedback, questions, and ideas for collaboration. Please contact me via email at OutcomesBooksFeedback@ccf.org and reference the Respiratory Institute book in your message.

Sincerely,

Herbert P. Wiedemann, MD, MBA
Chairman, Respiratory Institute
Institute Overview

The Respiratory Institute is regarded as one of the top respiratory centers in the nation, uniting specialists from the departments of Pulmonary Medicine, Critical Care Medicine, and Allergy and Clinical Immunology in the diagnosis and management of the full spectrum of respiratory and allergic disorders. In 2014, U.S. News & World Report’s “Best Hospitals” survey ranked Cleveland Clinic No. 3 in the nation for pulmonology services.

At the Respiratory Institute, patients with breathing disorders benefit from the expertise of 100 physicians, 41 fellows, 18 physician assistants, and 13 nurse practitioners. A multidisciplinary team of physicians is available for collaboration, including specialists from Thoracic and Cardiovascular Surgery, Thoracic Imaging, and Pulmonary Pathology.

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total visits</td>
<td>146,933</td>
</tr>
<tr>
<td>Interstitial lung disease visits</td>
<td>1839</td>
</tr>
<tr>
<td>Pulmonary arterial hypertension visits</td>
<td>2168</td>
</tr>
<tr>
<td>Sarcoidosis visits</td>
<td>3214</td>
</tr>
<tr>
<td>Lung cancer visits</td>
<td>1176</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease visits</td>
<td>11,583</td>
</tr>
<tr>
<td>Total hospital admissions</td>
<td>2340</td>
</tr>
<tr>
<td>Research funding</td>
<td>$10.8 million</td>
</tr>
<tr>
<td>Research grants/contracts</td>
<td>68</td>
</tr>
<tr>
<td>Lung transplants (includes heart/lung and liver/lung)</td>
<td>106</td>
</tr>
<tr>
<td>Bronchoscopies</td>
<td>3619</td>
</tr>
</tbody>
</table>
The Respiratory Institute manages and staffs the Medical Intensive Care Unit (MICU) at Cleveland Clinic. The unit has seen a steady increase in patient volume over the past 8 years and now has 64 dedicated beds. The unit is staffed by board-certified intensivists, who have been providing in-house coverage 24 hours a day since July 2008. Patient outcomes continue to be excellent, as exhibited by mortality rates below the risk-adjusted predicted values, improving infection rates, and low readmission rates.

Mean APACHE® IV Score and Standardized Mortality Ratio (Observed to Expected)

Cleveland Clinic’s APACHE IV mean score of 67 for 2014 is well above the benchmark of 54 from a large adult population that reflects the current practice of critical care in the United States.¹ The APACHE IV is used to risk-adjust the Respiratory Institute’s population of critical care patients.

Reference

Admissions to the MICU grew 7% compared with 2013, reaching 4549 patients in 2014. Direct interhospital transfers accounted for 27% of total MICU admissions. The percentage of direct emergency department admissions increased compared with the previous year, reaching 44% of the total unit admissions. Occupancy has remained above 92% throughout the year. MICU length of stay remained stable and was less than predicted by almost a day. Readmission rates within 48 hours of ICU discharge have remained below 2%.
Infection rates at Cleveland Clinic, including in the MICU, continue to decrease despite increased patient volumes and high acuity. The percentiles shown in the graphs are taken from the National Healthcare Safety Network report data summary for 2012.¹

**MICU Central Line-Associated Bloodstream Infections**

*2009 – 2014*

**Rate (per 1000 Line Days)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

CDC/NHSN 25th to 75th percentile

²Centers for Disease Control and Prevention’s National Healthcare Safety Network

**MICU Nosocomial Ventilator-Associated Pneumonia**

*2009 – 2014*

**Rate (per 1000 Vent Days)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>2.3</td>
<td>2.2</td>
<td>2</td>
<td>1</td>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

CDC/NHSN 25th to 75th percentile

²Centers for Disease Control and Prevention’s National Healthcare Safety Network

**Reference**


Outcomes 2014
No accepted benchmark exists for unit-acquired *C. difficile*.


Rate (per 1000 Catheter/days)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate (per 1000 Catheter/days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4.0</td>
</tr>
<tr>
<td>2014</td>
<td>2.3</td>
</tr>
</tbody>
</table>

CDC/NHSN 25th to 75th percentile

aCenters for Disease Control and Prevention’s National Healthcare Safety Network


Rate (per 1000 Patient Days)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate (per 1000 Patient Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0.5</td>
</tr>
<tr>
<td>2010</td>
<td>1.0</td>
</tr>
<tr>
<td>2011</td>
<td>1.5</td>
</tr>
<tr>
<td>2012</td>
<td>1.0</td>
</tr>
<tr>
<td>2013</td>
<td>1.5</td>
</tr>
<tr>
<td>2014</td>
<td>1.7</td>
</tr>
</tbody>
</table>

No accepted benchmark exists for unit-acquired *C. difficile*.
Cleveland Clinic’s Respiratory Institute provides a full range of advanced diagnostic and interventional bronchoscopy techniques. The institute has some of the world’s most extensive experience with:

- Electromagnetic navigation
- Lung transplant-related airway disease
- Airway stenting
- Management of airway complications due to histoplasmosis
- Benign airway diseases
- Metallic stent removal

Staff physicians performed 3797 bronchoscopies during 2014. Most important, the institute’s complication rates remain low.

<table>
<thead>
<tr>
<th>Selected Procedure Volumes 2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transbronchial lung biopsy</td>
<td>1229</td>
</tr>
<tr>
<td>Transbronchial needle aspiration</td>
<td>1057</td>
</tr>
<tr>
<td>Endobronchial ultrasound (EBUS)</td>
<td>934</td>
</tr>
<tr>
<td>Electrocautery/laser/cryoablation</td>
<td>309</td>
</tr>
<tr>
<td>Electromagnetic navigation</td>
<td>158</td>
</tr>
<tr>
<td>Balloon/rigid airway dilation</td>
<td>290</td>
</tr>
<tr>
<td>Bronchial/tracheal stenting/T-tube</td>
<td>224</td>
</tr>
<tr>
<td>Bronchial thermoplasty</td>
<td>23</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4224</strong></td>
</tr>
</tbody>
</table>

Total includes multiple advanced procedures per case.
The postbronchoscopy complication rate is lower than expected based on published averages.\textsuperscript{1,2} Complications not listed individually, but included in the total, such as arrhythmias, procedure-related respiratory failure, airway trauma, and aspiration, among others, demonstrate the need for a higher level of care after procedures. All bleeding is reported if it requires intraprocedural management, even if it does not require a change in level of care, blood transfusion, or another procedure such as bronchial artery embolization.

**References**


Asthma control can be assessed by using validated instruments, including the Asthma Control Test\textsuperscript{TM} (ACT). The ACT includes 5 questions that assess daytime symptoms, nighttime symptoms, reliance on as-needed “rescue” medication, the effect of asthma on everyday functioning, and patient assessment of control, with each of these 5 responses scored on a 1 to 5 scale. Higher scores reflect improved asthma control, a major objective of asthma management.

The ACT has been routinely used at Cleveland Clinic’s Asthma Center for more than 10 years. All asthma patients complete the ACT when seen at initial and follow-up visits.

The 2014 data are being reported in the context of a quality measure. The American Academy of Allergy, Asthma, and Immunology Qualified Clinical Data Registry (QCDR), developed in collaboration with CECity\textsuperscript{1,2} was recently approved by the Centers for Medicare and Medicaid Services. The QCDR qualifies as a reporting tool for the Physician Quality Reporting System for 2014.\textsuperscript{2} The measure addresses the proportion of asthma patients whose asthma was either poorly or not well controlled, as indicated by an ACT score below 20 at baseline, who achieve an improvement of 3 or more at a subsequent visit during a 12-month period. An increase of 3 has been shown to be the minimal important difference for the ACT.\textsuperscript{3}

### Change in ACT Scores for Patients With Poorly or Not Well Controlled Asthma at Initial Visit (N = 184)

#### 2014

<table>
<thead>
<tr>
<th>Mean ACT Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

**Patient Visits**

0 1 2 3 4 5 6 7 8 9 10 11 12

Initial Follow-Up

#### References


Of 239 asthma patients who completed the ACT at initial and follow-up visits in 2014, 77% (184) were poorly or not well controlled at their initial visit. An improvement in asthma control, as reflected in mean ACT scores, was observed at follow-up visits for these patients, 68% of whom demonstrated an improvement in ACT scores of at least 3.

These data offer evidence that care at the Asthma Center provides value and leads to improved asthma outcomes.1

Reference

Cleveland Clinic has one of the highest-volume lung and heart-lung transplant programs in the United States. It is the leading center in Ohio.

**Lung Transplant Procedures, Volume and Type**

2010 – 2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Heart-lung</th>
<th>Double lung</th>
<th>Single lung</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>122</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>2011</td>
<td>111</td>
<td>80</td>
<td>21</td>
</tr>
<tr>
<td>2012</td>
<td>104</td>
<td>122</td>
<td>23</td>
</tr>
<tr>
<td>2013</td>
<td>101</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>2014</td>
<td>106</td>
<td>20</td>
<td>60</td>
</tr>
</tbody>
</table>

Cleveland Clinic surgeons performed the second-largest number of lung transplants in the United States in 2014 — 106 transplants, which includes 2 heart-lung transplants.

**Primary Disease of Lung Transplant Recipients (N = 104)\(^a\)**

July 2013 – June 2014

<table>
<thead>
<tr>
<th>Disease Description</th>
<th>N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idiopathic pulmonary fibrosis</td>
<td>70 67%</td>
</tr>
<tr>
<td>Emphysema/chronic obstructive pulmonary disease</td>
<td>15 15%</td>
</tr>
<tr>
<td>Other</td>
<td>19 18%</td>
</tr>
</tbody>
</table>

Idiopathic pulmonary fibrosis was the most common primary disease among patients who had lung transplant procedures at Cleveland Clinic in 2014.

\(^a\)These data include only patients who had lung transplants. It excludes the 2 heart-lung transplant procedure performed in 2014.

Source: Scientific Registry of Transplant Recipients, December 2014. srtr.org
Patients who undergo lung transplantation at Cleveland Clinic have survival rates as expected and not statistically different from national rates.

Expected survival rate based on risk adjustment.

Source: Scientific Registry of Transplant Recipients, December 2014. srtr.org

The median wait time for lung transplantation at Cleveland Clinic is shorter than in the region as well as throughout the United States.

Source: Scientific Registry of Transplant Recipients, December 2014. srtr.org

Ambulatory ECMO

Extracorporeal membrane oxygenation (ECMO), used in very ill patients to add oxygen to and remove carbon dioxide from the blood, can provide a life-sustaining “bridge” to transplantation for patients on the wait-list.

Traditionally, ECMO requires the patient to stay in bed. This causes the muscles to weaken, and patients become less likely to be eligible for transplantation.

Cleveland Clinic is aggressively developing ambulatory ECMO technology to improve transplant candidacy, save lives, and improve outcomes.
The Pulmonary Vascular Program at Cleveland Clinic consists of a team of 6 pulmonary and critical care physicians, 2 cardiologists, 2 advanced practice nurses, 2 research nurse coordinators, and research fellows who collaborate closely with Cardiology, Cardiothoracic Surgery, and Lung Transplant providers. As part of Cleveland Clinic, the Pulmonary Vascular Program is able to draw on expertise in hepatology, liver transplantation, sleep medicine, and rheumatology. Cleveland Clinic has active clinical and research programs for all types of pulmonary hypertension, including idiopathic pulmonary arterial hypertension (previously known as primary pulmonary hypertension), chronic thromboembolic pulmonary hypertension, portopulmonary hypertension, and pulmonary hypertension associated with the scleroderma spectrum of diseases and other connective tissue diseases.

Physicians and nurses in the Pulmonary Vascular Program have special expertise and interest in pulmonary hypertension and are dedicated to the evaluation and care of pulmonary hypertension patients. All new and difficult cases are discussed in weekly multidisciplinary group meetings. Patients are treated with various intravenous, oral, inhaled, or combination therapies.

Another active program is surgical thromboendarterectomy for patients with chronic thromboembolic pulmonary hypertension, adult congenital heart disease, and hereditary hemorrhagic telangiectasia.

Clinicians in the program have several ongoing investigator-initiated research projects aimed at understanding the pathobiology of pulmonary hypertension. Cleveland Clinic is also participating in several multicenter clinical trials evaluating new therapies. Many patients referred to the Pulmonary Vascular Program benefit from enrollment in one or more of these ongoing clinical trials and research studies.
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**Actual and Predicted Survival of Patients With Pulmonary Category I Arterial Hypertension (N = 811)**

2014

![Survival Curve Graph](image)

The graph shows the survival curve for patients with category 1 pulmonary arterial hypertension enrolled in the Cleveland Clinic Pulmonary Hypertension Registry, compared with their predicted survival based on the NIH registry equation from the 1980s and a contemporary French registry. For both comparisons, Cleveland Clinic patients had better than expected survival. For example, actual 3-year survival for Cleveland Clinic patients was 67.0%, compared with 51.3% predicted by the NIH formula and 56.9% predicted by the French formula.

**References**


Chronic Thromboembolic Pulmonary Hypertension (CTEPH)

Pulmonary hypertension due to unresolved pulmonary emboli that narrow pulmonary arteries, also known as chronic thromboembolic pulmonary hypertension (CTEPH), is a deadly disease that can be effectively treated with a complex surgical procedure called pulmonary thromboendarterectomy (PTE). Cleveland Clinic has a multidisciplinary team dedicated to the evaluation and treatment of CTEPH patients. The team includes clinicians from Pulmonary Medicine, Cardiothoracic Surgery, Nuclear Medicine, Chest Radiology, Interventional Radiology, Cardiovascular Medicine, Anesthesiology, and Critical Care Medicine.

Over the past 20 years, a total of 150 PTE surgeries have been performed at Cleveland Clinic. Between 1995 and 2010, operative mortality was 11.6%. Between 2011 and 2014, volumes doubled and operative mortality decreased to 4.7%, a rate comparable to current published literature.¹,²

**Pulmonary Thromboendarterectomy Experience (N = 150)**

1995 – 2014

**Number of Patients**

For the 64 patients operated on between 2011 and 2014, hemodynamic data show normalization of pulmonary vascular resistance.

**References**


Hemodynamics Before and After PTE (N = 64)
2011 – 2014

<table>
<thead>
<tr>
<th></th>
<th>Preop Median (25th, 75th percentiles)</th>
<th>Postop Median (25th, 75th percentiles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean PAP, mm Hg</td>
<td>45 (39, 55)</td>
<td>25 (22, 31)</td>
</tr>
<tr>
<td>CI, L/min/m²</td>
<td>2.2 (1.8, 2.6)</td>
<td>2.9 (2.6, 3.3)</td>
</tr>
<tr>
<td>PVR, Wood units</td>
<td>6.2 (4.9, 10.1)</td>
<td>2.4 (1.8, 3.1)</td>
</tr>
</tbody>
</table>

CI = cardiac index, PAP = pulmonary artery pressure, PVR = pulmonary vascular resistance

Not only are hemodynamic results remarkable and operative mortality low, but long-term outcomes are excellent, with a 5-year survival rate of 87.4%, compared to 63.3% for patients treated with medical therapies (P = 0.04).

PTE vs Medical Therapy
2009 – 2014

Transplant-Free Survival

Number at Risk

<table>
<thead>
<tr>
<th></th>
<th>PTE</th>
<th>Medical Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>70</td>
<td>31</td>
</tr>
<tr>
<td>1</td>
<td>66</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>49</td>
<td>27</td>
</tr>
<tr>
<td>3</td>
<td>34</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>
Pneumonia All-Cause 30-Day Mortality and All-Cause 30-Day Readmissions
July 2011 – June 2014

The Centers for Medicare & Medicaid Services (CMS) calculates 2 pneumonia outcomes measures based on Medicare claims and enrollment information. The most recent risk-adjusted data available from CMS are shown. CMS ranks Cleveland Clinic’s pneumonia mortality as “no different than” the US national rate. Cleveland Clinic’s pneumonia readmission rate is ranked “worse than” the US national rate. To further reduce avoidable readmissions, Cleveland Clinic is focused on optimizing transitions from hospital to home or postacute facility. Specific initiatives have been implemented to ensure effective communication, education, and follow-up.

N = 269 326

Source: medicare.gov/hospitalcompare
CMS calculates 2 COPD outcomes measures based on Medicare claims and enrollment information. The most recent risk-adjusted data available from CMS are shown. Although Cleveland Clinic’s COPD patient mortality rate is lower than the US national rate, CMS ranks Cleveland Clinic’s performance as “no different than” the US national rate. Cleveland Clinic’s COPD readmissions rate is slightly higher than the US national rate and also ranked by CMS as “no different than” the US national rate. To further reduce avoidable readmissions, Cleveland Clinic is focused on optimizing transitions from hospital to home or postacute facility. Specific initiatives have been implemented to ensure effective communication, education, and follow-up.

COPD = chronic obstructive pulmonary disease

*aSource: medicare.gov/hospitalcompare*
Cleveland Clinic is dedicated to delivering excellent clinical outcomes surrounded by the best possible experience for patients and their families. Reported patient experiences are shared with caregivers and used to identify opportunities to improve care. Cleveland Clinic’s Office of Patient Experience supports caregivers through education and guidance to help them deliver consistent, patient-centered care.

**Outpatient Office Visit Survey — Respiratory Institute**

**CG-CAHPS Assessment**

2013 – 2014

**Percent Best Response**

<table>
<thead>
<tr>
<th>Metric</th>
<th>2013 (N = 631)</th>
<th>2014 (N = 1502)</th>
<th>CG-CAHPS 2013 database average (all practices)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment Access (% Always)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor Communication (% Yes, Definitely)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor Rating (% 9 or 10) 0 – 10 Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clerical Staff (% Yes, Definitely)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Results Communication (% Yes)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*a*In 2013, Cleveland Clinic began administering the Clinician and Group Practice Consumer Assessment of Healthcare Providers and Systems surveys (CG-CAHPS), standardized instruments developed by the Agency for Healthcare Research and Quality and supported by the Centers for Medicare & Medicaid Services for use in the physician office setting to measure patients’ perspectives of outpatient care.

*b*Based on results submitted to the CG-CAHPS database from 2172 medical practices in 2013.

*c*Response options: Always, Usually, Sometimes, Never

*d*Response options: Yes, definitely; Yes, somewhat; No

*e*Response options: Yes, No

Source: Press Ganey, a national hospital survey vendor
Inpatient Survey — Respiratory Institute

HCAHPS Overall Assessment
2013 – 2014

The Centers for Medicare & Medicaid Services requires United States hospitals that treat Medicare patients to participate in the national Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, a standardized tool that measures patients’ perspectives of hospital care. Results collected for public reporting are available at medicare.gov/hospitalcompare.

HCAHPS Domains of Care
2013 – 2014

*aBased on national survey results of discharged patients, January 2013 – December 2013, from 4067 US hospitals. medicare.gov/hospitalcompare

bResponse options: Definitely yes, Probably yes, Probably no, Definitely no

Source: Press Ganey, a national hospital survey vendor

*aBased on national survey results of discharged patients, January 2013 – December 2013, from 4067 US hospitals. medicare.gov/hospitalcompare

bBased on national survey results of discharged patients, January 2013 – December 2013, from 4067 US hospitals. medicare.gov/hospitalcompare
Overview

Cleveland Clinic health system uses a systematic approach to performance improvement while simultaneously pursuing 3 goals: improving the patient experience of care (including quality and satisfaction), improving population health, and reducing the cost of healthcare. The following measures are examples of 2014 focus areas in pursuit of this 3-part aim. Throughout this section, “Cleveland Clinic” refers to the academic medical center or “main campus,” and those results are shown.

Real-time dashboard data are leveraged in each Cleveland Clinic location to drive performance improvement. Although not an exact match to publicly reported data, more timely internal data create transparency at all organizational levels and support improved care in all clinical locations.

Improve the Patient Experience of Care

Cleveland Clinic Overall Mortality
Observed/Expected Ratio
2013 – 2014

Cleveland Clinic has implemented several strategies to reduce central line-associated bloodstream infections (CLABSI), including a central-line bundle of insertion, maintenance, and removal best practices. Focused reviews of every CLABSI occurrence support reductions in CLABSI rates in the high-risk critical care population.

Source: Data from the UHC Clinical Data Base/Resource Manager™ used by permission of UHC. All rights reserved.

Cleveland Clinic’s observed/expected (O/E) mortality ratio outperformed its internal target derived from the University HealthSystem Consortium (UHC) 2014 risk model. Ratios less than 1.0 indicate mortality performance “better than expected” in UHC’s risk adjustment model.
Improved screening, risk adjustment, and prevention strategies have supported Cleveland Clinic's continued improvement with respect to perioperative pulmonary embolism and deep vein thrombosis (AHRQ Patient Safety Indicator 12). Embolism/thrombosis prevention remains a safety priority for Cleveland Clinic in 2015.

A pressure ulcer is an injury to the skin that can be caused by pressure, moisture, or friction. These sometimes occur when patients have difficulty changing position on their own. Cleveland Clinic caregivers have been trained to provide appropriate skin care and regular repositioning help while taking advantage of special devices and mattresses to reduce pressure for high-risk patients. In addition, they actively look for hospital-acquired pressure ulcers and treat them quickly if they occur.
Cleveland Clinic is dedicated to delivering excellent clinical outcomes surrounded by the best possible experience for patients and their families. Reported patient experiences are shared with caregivers and used to identify opportunities to improve care. Cleveland Clinic’s Office of Patient Experience supports caregivers through education and guidance to help them deliver consistent, patient-centered care.

Outpatient Office Visit Survey — Cleveland Clinic

CG-CAHPS Assessmenta
2013 – 2014

Best Response (%)

<table>
<thead>
<tr>
<th>Service</th>
<th>2013 (N = 64,792)</th>
<th>2014 (N = 124,521)</th>
<th>CG-CAHPS 2013 database average (all practices)b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment Access (always)c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Care (always)c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialty Care (always)c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor Communication (yes, definitely)d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor Rating (9 or 10) 0–10 Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clerical Staff (yes, definitely)d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Results Communication (% yes)e</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aIn 2013, Cleveland Clinic began administering the Clinician and Group Practice Consumer Assessment of Healthcare Providers and Systems surveys (CG-CAHPS), standardized instruments developed by the Agency for Healthcare Research and Quality (AHRQ) and supported by the Centers for Medicare & Medicaid Services for use in the physician office setting to measure patients’ perspectives of outpatient care.

bBased on results submitted to the AHRQ CG-CAHPS database from 2172 practices in 2013

cResponse options: Always, Usually, Sometimes, Never

dResponse options: Yes, definitely; Yes, somewhat; No

eResponse options: Yes, No

Source: Press Ganey, a national hospital survey vendor
The Centers for Medicare & Medicaid Services requires United States hospitals that treat Medicare patients to participate in the national Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, a standardized tool that measures patients’ perspectives of hospital care. Results collected for public reporting are available at medicare.gov/hospitalcompare.

Inpatient Survey — Cleveland Clinic

HCAHPS Overall Assessment
2013 – 2014

Best Response (%)

Hospital Rating (Best Response)
0 – 10 Scale

Recommend Hospital (Best Response)

2013 (N = 10,730)
2014 (N = 10,369)

National average all patients

Based on national survey results of discharged patients, January 2013 – December 2013, from 4067 US hospitals. medicare.gov/hospitalcompare

Response options: Definitely yes, Probably yes, Probably no, Definitely no

Source: Press Ganey, a national hospital survey vendor

HCAHPS Domains of Care
2013 – 2014

Best Response (%)

Discharge Information
Doctor Communication
Nurse Communication
Pain Management
Room Clean
New Medications Communication
Responsiveness to Needs
Quiet at Night

% Always (% 9 or 10)

2013 (N = 10,730)
2014 (N = 10,369)

National average all patients

Except for “Room Clean” and “Quiet at Night,” each bar represents a composite score based on responses to multiple survey questions.

Source: Press Ganey, a national hospital survey vendor

Based on national survey results of discharged patients, January 2013 – December 2013, from 4067 US hospitals. medicare.gov/hospitalcompare
Focus on Value

Cleveland Clinic is developing and implementing new models of care that focus on “Patients First” and aim to deliver on the Institute of Medicine goal of Safe, Timely, Effective, Efficient, Equitable, Patient-centered care. Creating new models of Value-Based Care is a strategic priority for Cleveland Clinic. As care delivery shifts from fee-for-service to a population health and bundled payment delivery system, Cleveland Clinic is focused on concurrently improving patient safety, outcomes, and experience.

What does this new model of care look like?

- The Cleveland Clinic Integrated Care Model (CCICM) is a value-based model of care, designed to improve outcomes while reducing cost. It is designed to deliver value in both population health and specialty care.
- The patient remains at the heart of the CCICM.
- The blue band represents the care system, which is a seamless pathway that patients move along as they receive care in different settings. The care system represents integration of care across the continuum.
- Critical competencies are required to build this new care system. Cleveland Clinic is creating disease- and condition-specific care paths for a variety of procedures and chronic diseases. Another facet is implementing comprehensive care coordination for high-risk patients to prevent unnecessary hospitalizations and emergency department visits. Efforts include managing transitions in care, optimizing access and flow for patients through the CCICM, and developing novel tactics to engage patients and caregivers in this work.
- Measuring performance around quality, safety, utilization, cost, appropriateness of care, and patient and caregiver experience is an essential component of this work.
Improve Population Health

Select Accountable Care Organization Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cleveland Clinic 2014 Performance (%)</th>
<th>Cleveland Clinic Goala (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumococcal vaccination</td>
<td>84.9</td>
<td>100</td>
</tr>
<tr>
<td>Colorectal cancer screening</td>
<td>72.3</td>
<td>100</td>
</tr>
<tr>
<td>Mammography screening</td>
<td>77.5</td>
<td>≥ 99.6</td>
</tr>
<tr>
<td>Hemoglobin A1c &gt; 9%</td>
<td>20.5</td>
<td>≤ 10b</td>
</tr>
<tr>
<td>Hypertension control</td>
<td>69.3</td>
<td>≥ 79.7</td>
</tr>
</tbody>
</table>

a2015 ACO 90th percentile
bLower is better

As part of Cleveland Clinic’s commitment to population health and in support of its newly certified Accountable Care Organization (ACO), these primary care ACO measures have been prioritized for monitoring and improvement. Cleveland Clinic is improving performance in these measures through enhanced care coordination, optimizing technology and information systems, and engaging primary care physicians and specialists directly in the improvement work. These pursuits are part of Cleveland Clinic’s overall strategy to transform care in order to improve health and make care more affordable.

Reduce the Cost of Care

Cleveland Clinic All-Cause 30-Day Readmission Rate to Any Cleveland Clinic Hospital

2013 – 2014

<table>
<thead>
<tr>
<th>Percent of Discharges</th>
<th>Case Mix Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
</tr>
</tbody>
</table>

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4

Cleveland Clinic rate
Cleveland Clinic CMI
UHC academic medical centers CMI

N*a = 2013 52,104
      2014 50,755

CMI = case mix index
aTotal discharges

Source: Data from the UHC Clinical Data Base/Resource Manager™ used by permission of UHC. All rights reserved.

Cleveland Clinic monitors 30-day readmission rates for any reason to any of its system hospitals. Unplanned readmissions are actively reviewed for improvement opportunities. Strategies associated with communication, education, and follow-up have been implemented for several high-risk conditions, including heart failure and pneumonia. These practices are being expanded and enhanced to reduce overall avoidable readmissions. Sicker, more complex patients are more susceptible to readmission. Case mix index (CMI) reflects patient severity of illness and resource utilization. Cleveland Clinic’s CMI remains one of the highest among American academic medical centers.
Customized Airway Stents

Stenting of the central airways is an important therapeutic and palliative intervention used for a variety of malignant and benign disorders. Even after decades of innovations in stent technology, challenges remain, largely related to anatomic variations in the size and configuration of airways among patients as well as the particular specifications dictated by the underlying disease process. Airway reconstruction imaging software and 3-dimensional printers offer the ability to design an ideal stent for each patient/disease combination. The process takes advantage of a proprietary software package that uses a patient’s CT to generate a 3-dimensional prescription for a proposed stenting solution. A 3-dimensional printer then uses this stent prescription to “print” a mold that, in turn, is used to produce a silicone stent. This ability to customize the stent to the particular needs and anatomy of the patient is expected to extend the useful life of the stent and reduce some of the complications associated with the use of airway stents.

The National Institutes of Health has awarded Thomas Gildea, MD, MS, an Accelerated Innovations Grant in recognition of the potential clinical importance of customized stent design.

Exhaled Breath Analysis: Applications Beyond the Lung

Breath analysis techniques, already shown as useful in identifying unique “breath-prints” in patients with pulmonary arterial hypertension, are also being evaluated for patients with nonpulmonary disorders. In one study in the Respiratory Institute, analysis of the volatile organic compounds (VOC) composition of exhaled gas in patients with heart failure, when compared with non–heart failure patients admitted to the hospital, correctly classified 100% of subjects as either heart failure or control. In patients with liver disease, novel breath biomarkers have been identified for alcoholic hepatitis. With the use of an ROC (receiver operating characteristic) curve, researchers developed a model for the diagnosis of alcoholic hepatitis that included the breath levels of trimethylamine, acetone, and pentane (TAP model). TAP provided excellent prediction accuracy for the diagnosis of alcoholic hepatitis, with 97% sensitivity and 72% specificity. In the pediatric population, breath-print analysis is being investigated in diagnosing fatty liver disease and inflammatory bowel disease.

The long-term goal of the institute’s research is to continue to discover new markers of disease in the breath that will serve as the basis for developing novel sensors that can be used as point-of-care tests in a variety of disease states, thus allowing for better and more personalized care for each patient based on his or her own unique breath-print.
Canonical discriminant analysis using 5 selected mass scanning ion peaks was performed in a training cohort of 25 acute decompensated heart failure (ADHF) subjects (blue) and 16 controls (red). This ADHF breath-print was then used to classify an independent validation cohort of 36 ADHF subjects (green) with no misclassifications.

References
TRPV4, the Long-Elusive Mechanosensor, Mediates Pulmonary Fibrosis

Idiopathic pulmonary fibrosis is a fatal fibrotic lung disorder with marginally effective medical treatment. Myofibroblasts are critical scar-forming cells. Although they require a mechanical signal to develop, the mechanical sensor has remained elusive.

Recent research at Cleveland Clinic\(^1\) shows that inhibition of a calcium-permeable ion channel in the cell membrane (TRPV4) results in the loss of mechanical sensing ability and nullifies myofibroblast generation. Moreover, deletion of TRPV4 reduces pulmonary fibrosis in an experimental animal model of human pulmonary fibrosis. These data suggest that blocking TRPV4 function could potentially ameliorate pulmonary fibrosis.
TRPV4 is required for TGFβ (transforming growth factor-beta)-induced lung myofibroblast differentiation. Primary isolates of murine lung fibroblasts from either wild type (WT) or TRPV4 knockout mice (TRPV4 KO) were treated with TGFβ or without (UT) and stained for actin fibers (red), α-smooth muscle actin (α-SMA, green), or nuclei (blue). Incorporation of α-SMA into actin fibers (orange; indicative of myofibroblast differentiation) upon TGFβ treatment was blocked in the TRPV4 KO murine fibroblasts as compared to the WT fibroblasts.

**Reference**

Contact Information

Pulmonary Appointments/Referrals
216.444.6503 or 800.223.2273, ext. 46503

Allergy Appointments/Referrals
216.444.3386 or 800.223.2273, ext. 43386

On the Web at clevelandclinic.org/pulmonary

Staff Listing
For a complete listing of Cleveland Clinic’s Respiratory Institute staff, please visit clevelandclinic.org/staff.

Publications
Respiratory Institute staff authored 197 publications in 2014.
For a complete list, go to clevelandclinic.org/outcomes.

Locations
For a complete listing of Respiratory Institute locations, please visit clevelandclinic.org/resplocations.
Additional Contact Information

General Patient Referral
24/7 hospital transfers or physician consults
800.553.5056

General Information
216.444.2200

Hospital Patient Information
216.444.2000

General Patient Appointments
216.444.2273 or 800.223.2273

Referring Physician Center and Hotline
855.REFER.123 (855.733.3712)
Or email refdr@ccf.org or visit clevelandclinic.org/refer123

Request for Medical Records
216.444.2640 or 800.223.2273, ext. 42640

Same-Day Appointments
216.444.CARE (2273)

Global Patient Services/ International Center
Complimentary assistance for international patients and families
001.216.444.8184 or visit clevelandclinic.org/gps

Medical Concierge
Complimentary assistance for out-of-state patients and families
800.223.2273, ext. 55580, or email medicalconcierge@ccf.org

Cleveland Clinic Abu Dhabi
clevelandclinicabudhabi.ae

Cleveland Clinic Canada
888.507.6885

Cleveland Clinic Florida
866.293.7866

Cleveland Clinic Nevada
702.483.6000

For address corrections or changes, please call
800.890.2467
Overview

Cleveland Clinic is an academic medical center offering patient care services supported by research and education in a nonprofit group practice setting. More than 3200 Cleveland Clinic staff physicians and scientists in 130 medical specialties and subspecialties care for more than 5.9 million patients across the system, performing more than 192,000 surgeries and conducting more than 497,000 emergency department visits. Patients come to Cleveland Clinic from all 50 states and more than 147 nations.

Cleveland Clinic is an integrated healthcare delivery system with local, national, and international reach. The main campus in midtown Cleveland, Ohio, has a 1400-bed hospital, outpatient clinic, specialty institutes, labs, classrooms, and research facilities in 42 buildings on 165 acres. Cleveland Clinic's CMS case-mix index is the second highest in the nation. Cleveland Clinic encompasses more than 90 northern Ohio outpatient locations, including 18 full-service family health centers, 8 regional hospitals, an affiliate hospital, and a rehabilitation hospital for children. Cleveland Clinic also includes Cleveland Clinic Florida; Cleveland Clinic Nevada, which includes the Lou Ruvo Center for Brain Health in Las Vegas, and urology and nephrology services; Cleveland Clinic Canada; and Sheikh Khalifa Medical City (management contract). Cleveland Clinic Abu Dhabi is a full-service hospital and outpatient center in the United Arab Emirates (UAE), which began offering services in spring 2015. Cleveland Clinic is the second-largest employer in Ohio, with more than 42,500 employees. It generates $12.6 billion of economic activity a year.

Cleveland Clinic Global Solutions supports physician education, training and consulting, and patient services around the world through offices in Canada, China, the Dominican Republic, El Salvador, Guatemala, Honduras, Panama, Peru, Saudi Arabia, Turkey, UAE, and the United Kingdom.

The Cleveland Clinic Model

Cleveland Clinic was founded in 1921 by 4 physicians who had served in World War I and hoped to replicate the organizational efficiency of military medicine. The organization has grown through the years by adhering to the model set forth by the founders. All Cleveland Clinic staff physicians receive a straight salary with no bonuses or other financial incentives. The hospital and physicians share a financial interest in controlling costs, and profits are reinvested in research and education.

The Cleveland Clinic health system began to grow in 1987 with the founding of Cleveland Clinic Florida and expanded in the 1990s with the development of 18 family health centers across Northeast Ohio. Fairview Hospital, Hillcrest Hospital, and 6 other regional hospitals have joined Cleveland Clinic over the past 2 decades, offering Cleveland Clinic institute services in heart and neurological care, physical rehabilitation, and more. Clinical and support services were reorganized into 27 patient-centered institutes beginning in 2007. Institutes combine medical and surgical specialists for specific diseases or organ systems under unified leadership and in a shared location to provide optimal team care for every patient. Institutes work with the Office of Patient Experience to give every patient the best outcome and experience.

A Clinically Integrated Network

Cleveland Clinic is committed to providing value-based care, and it has grown the Cleveland Clinic Quality Alliance into the nation's second-largest and Northeast Ohio's largest clinically integrated network. The network comprises more than 5400 physician members, both employed and independent physicians from the community. Led by its physician members, the Quality Alliance strives to improve quality and consistency of care; reduce costs and increase efficiency; and provide access to expertise, data, and experience.
Cleveland Clinic Lerner College of Medicine

Lerner College of Medicine is known for its small class sizes, unique curriculum, and full-tuition scholarships for all students. Each new class accepts 32 students who are preparing to be physician investigators. Cleveland Clinic is building a multidisciplinary Health Education Campus as the new home of the Case Western Reserve University (CWRU) School of Medicine and Cleveland Clinic's Lerner College of Medicine, as well as the CWRU School of Dental Medicine, the Frances Payne Bolton School of Nursing, and physician assistant and allied health training programs.

Graduate Medical Education

In 2014, nearly 1800 residents and fellows trained at Cleveland Clinic and Cleveland Clinic Florida, which is part of a continuing upward trend.

U.S. News & World Report Ranking

Cleveland Clinic is consistently ranked among the top hospitals in America by *U.S. News & World Report*. It is ranked No. 1 in urology and has ranked No. 1 in heart care and heart surgery since 1995. In 2014, 4 of its programs were ranked No. 2 in the nation: diabetes and endocrinology, gastroenterology and GI surgery, nephrology, and rheumatology.

For more information about Cleveland Clinic, please visit [clevelandclinic.org](http://clevelandclinic.org).

Cleveland Clinic Physician Ratings

At Cleveland Clinic, we believe in transparency. We also believe in the positive influence of the physician-patient relationship on healthcare outcomes. To continue to meet the highest standards of patient satisfaction, we now publish Cleveland Clinic physician ratings, based on nationally recognized Press Ganey patient satisfaction surveys, online at [clevelandclinic.org/staff](http://clevelandclinic.org/staff).
Resources

Referring Physician Center and Hotline
Call 24/7 for access to medical services or to schedule patient appointments: 855.REFER.123 (855.733.3712), email refdr@ccf.org, or go to clevelandclinic.org/Refer123. The free Cleveland Clinic Physician Referral App, available for mobile devices, gives you 1-click access. Available at the App Store or Google Play.

Remote Consults
Anybody anywhere can get an online second opinion from a Cleveland Clinic specialist through our MyConsult service. For more information, go to clevelandclinic.org/myconsult, email eclevelandclinic.org, or call 800.223.2273, ext. 43223.

Request Medical Records
216.444.2640 or 800.223.2273, ext. 42640

Track Your Patients' Care Online
Cleveland Clinic offers an array of secure online services that allow referring physicians to monitor their patients’ treatment while under Cleveland Clinic care, as well as access test results, medications, and treatment plans. my.clevelandclinic.org/online-services

DrConnect (online access to patients' treatment progress while under referred care): 877.224.7367; drconnect@ccf.org

MyPractice Community (affordable electronic medical records system for physicians in private practice): 866.320.4573

eRadiology (teleradiology consultation provided nationwide by board-certified radiologists with specialty training, within 24 hours or stat): 216.986.2915; starimaging@ccf.org

Medical Records Online
Patients can view portions of their medical record, receive diagnostic images and test results, make appointments, and renew prescriptions through MyChart, a secure online portal. All new Cleveland Clinic patients are automatically registered for MyChart. clevelandclinic.org/mychart

Critical Care Transport Worldwide
Cleveland Clinic's fleet of ground and air transport vehicles is ready to transfer patients at any level of acuity anywhere on earth. Specially trained crews provide Cleveland Clinic care protocols from first contact. To arrange a transfer for STEMI (ST-elevation myocardial infarction), acute stroke, ICH (intracerebral hemorrhage), SAH (subarachnoid hemorrhage), or aortic syndrome, call 877.379.CODE (2633). For all other critical care transfers, call 216.444.8302 or 800.553.5056.

CME Opportunities: Live and Online
Cleveland Clinic's Center for Continuing Education operates the largest CME program in the country. Live courses are offered in Cleveland and cities around the nation and the world. The center's website (ccfcme.org) is an educational resource for healthcare providers and the public. It has a calendar of upcoming courses, online programs on topics in 30 areas, and the award-winning virtual textbook of medicine, The Disease Management Project.

Clinical Trials
Cleveland Clinic is running more than 2100 clinical trials at any given time for conditions including breast and liver cancer, coronary artery disease, heart failure, epilepsy, Parkinson disease, chronic obstructive pulmonary disease, asthma, high blood pressure, diabetes, depression, and eating disorders. Cancer Clinical Trials is a mobile app that provides information on the more than 100 active clinical trials available to cancer patients at Cleveland Clinic. clevelandclinic.org/cancertrialapp.
Healthcare Executive Education
Cleveland Clinic has programs to teach people from outside the organization how it operates a major medical center. The Executive Visitors’ Program is an intensive 3-day behind-the-scenes view of the Cleveland Clinic organization for the busy executive. The Samson Global Leadership Academy is a 2-week immersion in challenges of leadership, management, and innovation taught by Cleveland Clinic leaders, administrators, and clinicians. Curriculum includes coaching and a personalized 3-year leadership development plan. Learn more at clevelandclinic.org/executiveeducation.

Consult QD Physician Blog
A singular blog for physicians and healthcare professionals from Cleveland Clinic. Discover the latest research insights, innovations, treatment trends, and more for all specialties. Join the conversation: consultqd.clevelandclinic.org.

Social Media
Cleveland Clinic uses social media to help caregivers everywhere provide better patient care. Millions of people currently like, friend, or link to Cleveland Clinic social media — including leaders in medicine.
Facebook for Medical Professionals facebook.com/CMEclevelandclinic
Follow us on Twitter @cleclinicMD
Connect with us on LinkedIn Clevelandclinic.org/Mdlinkedin
This project would not have been possible without the commitment and expertise of a team led by Umur Hatipoglu, MD and Marianne Mitri, MBA.

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