Supplemental Table 1. *Overview of adverse event (AE) severity grade classification system.*

Overall Classification System	
As per the Clavien system, the following definition of complication and overall classification scheme was used to describe any deviation from the normal postoperative course.	
Minor	
Grade I	Any complication without need for pharmacological treatment or other intervention
Grade II	Any complication that requires pharmacological treatment or minor intervention only
Major	
Grade IIIa	Any complication that requires surgical, radiological, endoscopic intervention, or multi-therapy – Intervention does not require general anesthesia
Grade IIIb	Any complication that requires surgical, radiological, endoscopic intervention, or multi-therapy – Intervention requires general anesthesia
Grade IVa	Any complication requiring ICU management and life support – Single organ dysfunction
Grade IVb	Any complication requiring ICU management and life support – Multi-organ dysfunction
Grade V	Any complication leading to the death of the patient

Supplemental Table 2. *Outline of total range of data studied by analysis and seminar type. Ranges include pre- and post-intervention periods for all participating centers (important for local seminars, as each center organized seminars on unique dates).*

Analysis	Seminar Type	Range Start	Range End
LOS*	Multicenter	May 2019	October 2020
	Local	December 2018	August 2020
PAL	Multicenter	September 2018	February 2020
	Local	February 2014	July 2019
AFIB	Multicenter	September 2018	February 2020
	Local	February 2014	May 2015

Asterisk (*) indicates that ranges were the same for both LOS analyses for lobectomy as well as for all procedures.

Supplemental Table 3. *Local positive deviance seminar recommendations.*

Local Positive Deviance Seminars	
Topic	Recommendations
Prolonged alveolar air leak	*Pre-op* • In patients with (1) increased risk of post-operative air leak or (2) high volume air leak (suggested to be >400cc/hr at 48 hrs), inform them pre-operatively (1) or 48 hr post-op (2) of the possibility of discharge with pneumostat and appropriate home care support *Intra-op* • Avoid manipulation of the lung tissue not to be removed • If there is a tear or a visible injury to the remaining lung, seek to repair it prior to closure • Choose a stapler that is of the staple height appropriate for the size of the tissue • Avoid stapling thick tissues to avoid undue tension; if necessary, use a lung clamp prior • Use cautery in dividing the fissure where possible if too thick to staple • Avoid dissection in a thick fissure if possible for lobar resection • Use reinforced stapler for pursuing pulmonary resection in patients in severe emphysema • Avoid inflation pressures greater than 10-12 cm H_2O when re-inflating the lung* *Post-op* • Reduce/eliminate suction in post-operative period* • The presence of suction should not be considered a contraindication to chest tube removal when no air leak is present • If high volume air leak (suggested to be >400cc/hr at 48 hrs) is present post-operatively, consider early discharge (target 72 hrs) with chest tube and pneumostat
Atrial fibrillation	*Post-op* • Diligent and rapid electrolyte (K, Ca, Mg, Ph) replacement on daily bases; highlight with residents, especially when on-call

	• Efficient use of blood work, laboratory testing across the board
Length of stay	**Thoracoscopic Wedge Resection (i.e. non-anatomic pulmonary resection)** *Pre-op* □ Patient education and expectation setting* □ Inform patients of expectations of being discharged on POD 1 □ Inform patients of importance of daily exercise in preparation for surgery *Intra-op* □ Use purple or black stapler to divide lung tissue, based on thickness □ Avoid routine use of foley catheters □ 1 chest tube, either 24 or 28 French □ In selected cases, consider leaving no chest tube after confirming no air leak under water with lung insufflation and no concern regarding bleeding *Post-op* □ Minimal or no suction on chest tube post-operatively (-8 cm H2O or less) □ Post-operative oral analgesia, no pca **Thoracoscopic Segmentectomy (i.e. anatomic pulmonary resection with individual ligation of bronchovascular structures)** *Pre-op* • Inform patients of expectations of being discharged on POD 1 • Inform patients of importance of daily exercise in preparation for surgery *Intra-op* • Use purple or black stapler to divide lung tissue, based on thickness • Avoid routine use of foley catheters (unless expectation of complex segment, lasting greater than 2-1/2 hours) • 1 chest tube, either 24 or 28 French

	• Use of regular cautery (no hook) *Post-op* • Minimal or no suction on chest tube post-operatively (-8 cm H2O or less) • Postoperative oral analgesia, no pca **VATS/MIS Lobectomy** *Pre-op* □ Patient education and expectation setting* □ Vigorously promote smoking cessation pre-operatively □ Promote walking 45 mins/day □ To use inspiratory muscle training for post-operative predicted FEV1<50% □ Teach patients that expected LOS is 2-3 days *Intra-op* □ Routinely leave one chest tube *Post-op* □ Use of digital suction recommended □ Minimal pleural pressure settings (minimize suction) □ Remove chest tube as per protocolized management □ Oral analgesia, no pca □ Liberal criteria for chest tube removal and discharge home □ Use of portable chest drainage system **Open Lobectomy** *Pre-op* • Patient education and expectation setting *Intra-op* • Liberal use of anterior thoracotomy

	Post-op • Liberal criteria for chest tube removal and discharge home • Use of portable chest drainage system • No strict limits on chest tube output **Laparoscopic Paraesophageal Hernia Repair and Laparoscopic Heller Myotomy/Dor** *Pre-op* □ Teach patients that expected LOS is 2 days *Intra-op* □ Simultaneous endoscopy and laparoscopy to confirm mucosal integrity *Post-op* □ Continuous ondansetron for 24 hours □ Clear fluids on POD 0 □ Full fluids on POD 1 □ Selective NG tube, avoid in routine cases □ Selective barium swallow, avoid in routine cases **Any Esophagectomy** *Intra-op* • Consider a more concerted effort to perform MIS esophagectomy • Use of soft close suction tube (JP tube) instead of chest tube *Post-op* • No NG tube and barium swallow* • No calorie count before discharge home **Pneumonectomy** *Post-op* • Communicate with ICU re minimum LOS in the ICU

Asterisk (*) *indicates that a recommendation was generated by ≥ 2 centers.*