### Summary

- **Purpose**
  - Built centre designed and equipped specifically for joint and spine patients
- **Services**
  - Concentrated on a single site; previously provided at a multi-specialty university hospital and other sites
  - Able to treat patients of all levels of acuity – including referrals from other hospitals (excluding EF < 25%, pulmonary hypertension, acute renal failure – not previously on dialysis)
  - Fully dedicated resources and teams, leading to low rates of infections and revisions
  - Emory has developed many innovations and improvements to the pathway to increase quality, value and patient centredness:
    - Total joint classes preadmission
    - Extensive screening presurgery to identify and resolve/manage potential risks
    - All day-of-surgery admissions are staggered starts – with patients suitable for accelerated recovery scheduled earlier in the day
    - Optimised anaesthesia and theatre processes to support early mobilization and effective pain relief
    - Physiotherapy available 7 days a week and 12 hours a day
    - Dedicated social worker to support discharge

### Delivery model

- **EUOSH** is part of Emory Healthcare, a not-for-profit clinically integrated network of specialist teaching hospitals, community hospitals and primary healthcare facilities
  - It operates a mixed contractual model with some employed and some self-employed surgeons

### Background and history

- Emory Healthcare was created in 1997 to unite Emory’s hospitals and clinic into one system of care. It has continued to grow through a series of mergers and acquisitions
- Emory University Hospital has operated in Atlanta since the early 20th century
- It is now the largest hospital system in Georgia

### Health system context

- The USA has a mixed model of insurance coverage, with public funds covering the elderly, disabled and low income groups through CMS-administered Medicare and Medicaid programmes managed by federal and/or state governments
- Emory serves patients from all insurance groups

---

1 This case review was externally commissioned. Sources included site visits, interviews and reviews of company reports/information systems.
Specific additional sources are given where appropriate.
Overview

- Clinically integrated network of AMC specialist hospitals, community hospitals and primary healthcare facilities, established in 1997:
  - six hospitals
  - 200 provider sites
  - 1,800 physicians in 70 specialties
  - 220 primary care physicians
- Focus on patient- and family-centred care within a single, comprehensive system
- Largest hospital system in Georgia
- Mix of directly employed and private practice physicians

Overview of EUOSH

- Single, inpatient teaching site for elective orthopaedic surgery – organisationally connected to major university hospital for research, technology and links to all other specialties
- Elective orthopaedic and spinal activity now concentrated on this site (transferred from Emory University Hospital)
- Provides:
  - seven operating theatres
  - X-ray services
  - inpatient services
  - laboratory services
  - physiotherapy services
- Outpatient clinics and services are provided on a separate site (Emory Orthopaedics and Spine Center) with physicians working across both sites
- 13 Board-certified specialist surgeons:
  - six spinal specialists
  - four joint replacement specialists
  - three other ortho sub-specialists
- Dedicated and specialist orthopaedic and spine nursing staff
- Specially designed orthopaedic spaces with furniture customized for joint and spine patients

EUOSH is part of the Emory integrated hospital network
## EUOSH: Volume and outcomes for selected joint replacement pathways

Data for 2014

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Activity (number)</th>
<th>ALOS (days)</th>
<th>Day of surgery admissions (%)</th>
<th>30-day readmission rate (%)</th>
<th>Readmission ALOS (days)</th>
<th>Infection rate (%)&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Discharge destination (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total hip replacement</td>
<td>745</td>
<td>1.7</td>
<td>100</td>
<td>1.1</td>
<td>1.8</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Revision of total hip replacement&lt;sup&gt;2&lt;/sup&gt;</td>
<td>117</td>
<td>2.7</td>
<td>100</td>
<td>2.6</td>
<td>2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total knee replacement</td>
<td>527</td>
<td>2.4</td>
<td>100</td>
<td>1.0</td>
<td>2.4</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Revision of total knee replacement&lt;sup&gt;2&lt;/sup&gt;</td>
<td>81</td>
<td>3.1</td>
<td>100</td>
<td>1.2</td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ALOS, average length of stay

<sup>1</sup> Combined rate for primary replacement and revisions

<sup>2</sup> Most revisions are referrals from other providers

Surginet information system
EUOSH’s approach to optimising the joint replacement pathway

- **Decision to operate**
- **Procedure booked**
- **PAC**
- **Preop area**
- **Preop preparation**
- **Theatre**
- **PACU**
- **Ward**
- **Home**

**Total joint class** provides advice on nutrition, post-discharge preparation and what to expect.

- **Preop area** (not ward bed): Patient and relative wait in preop area. Relative keeps patient’s clothes.
- **Preop preparation**:
  - Optimised anaesthesia for early mobility and good pain control (no nerve blocks; no CPM).
  - Turnaround time – 17 to 22 min

- **Theatre**
  - Nurse alerts PACU <10 min surgery ends

- **PACU**
  - Postop imaging in PACU

- **Bed moves with patient**: Dedicated ortho beds

- **Physio evaluation and mobilisation on day of surgery**

- **Social worker** (rather than nurse) on hospital staff dedicated to discharge planning from day of admission, able to organize:
  - care package
  - home adaptions

**Theatre team**
- Surgeon and anaesthetist
- One anaesthesia assistant
- One physician assistant (responsible for positioning, etc)
- One scrub technician
- One circulating nurse (turns over room; responsible for trays, equipment, documentation and communication with preop and PACU) plus additional nurse tech/transporter to turn room
- +/- One resident/fellow (trainee)
- +/- One vendor

**Preadmission testing** streamed by risk profile:
- Fast track for low-risk patients with complete data
- All lab test results in EHR 24 h prior to surgery

**Standardised screenings and pathways** for:
- Sleep apnoea
- Alcohol misuse
- Weight management

**TRIAD initiative supports early discharge**
- Twice-daily multidisciplinary team meeting
- OT equipment delivered to hospital (not home)
- Daily ward round (including on Saturdays) to make discharge decisions

---

PAC, preassessment clinic; PACU, post-anaesthesia care unit; CPM, continuous passive motion; HER, electronic health record; TRIAD, targeted review intending to advocate discharge.

1. Low bed occupancy (68%) as patient flow is optimized and delayed discharges are avoided.
2. Patient stays in same transportable bed to minimize joint movement in period immediately post surgery.
EUOSH has increased on-time starts in theatre from 58% to >95% in the last few years

- Multi-disciplinary ‘task force’ assigned to assess every aspect of patient flow and surgical team processes to improve on-time start rate:
  - set clear common mission and desire to do things differently
  - first patient called in earlier to ensure all preop activities complete before scheduled start time in theatre
  - variable opening times for operating theatres
  - young, medically-fitter patients scheduled earlier on the list
  - no preadmission testing on day of surgery (all data must be complete and verified by midday on day before surgery) – this had been the root cause of ~15% of delays
- Support and sustain culture of professional pride in running theatres effectively
- Surgeons will engage (with on-time starts) if all non-surgical aspects run efficiently
EUOSH approach to orthopaedic theatre scheduling

**Scheduling approach**
- Theatre blocks assigned to ortho or spinal 3 months in advance – then allocated to individual surgeons by the chief medical officer (CMO)
- ORBC software automatically assigns time to procedure based on individual’s historical average
- Surgeon adjusts it if needed based on patient profile
- Surgeon and department-level utilization reviewed weekly and monthly by full multi-disciplinary executive team including CMO, data lead, bed manager, heads of nursing (surgical and inpatient) and radiology. Chief surgeon follows up with individuals if:
  - utilization below expected level
  - theatre over-runs exceed expected limits
- Physicians paid per procedure (not per theatre block)

**Impact**
- Four to five primary joint replacement procedures per 8.5-h session (or up to 10 if running parallel lists)
- Turnaround time of 17 to 22 min
- >95% on-time starts
- 82% to 90% theatre utilisation

1 Small proportion (single digit %) of anterior hip patients discharged on day of surgery; also smaller proportion of primary knee replacement patients
2 Monthly utilization rates: December 2014 = 90%; January to March 2015 = 82%
EUOSH uses dashboards to monitor quality of care

### Nursing Quality Index

**Third Quarter, Fiscal Year 2015 (March 2015 - April 2015)**

<table>
<thead>
<tr>
<th>Indicator/Indicator Category</th>
<th>Desired Direction</th>
<th>FY15 Q3 Actual</th>
<th>FY15 Target</th>
<th>Q3 % of Units at Target</th>
<th>% Units at Target ≥ 5 of 8 QTRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Satisfaction:</td>
<td>up</td>
<td>89</td>
<td>50</td>
<td>66.70%</td>
<td>66.60%</td>
</tr>
<tr>
<td>Overall Rating of Nursing Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Satisfaction:</td>
<td>up</td>
<td>88</td>
<td>50</td>
<td>66.70%</td>
<td>100.00%</td>
</tr>
<tr>
<td>How well pain was controlled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Acquired Pressure Ulcer Stage II &amp; Above Prevalence</td>
<td>down</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Falls with injury per 1,000 patient days</td>
<td>down</td>
<td>0.00</td>
<td>0.17</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Catheter Associated Urinary Tract Infections per 1,000 Catheter Days</td>
<td>down</td>
<td>0.00</td>
<td>0.17</td>
<td>100.00%</td>
<td>66.67%</td>
</tr>
<tr>
<td>Central Line Associated Blood Stream Infections per 1,000 Line Days</td>
<td>down</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>RN Certification</td>
<td>down</td>
<td>35.23%</td>
<td>17.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>RN Education (BSN or Higher)</td>
<td>up</td>
<td>62.22%</td>
<td>56.40%</td>
<td>83.30%</td>
<td>66.67%</td>
</tr>
<tr>
<td>*Nursing Engagement Overall</td>
<td>up</td>
<td>73.6</td>
<td>70.8</td>
<td>*</td>
<td>57.14%</td>
</tr>
<tr>
<td>**Research Studies in progress with Nurse PI/Co-PI</td>
<td>up</td>
<td>1</td>
<td>1</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

**# of Indicators at Target:** 10 of 10

- Quality dashboards and real-time monitoring of information is used extensively to inform and enhance performance management.
- Performance management is part of a broader programme to transform care delivery with a shared set of goals:
  - **improve consistency** in the delivery of and quality of care
  - **involve patients and families** in every aspect of the healthcare delivery system
  - **decrease medical errors and infection rates**
  - **improve communication**
  - **increase patient and employee satisfaction**
  - **improve facility design and educational information**
EUOSH’s approach to supporting surgeons to utilise theatre time most effectively

<table>
<thead>
<tr>
<th>Performance review embedded in daily work ...</th>
<th>... and in annual performance incentives ...</th>
<th>... but organisational culture is also key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice-daily multi-disciplinary theatre team meetings</td>
<td>Performance is clearly and directly related to pay structure</td>
<td>Organisational culture emphasises professional pride and quality</td>
</tr>
<tr>
<td>9:00am meeting:</td>
<td>Physician pay components:</td>
<td>All staff are engaged in identifying and implementing solutions to issues</td>
</tr>
<tr>
<td>• case-by-case review</td>
<td>• base salary</td>
<td>Organisation fosters collective accountability and recognition for delivery of patient- and family-centred, high value care</td>
</tr>
<tr>
<td>• plan for day</td>
<td>• bonus for volume adjusted for casemix</td>
<td>Surgeons like working in an efficient environment where processes run smoothly and resources (including their own time) are used efficiently</td>
</tr>
<tr>
<td>• review of previous day’s performance looking at actual vs expected utilisation/LOS data, etc</td>
<td>• eligibility for bonus dependent on meeting quality thresholds</td>
<td></td>
</tr>
</tbody>
</table>

**End-of-day core team – wrap up and review:**

<table>
<thead>
<tr>
<th>Performance review embedded in daily work ...</th>
<th>... and in annual performance incentives ...</th>
<th>... but organisational culture is also key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice-daily multi-disciplinary theatre team meetings</td>
<td>Performance is clearly and directly related to pay structure</td>
<td>Organisational culture emphasises professional pride and quality</td>
</tr>
<tr>
<td>9:00am meeting:</td>
<td>Physician pay components:</td>
<td>All staff are engaged in identifying and implementing solutions to issues</td>
</tr>
<tr>
<td>• case-by-case review</td>
<td>• base salary</td>
<td>Organisation fosters collective accountability and recognition for delivery of patient- and family-centred, high value care</td>
</tr>
<tr>
<td>• plan for day</td>
<td>• bonus for volume adjusted for casemix</td>
<td>Surgeons like working in an efficient environment where processes run smoothly and resources (including their own time) are used efficiently</td>
</tr>
<tr>
<td>• review of previous day’s performance looking at actual vs expected utilisation/LOS data, etc</td>
<td>• eligibility for bonus dependent on meeting quality thresholds</td>
<td></td>
</tr>
</tbody>
</table>

**Enablers**

- Ability to pay surgeons for performance based on volume and mix of procedures¹ (not surgical blocks)
- Real-time data for next-day review
- Collaborative team working for collective accountability, knowledge sharing and support

¹ Other staff are paid an hourly rate (not adjusted for volume)