ISHLT CONSENSUS STATEMENT

Statement from the International Society for Heart and Lung Transplantation (ISHLT) Consensus Conference on the Evolving Role of Nursing Professionals in Thoracic Transplantation

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Abbreviations: AACN, American Association of Critical Care Nurses; ABTC, American Board for Transplant Certification; AI, Artificial intelligence; ANP, Advanced nurse practitioner; ANA, American Nurses Association; APP, Advanced practice provider; AST, American Society of Transplantation; ASTS, American Society of Transplant Surgeons; BSN, Bachelor of Science in Nursing; CCTC, Certified Clinical Transplant Coordinator; CCTN, Certified Clinical Transplant Nurse; CNS, Clinical nurse specialist; DCD, Donation after circulatory death; DNP, Doctor of Nursing Practice; ECMO, Extracorporeal membrane oxygenation; EMR, Electronic medical record; EVLP, Ex vivo lung perfusion; FTE, Full-time equivalent; H-L, Heart-lung; HT, Heart transplant; HTx, Heart transplantation; HWE, Healthy work environment; ICU, Intensive care unit; ISHLT, International Society for Heart and Lung Transplantation; ITNS, International Transplant Nurses Society; LVAD, Left ventricular assist device; MBA, Master of Business Administration; MCS, Mechanical circulatory support; MD, Physician or medical doctor; MSN, Master of Science in Nursing; NASEM, National Academy of Sciences, Engineering, and Medicine; NATCO, The Organization for Transplant Professionals; NHS, National Health System; NP, Nurse practitioner; NRP, Normothermic regional perfusion; OCS, Organ Care System; OPO, Organ Procurement Organization; OPTN, Organ Procurement and Transplantation Network; PhD, Doctor of Philosophy; QI, Quality improvement; RN, Registered nurse; SRTR, Scientific Registry of Transplant Recipients; TC, Transplant coordinator; Tx, Transplant; UK, United Kingdom; UNOS, United Network for Organ Sharing; US, United States; VAD, Ventricular assist device

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Thoracic transplantation has become increasingly complex, with new donor technologies, higher-acuity candidates and recipients resulting in expanding clinical demands and placing significant pressure on transplant coordinators (TCs) and Advanced Practice Registered Nurses (APRNs), including Advanced Nurse Practitioners (ANPs) in some international centers. The International Society for Heart and Lung Transplantation (ISHLT) convened its second Transplant Nursing Consensus Conference on April 26, 2025, in Boston, to address these pressures and develop actionable recommendations. A multi-method approach integrated 3 sources: a pre-conference international survey of transplant nursing professionals, 2 virtual international roundtables with nurses from 8 countries, and 4 facilitated in-person breakout sessions. Findings converged across sources, identifying incremental accumulation of duties without resource relief, administrative and after-hours burden, role ambiguity between TCs and APRNs, and absent career structures as dominant threats to workforce sustainability. International input revealed wide variation in roles, prescribing rights, and care models, while affirming shared priorities around retention, role clarity, work–life balance, and recognition. Seven overarching themes guided recommendations: staffing models and workload; work environment and retention; workforce roles and qualifications; professional development and impact measurement; clinical processes and protocols; technology and innovation; and patient education access. The panel endorsed acuity-driven staffing ratios, hybrid call structures with protected recovery, offloading non-clinical tasks to dedicated personnel, competency-based career ladders linked to certification and compensation, standardized nurse-led protocols with clear escalation, digital tools that reduce documentation duplication, and a universal modular patient education curriculum. These consensus statements provide an internationally informed blueprint for sustaining the thoracic transplant nursing workforce.

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KEYWORDS:
thoracic transplantation; transplant nursing; transplant coordinators; advanced practice providers; workforce and staffing; professional development; clinical protocols; patient education

1. BACKGROUND

Thoracic transplantation has evolved into one of the most advanced and multifaceted disciplines of modern medicine.[1–5] Transplant nurses play a pivotal role in delivering comprehensive care across the entire transplant continuum, supporting patients and caregivers from referral through long-term post-transplant follow-up. Transplant nurse coordinators (TCs) and nurse practitioners serve as central navigators of transplant care. Nurse practitioners are hereafter referred to as Advanced Practice Registered Nurses (APRNs), a term that also includes Advanced Nurse Practitioners (ANPs) used in some international settings. The breadth and complexity of this work present substantial challenges that influence job satisfaction, workforce retention, clinical performance, and ultimately patient outcomes. Their responsibilities span referral and evaluation, waitlist management, donor organ offers and procurement logistics, inpatient perioperative care, multidisciplinary coordination, discharge planning, ambulatory and telehealth surveillance, outpatient management, 24-hour call coverage, and patient and caregiver education.[6–10] Through their multifaceted responsibilities, TCs and APRNs not only integrate information across the care continuum but also serve as frontline providers of care, often acting as the first and last points of contact for patients and caregivers.[8] Thoracic transplant programs run on this work: the daily expectation that TCs and APRNs will organize, coordinate, monitor, and teach across the entire continuum of care is itself the clearest statement of their value. The supports examined in this document are what allow these professionals to meet that expectation while practicing at the top of their license.

Over the past decade, the roles of TCs and APRNs have expanded in parallel with advances in thoracic transplant care.[6–9] The increasing complexity of thoracic transplantation combined with administrative burden, workload intensity, and the need for rapid, accurate communication across multidisciplinary teams places significant pressure on TCs and APRNs. Importantly, emerging technologies including novel organ recovery systems such as ex vivo lung perfusion (EVLP), normothermic regional perfusion (NRP), and hypothermic transport platforms, have rapidly increased transplant volumes through improved donation after circulatory death (DCD) retrieval, which often outpace staffing and training models. As programs grow, TCs and APRNs are frequently expected to assume additional tasks to improve throughput without a corresponding reduction in existing clinical or administrative role expectations.[11,12] While such adaptations may be necessary for program operations, as a sustainable strategy they risk eroding job satisfaction, retention, and

recognition of nursing's unique value, ultimately impeding full-scope of nursing practice.[13–15] The burnout, turnover, and workload findings reported here should therefore be read as the measurable cost of under-investment in these roles, not as their defining characteristic.

Transplant nursing care models also vary considerably across North America and globally. These differences are driven by program needs, national licensure requirements, regulatory frameworks, and economic contexts, which in turn shape nursing roles, expectations, and workflows. This variability compounds already demanding roles and complicates efforts to benchmark staffing, harmonize competencies, and compare outcomes across programs. These factors underscore the need for consensus-based practices and professional development guidance that reflects both the diversity and the shared priorities of the global thoracic transplant nursing workforce.

2. METHODS

Following ISHLT Standards and Guidelines Committee policy, we sought the broadest possible sampling of thoracic transplant nursing perspectives through a multi-pronged international approach. Data collection began with a pre-conference anonymous electronic survey distributed to ISHLT nursing professional members, which captured 203 respondents, primarily TCs (58.1%) and APRNs (29.5%), with administrators (7.8%) and 4.4% missing role data. Respondents represented diverse regions (77.3% North America, 12.3% Europe, with additional Asia Pacific and Latin America representation) and program types (52.4% academic, 30.5% public, 11.2% private; Supplementary Table 1). The survey examined practice patterns, workload, and workforce experience (Appendix).

We then contacted medical directors of small (< 30 transplants/year), medium (30–60), and large (> 60) thoracic transplant programs and asked them to nominate TCs, APRNs, and nurse administrators to attend the consensus conference. Of those invited, 75 nurses agreed to attend the in-person conference (53% TCs, 24% APRNs, 23% administrators). An additional 27 nominees from 8 countries (United States, United Kingdom, Ireland, Sweden, Canada, Israel, Australia, and Japan) expressed strong interest in participating but were unable to travel. To ensure their voices informed the consensus process, we convened 2 virtual international roundtable discussions. Findings from the survey and roundtables informed consensus building during the in-person conference. To ensure that consensus recommendations were rigorous, practice-informed, and globally relevant, a multi-method approach was employed integrating quantitative and experiential data from 3 complementary sources: (1) the pre-conference international survey of transplant nursing professionals (N = 203); (2) two 90-minute virtual international roundtables held before the conference (n = 27); and (3) four facilitated breakout sessions during the in-person conference. The survey was designed to capture representation across professional roles and geographic regions. The roundtables added systems-level insights into structural, regulatory, and policy differences from an international perspective. The breakout discussion created focused solution-oriented dialogue in which participants validated survey findings, examined root causes, and generated actionable strategies through voting by consensus on shared recommendations.

Prior to the meeting in Boston, an anonymous electronic survey was distributed to ISHLT nursing professional members and remained open from February 10, 2025 to March 17, 2025. To broaden representation beyond English-speaking respondents, the instrument was translated into Spanish and disseminated through targeted outreach to thoracic transplant nursing communities in Spanish-speaking countries, yielding 17 Spanish-language responses alongside 186 English-language responses. Quantitative items were summarized. Full survey results, stratified by professional practice group and language version, are presented in Supplementary Table 1.

2.1. International roundtable discussions

Two 90-minute virtual roundtables were convened in advance of the conference to incorporate perspectives from internationally nominated participants who were unable to travel. Sessions were facilitated by members of the writing committee using a structured guide of open-ended questions developed to elicit systems-level information on transplant nursing models, scope of practice, regulatory context, educational preparation, and perceived structural barriers. This guide is provided in the Appendix. Sessions were recorded and auto-transcribed via the Microsoft Teams platform's transcription function, with transcripts verified by the 2 organizers of the roundtable discussion plus a scribe who was also in attendance. Transcripts were analyzed using thematic analysis.

Table 1 Seven Overarching Themes

#	Topic categories	New/changed since 2015
1	Staffing Models & Workload	Need for an acuity weighted ambulatory tools to balance nurse patient ratios
2	Work Environment & Retention	Remote/hybrid must be formally endorsed
3	Workforce, Roles & Qualifications	Added DNP option; Global role framework
4	Professional Development & Impact Measurement	ANA "Human Capital" model provides a pathway to demonstrating the value of nursing
5	Clinical Processes & Protocols	Alignment with 2024 ISHLT Guidelines
6	Technology & Innovation	First reference to AI decision-support
7	Patient Access & Standardized Education	New standardization scorecard

AI, Artificial Intelligence; ANA, American Nurses Association; DNP, Doctor of Nursing Practice; ISHLT, International Society for Heart and Lung Transplantation.

2.2. Conference breakout sessions

During the in-person conference, participants were assigned to 4 facilitated breakout sessions organized around the priority topics identified through pre-conference data review (Table 1). Each breakout was led by a writing committee member and supported by a designated scribe, to experientially validate or challenge survey and roundtable findings, examine root causes, and propose actionable strategies. Session notes were compiled by facilitators and presented to the conference participants for their validation and agreement.

3. DATA SYNTHESIS AND IMPLICATIONS FOR CONSENSUS

Findings from the data sources collected were iteratively compared rather than analyzed in isolation. Areas of convergence were identified and prioritized to form the evidentiary foundation for the consensus statements, ensuring that recommendations rested on both empirical data and collective expert interpretation.

4. CONSENSUS DEVELOPMENT PROCESS

Draft consensus statements were developed from the integrated findings of the pre-conference survey, international roundtable discussions, and conference breakout sessions. Each draft statement was presented to conference participants in plenary session and subjected to facilitated discussion. Participants then voted on each statement by open show of hands, with further discussion following votes to surface dissenting perspectives. Where discussion identified concerns or incomplete agreement, statement wording was revised and re-presented to the group for further discussion and affirmation. A pre-specified quantitative agreement threshold was not employed, and vote tallies were not recorded; consensus was defined as general agreement among participants following discussion, open voting, and iterative refinement. Most statements were affirmed with broad or unanimous agreement. Following the conference, the complete draft manuscript was circulated to all conference participants for review and validation. All participant feedback was reviewed by the writing group and incorporated through successive revisions.

5. RESULTS

The pre-conference community survey, international roundtable discussions, and conference breakout sessions converged on a consistent set of pressures. Across all 3 sources, respondents described expanding scope and acuity, rising administrative and after-hours burden, role ambiguity between TCs and APRNs, and absent or

uneven career structures as the dominant threats to workforce sustainability. The international roundtables also added a systems-level lens, highlighting that nurses frequently function as the institutional memory of fragmented systems, performing essential work that staffing models and productivity metrics rarely capture. Despite wide variation in roles, educational preparation, prescribing rights, and care structures across countries, participants were aligned on the need for shared frameworks anchored in core program functions rather than uniform titles, and on system-level redesign rather than incremental task redistribution.

These findings map onto, and meaningfully extend, the priorities identified at the 2015 ISHLT Nursing Consensus Conference.[11] Comparison with the 2015 agenda framed the 2025 starting point and surfaced both persistent gaps and newer pressures that have emerged in the intervening decade. Seven overarching themes were prioritized for in-depth examination (Table 1). For each, we present the supporting evidence, including survey statistics, international roundtable observations, and breakout discussion themes, and the resulting consensus statement(s).

5.1. Theme 1: Staffing models and workload

Robust evidence from acute care and transplant settings links nurse staffing models directly to patient safety and outcomes.[16–18] McHugh et al. demonstrated that improved nurse-to-patient ratios were associated with significant reductions in mortality, unplanned readmissions, and hospital length of stay, with benefits extending to high-acuity specialty populations.[19] Similar findings from a systematic review confirm that insufficient staffing increases adverse events, delays in care, and mortality risk.[17] For thoracic transplant programs where patient acuity remains consistently high and new technologies are rapidly integrated into practice, participants described an expectation to take on additional responsibilities or workflows without corresponding increases in staffing. They referred to this phenomenon as “work creep,” which is the incremental expansion of administrative and clinical duties added to existing roles without relief from prior responsibilities or proportional resource support. The concept is foundational to supporting acuity-adjusted TC ratios. Enforceable nurse-to-patient ratio standards are essential for patient safety and nurse well-being, but their success depends on adaptive, data-driven infrastructure that responds to technology-enabled care demands and case mix. Rather than relying on fixed nurse-to-patient ratios, transplant programs should establish caseload benchmarks that reflect patient acuity, model of care, and program complexity. Increases in patient volume should serve as predefined triggers for programmatic review of staffing models, workload distribution, and quality outcomes to ensure that infrastructure and resources continue to support safe, high-quality care. Survey findings highlighted significant non-clinical workload among respondents. About 55% reported spending at least one-quarter of their week (≥26%) on administrative tasks such as scheduling, obtaining records, and managing calls. Within this group, 24% spent up to half of their time and 31% reported more than half of their week devoted to these duties. This quantifies the administrative burden that limits top-of-license clinical practice. While these results do not capture every staffing challenge faced by TCs or APRNs, they provide a strong foundation for further evaluation of workload distribution and role optimization. To facilitate role optimization, specific clinical and administrative responsibilities of thoracic transplant coordinators and advanced practice providers are organized into a comprehensive responsibility matrix and workload tracking framework (Table 2).

Fixed coordinator to patient ratios has not kept pace with this complexity. A multicenter survey of lung programs reported wide variability in staffing and workload by program size and phase of care and underscored the absence of consensus ratios by role or phase.[20] North American and other international participants echoed this variability and emphasized that not one model fits every program or health system, given growth in DCD recovery, dual organ transplants, Hepatitis C viremic donors, and increased acceptance of higher risk donors/recipients. These data support acuity and complexity-adjusted, phase specific staffing benchmarks for referral, evaluation, waitlist, peri-transplant, and early/late posttransplant, rather than static ratios. Call coverage models also require modernization. Single-center analyses demonstrate increasing time required for donor offer review and coordination of clinical and administrative information with procurement service vendors. Participants reported that 38.6% of transplant programs have TC-led in-house donor call teams. Conversely, 68.5% are outsourcing at least some portion of donor offer review, surgical recovery, and perfusion leading to significant workflow variations across thoracic organ transplant programs.[21–26] Outsourced or shared donor-call coverage has been utilized across abdominal and thoracic transplant programs for decades, particularly for initial donor screening, organ offer triage, and after-hours call responsibilities. These models have gained increasing attention

Table 2 Thoracic Transplant TC and APRN/ANP Responsibility Matrix and Workload Tracking Framework

Responsibility theme	Examples of responsibilities	TC role in many programs	APRN/ANP role in many programs
Referral intake and triage	New referral intake, records request, initial patient contact, coordination with referring teams	Primary or shared	Shared
Evaluation coordination	Testing coordination, education, multidisciplinary review prep, committee follow-up	Primary	Shared
Waitlist management	Listing activation, status updates, re-evaluations, exception documentation support	Primary	Limited
Peri-transplant coordination	Admission coordination, inpatient transitions, discharge planning, multidisciplinary rounding support	Shared	Primary or shared
Early post-transplant surveillance	Lab surveillance, symptom triage, infection and rejection pathway escalation, early follow-up coordination	Primary or shared	Shared
Late post-transplant follow-up and annuals	Longitudinal follow-up, annual testing coordination, chronic immunosuppression monitoring support, adherence interventions	Primary or shared	Shared
Mechanical circulatory support, LVAD and MCS	Candidate coordination, device education support, outpatient coordination, escalation pathways	Varies by program	Shared
Donor offer review and allocation workflow	Offer screening, data review, escalation to physicians, documentation of accept or decline	TC primary	Limited
Retrieval logistics and perfusion-device workflows	Travel and vendor coordination, organ transport logistics, device management workflows such as OCS, EVLP, NRP where applicable	Varies by country and model	Limited
Patient and caregiver education	Modular education at eval, admission, discharge, follow-up, teach-back reinforcement	Primary or shared	Shared
Telehealth and remote monitoring	Telehealth follow-ups, remote data triage, routing protocols, escalation pathways	Shared	Shared
After-hours call and longitudinal access	On-call triage, urgent escalation, donor offer after-hours work, weekend coverage	TC primary	Limited
Administrative and coordination work	Scheduling, records, insurance tasks support, authorizations support, regulatory and compliance coordination	Often primary	Limited
Data, quality improvement, research, and education support	Dashboard reporting, QI projects, protocol updates, orientation, mentorship	Shared	Shared
Clinic Operations & Workflow	Pre-visit planning, visit flow management, orders, follow-up scheduling	Shared, often TC-heavy	Shared
Medication Management & Immunosuppression	Dose adjustments, toxicity monitoring, drug interaction review	Shared	Shared
Psychosocial Support & Social Determinants Integration	Coordination with social work, adherence interventions, caregiver support	Shared	Shared
Regulatory & Compliance Support	UNOS audit prep, policy review, compliance documentation	TC primary	Shared, varies by program
Program Development & Strategic Initiatives	Referring center engagement, education to ICU/ED, community partners	Shared, often TC heavy	Shared
Outreach Collaboration	Referring center engagement, community partners	Shared	Shared
Inpatient Transplant Rounds	Provides daily inpatient management of clinical care	Limited	Primary
	Immunosuppression management, complications	Limited	Primary
	Discharge education	Primary	Shared
	Discharge planning	Shared	Shared

ANP, Advanced nurse practitioner; APRN, Advanced Practice Registered Nurse; EVLP, Ex vivo lung perfusion; OCS, Organ Care System; TC, Transplant coordinator.

as transplant programs face growing workforce constraints, including shortages of transplant physicians and advanced practice providers, increasing clinical volumes, and challenges recruiting and retaining specialized personnel. Although implementation requires administrative investment, these approaches may reduce after-hours staffing costs, overtime, and post-call recovery requirements while preserving daytime clinical productivity. More importantly, staffing models that reduce excessive call burden may decrease burnout and turnover among

experienced transplant coordinators and physicians. High turnover can disrupt continuity of care, adversely affect patient and referring-provider satisfaction, increase the time required to develop transplant-specific expertise, and result in substantial institutional costs related to recruitment, onboarding, and training. Investment in sustainable staffing models may therefore provide both clinical and financial value by supporting workforce retention and maintaining consistent, high-quality transplant care.

International practices differ from some U.S. models in that donor offer calls are generally managed directly by transplant coordinators or transplant clinical nurse specialists rather than outsourced call services. Across Ireland, the United Kingdom, Canada, Australia, and New Zealand, donor offers are coordinated through national organ donation organizations or provincial organ procurement organizations and reviewed collaboratively by transplant coordinators, surgeons, and transplant physicians, illustrating regional variation while maintaining the central nursing role in donor offer management.

Finally, redistributing work to enable nurses to practice at the top of their license is essential. Programs that offload nonclinical tasks such as prior authorizations, scheduling, regulatory data collection, and equipment ordering to trained administrative staff, data personnel, or specialized clinicians report improved efficiency and reduced overtime, consistent with broader nursing literature.[27–30] Our data showed that around 31% of coordinators still perform scheduling, and that several centers are adding administrative teams and prior authorization teams to relieve clinical staff. In the survey, 22% of programs reported having a dedicated transplant educator; of those, 14% said the educator oversees new-hire training and allocation-policy updates. Participants voiced that workload and role delineation between TCs, and APRNs also vary by program, arguing for stratified benchmarking and published responsibility grids that define scope of decision making and transfers of care and responsibility. To address “work creep,” common support roles and workflow interventions used by programs to shift nonclinical tasks away from transplant coordinators and advanced practice providers are outlined in Table 3.

As transplant programs evolve and responsibilities are redistributed across multidisciplinary roles, preserving specialty expertise becomes as important as preventing role expansion beyond an individual’s training. Programs should define permissible task mixes for each role and implement standardized onboarding, competency-based education, periodic competency validation, and role-specific continuing education to maintain proficiency. Recertification through specialty organizations, where available, and standardized educational curricula help ensure consistency in clinical practice despite variation in staffing models. These strategies support workforce flexibility while reducing skill drift, maintaining high-quality patient care, and ensuring that educational content and clinical decision-making remain aligned with current evidence, regulatory requirements, and program standards.

5.2. Consensus statement

Staffing models: Acuity-driven staffing ratios, flexible hybrid in-house/on-call coverage models, and the selective use of outsourced donor-call services are endorsed to provide continuous 24/7 coverage while minimizing staff fatigue, reducing burnout, improving retention, and maintaining a sustainable transplant workforce.

5.3. Theme 2: Work environment, retention, and resilience

The American Association of Critical Care Nurses (AACN) Healthy Work Environment (HWE) standards[31] which include skilled communication, collaboration, decision making, appropriate staffing, meaningful recognition, and authentic leadership, provide the framework for evaluating work environment, retention, and resilience in thoracic transplant nursing. Transplant nurses identified a “healthy work environment” and “autonomy” as top satisfaction drivers, emphasizing the importance of reporting to leaders who understand transplant practice. Burnout contributors included after-hours call burden for TCs, portal/inbox message volume, insurer compliance tasks, and regulatory/compliance expectations. These align with post-pandemic findings on sustained Electronic Medical Record (EMR)/inbox demands and policy efforts, such as APRN e-visit billing to reduce message load.[32,33] Strategies suggested included offloading administrative tasks, providing protected time for focused work and recovery, and redesigning call teams. Consistent with these themes, 69.3% report availability of alternative scheduling (remote/hybrid or non-5–day work week); among those without it, 90.6% consider it important.

Burnout is common in transplant nursing due to sustained high-acuity caseloads, 24/7 on-call coverage, and the emotional demands of longitudinal care.[34,35] Research consistently shows that flexible scheduling, equitable

Table 3 Mitigating Work Creep by Supporting Personnel Who Off-Load Tasks From TCs and APRN/ANPs

Support personnel or team	Primary deliverables	TC and APRN/ANPwork off-loaded	When it becomes high value	Survey and roundtable signals
Transplant program administrative assistant	Scheduling support, meeting coordination, document management, phone routing, record requests	Routine scheduling, record retrieval, clerical follow-up that displaces clinical work	When coordinators are spending substantial time on clerical tasks and overtime increases	About 55% reported spending at least 26% of their week on administrative tasks, and about 31% of coordinators still perform scheduling
Scheduling and clinic operations coordinator	Clinic templates, appointment sequencing, test scheduling, rescheduling and no-show follow-up	Scheduling workload, coordination logistics, repetitive patient outreach for logistics	When clinic volume, annual testing, and telehealth follow-up expand and scheduling is a major system-level challenge	Scheduling remains common in TC workflows as noted above
Medical records and referral intake specialist	Outside record acquisition, referral packet completion, tracking missing components	Referral intake coordination, records retrieval, manual tracking of incomplete evaluation elements	When referral and evaluation throughput increases and delays are driven by missing documents	Supports the manuscript emphasis on evaluation coordination and throughput pressure
Prior authorization and insurance authorization team	Prior auth packets, payer communications, documentation collection, status tracking	Insurer compliance tasks, repeated portal or fax work, documentation rework	When authorization turnaround time and payer demands increase and displace clinical surveillance	Manuscript notes increasing insurer and compliance workload as a burnout contributor and describes centers adding authorization teams
Financial coordinator	Benefits verification, coverage counseling, financial clearance pathways	Financial clearance follow-up and repetitive payer navigation that often falls to clinical staff	When payer mix is complex and delays are common in evaluation and post-transplant medication access	Aligns with administrative off-loading theme and access barriers discussed in patient access section
Transplant data coordinator and regulatory reporting specialist	Registry reporting support, data entry, audit readiness, deadline tracking	Regulatory data collection and reporting that otherwise consumes nurse time	When audit and reporting requirements intensify and data work expands beyond what clinicians can absorb	Manuscript highlights administrative burden and calls for auditable workflows and dashboards
Quality improvement and outcomes analyst	Dashboards, metric definitions, performance monitoring, near-miss review support	Manual tracking of nurse-sensitive indicators and duplicative reporting	When programs adopt nurse-sensitive dashboards and need consistent definitions and reporting	Manuscript recommends dashboard tracking that links nursing activity to outcomes and retention
Dedicated transplant educator	Modular education curriculum delivery, education documentation, teach-back reinforcement, standardized updates	Repetitive education delivery, curriculum maintenance, portions of onboarding and policy updates	When patient education is frequent and recurrent across phases and staff onboarding is frequent	Survey: 22% reported a dedicated transplant educator, and 22% of programs reported having a dedicated transplant educator; of those, approximately half indicated the educator oversees new-hire training and allocation-policy updates.
Structured triage support for portal and inbox	Message routing rules, triage categories, standardized response pathways, patient education on urgent vs routine	Unfiltered inbox burden, interruptions, non-urgent message handling by clinical decision-makers	When portal and inbox message volume drives after-hours work and fragmentation	Manuscript identifies inbox and portal burden as a burnout contributor and recommends structured triage systems
Dedicated donor call model, remote call pool, or hybrid call structure	Offer screening workflows, standardized transfer-of-care and responsibility processes, protected post-call recovery structures	Continuous on-call burden borne by the same small group, unstructured after-hours work	When donor offer volume, time to decision pressure, and after-hours work increase	Survey: 39% reported TC-led in-house donor call teams; manuscript highlights call redesign as a key strategy
Outsourced procurement, perfusion support, and retrieval logistics partners	Retrieval logistics, perfusion-device management support, standardized vendor handoffs, transport coordination	Retrieval travel, logistics coordination, portions of perfusion-device coordination depending on model	When procurement complexity rises and internal teams cannot sustain retrieval logistics workload	Manuscript reports that about 70% outsource at least one component of offer review, recovery, or perfusion, with resulting workflow variability
EMR and digital workflow analyst	Smart phrases, standardized templates, e-checklists, structured fields, automation support	Duplicate documentation, manual tracking, inconsistent transfers of care and responsibility,and work that is hard to measure	When telehealth growth and documentation workload increase and standardization is needed	Manuscript endorses EMR tools, checklists, and tracking of coordinator work to reduce duplication

ANP, Advanced nurse practitioner; APRN, Advanced Practice Registered Nurse; EMR, Electronic medical record; TC, Transplant coordinator.

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workload distribution, and recognition programs such as professional development pathways can significantly reduce burnout and improve job satisfaction among nurses.[36–41] Resilience-building through peer support, mentorship, and structured onboarding is widely supported as a means to enhance nurse engagement and lower turnover. Tailored resilience training addressing stressors of organ allocation, critical illness, and post-transplant complexity is critical. Resilience, a protective factor against psychological harm,[42] supports nurses in maintaining emotional strength under pressure. However, chronic stress can erode team dynamics, especially when management support is lacking, leading to poor patient outcomes.[34,35,43,44]

Retention is also shaped by schedule design and professional growth and development. Flexible schedules and hybrid or virtual models are emerging strategies to address these issues, with lower turnover reported in programs that use them.[45,46] Participants cited success with 4 day 10-hour shifts, guaranteed post-call recovery, and hybrid arrangements. Structured onboarding and longitudinal mentorship improve first-year retention and role confidence, with reviews supporting 12-month transition programs and formal mentoring, especially valuable for smaller programs.[47,48] Programs should track environment metrics via the AACN healthy work environment (HWE) Assessment Tool, burnout indices, retention rates at 12/24 months, time to autonomy, internal transfers vs. exits, and after-hours/portal workload, benchmarking against national reports.[31,49]

5.4. Consensus statements

- *Work environment:* A healthy transplant program provides autonomy, supportive nurse leadership in collaboration with medical directors, shared governance and dedicated essential administrative assistance.
- *Retention and resilience:* Burnout can be reduced through flexible or hybrid schedules, formal mentoring, visible recognition and evidence-based resilience training continuing educational programs, opportunities/encouragement to participate in national transplant memberships/programs.

5.5. Theme 3: Workforce, roles and qualifications

The thoracic transplant landscape has grown more complex. Larger program volumes and broader donor acceptance, including DCD donation and increased extended-criteria donor cases, along with advances in organ perfusion, have expanded the scope and skill demands for TCs and APRNs. More complex candidate and recipient clinical requirements also contribute to this shift, with factors such as mechanical circulatory support/left ventricular assist device (MCS/LVAD) bridge status, sensitization, comorbidities, organ perfusion and re-transplantation needs shaping clinical decision-making. APRNs provide highly specialized transplant care across a broad continuum spanning inpatient, ambulatory care, and telehealth modalities. Standardizing roles and competencies across diverse program structures and responsibilities continues to be challenging.[11] In practical terms, TCs lead complex clinical protocols, interface with new donor technology and research protocols, navigate care trajectory from donor to discharge, patient/caregiver education, protocol-guided triage, and inter-team orchestration. Consistent with this role delineation, TCs predominantly perform evaluation (79%), waitlist activation (87%), waitlist updating (88%) and donor/recipient on-call responsibilities (around 55%). The Clinical Nurse Specialist (CNS) role which can vary oversees diagnosis, manages patient care elements as outlined by state scope (e.g., protocolized titration, surveillance clinics) and leads quality projects. Nonclinical administrative, data, or program specialist roles oversee patient scheduling, complete components of medical forms, and participate in the prior authorization process, or may assist with regulatory reporting aspects thus reducing workload duplication.[50,51]

As role complexity increases, staffing decisions should be informed by objective workload assessment rather than patient census alone. Programs should routinely evaluate coordinator and APRN workload using standardized measures, including caseload tracking aligned with the responsibility matrix and workload framework (Table 2), after-hours donor call frequency and duration, remote-monitoring and telehealth activity, outpatient encounter volume, and nonclinical responsibilities. Longitudinal review of these metrics, together with patient outcomes and program growth, provides a data-driven approach to identifying workload imbalance and determining when staffing models or role distribution should be reassessed.

Certification and international role responsibilities vary. The American Board for Transplant Certification (ABTC) credentials (e.g., Certified Clinical Transplant Coordinator (CCTC), Certified Clinical Transplant Nurse (CCTN) (bedside care) confirm specialty knowledge and, together with comparable national credentialing where

available, should be explicitly linked to career ladders and compensation, with ongoing competence maintained through recertification. Outside the U.S., role configurations differ; for example, in the UK, recipient TCs are embedded throughout the transplant pathway, with broader cross-coverage and donor retrieval responsibilities. These variations highlight the need to define permissible task mixes, such as logistics, offer data collection, and retrieval support—and to implement safeguards, including role-specific training, TC/APRN oversight at clinical decision points, clear escalation pathways, and auditable operational and clinical outcomes to inform triggers for staffing increases.[50] Amid this international variation, the panel reinforces the BSN as the entry-level educational standard for the TC role. Baccalaureate nursing education is now available in the large majority of countries,[52] so university-based preparation should be underscored as the expected foundation for these roles, supporting a deliberate move away from vocational or associate-degree-only preparation. Where such pathways are limited, programs should define an equivalent competency standard and a pathway to degree completion.

5.6. Consensus statements

- *Role scope and qualifications:* Every adult thoracic transplant nurse is expected to hold at least a BSN or equivalent, with an MSN or higher (or equivalent) for advanced practice roles, and to meet a common, competency-based certification standard.
- *Job description and title clarity:* Internationally harmonized job titles and detailed descriptions for transplant coordinator, advanced practice registered nurse and related roles are needed to guide staffing benchmarks and reduce confusion.
- *Workload and responsibilities:* Programs are encouraged to proactively assess coordinator and APRN workload using standardized measures that account for patient caseload and acuity, clinical practice responsibilities, administrative work, after-hours call, outpatient follow-up, remote monitoring, and program growth. Auditable operational, workforce, and clinical outcomes should be defined within each program to identify workload imbalance and establish objective triggers for staffing model review and resource allocation.
- *Program structure:* Clear delineation of responsibilities supported by policy across multidisciplinary teams (MCS/LVAD, pediatric/adult, inpatient/outpatient) prevents role overlap and improves efficiency.

5.7. Theme 4: Professional development and value of nursing

Professional development is a core enabler of full-scope TC/APRN practice and a practical lever for retention. Building on the survey findings summarized in the Current Issue Overview, participants identified 2 modifiable gaps: (1) the frequent absence of formal clinical ladders (around 62% of programs) and (2) limited support for specialty conference participation (reported as needed by 58.7%). We recommend: (i) career ladders tied to competencies and specialty certification (e.g., Coordinator I–III and Senior/Lead with a parallel APRN track), with transparent criteria and pay differentials; (ii) protected time and mentorship pipelines for Quality Improvement (QI), education, and research; (iii) conference support and continuing education to maintain leading-edge practice; and (iv) lateral expert tracks (e.g., education specialist; transplant quality manager) to recognize advanced, non-managerial expertise. Evidence from residency and transition-to-practice programs shows that structured development and mentoring improve early-career retention and readiness for practice.[47,48] These strategies align with national workforce evidence linking structured development to retention and recognition of nursing's value within thoracic transplantation.[11,53] Table 4 outlines concrete strategies for professional development, offering a structured pathway that includes internal role progression, committee participation, and opportunities for professional recognition and advanced education. Positioning this agenda through a value lens aligns with the American Nurses Association's national guidance to make nursing's value contribution visible through outcomes rather than solely labor costs (Table 5).[44,54]

Nursing value can be further demonstrated as programs invest in nurse-led quality improvement and research by providing protected time, mentorship pipelines, and seed grants to support these efforts. Evaluating impact should focus on practical indicators that capture quality, outcomes, and efficiency. These include adherence to clinical protocols, timely action on key care processes such as authorization and follow-up, and completion and comprehension of patient education. Clinical outcomes of interest encompass short-term readmissions, acute rejection episodes requiring treatment, infections necessitating intravenous antibiotics, emergency department visits, and inpatient days per patient year. Psychological and behavioral outcomes, health-related quality of life,

Table 4 Professional Growth Strategies for Thoracic Transplant Coordinators, APRN/ANPs

Role	Opportunities to grow (role options in transplant program)	Places to grow (committees)	Professional recognition	Educational growth make learning a ritual
Coordinator (Heart, Lung, VAD)	Pre-transplant Waitlist Post-transplant Annuals Inpatient Clinic Manager Provide coaching to new staff, student nurses	Transplant Quality Hospital committees (Ethics, Policy, Magnet) Local OPO committees UNOS Regional committees UNOS national committees SRTR committees ISHLT committees ITNS committees NATCO committees AST ASTS	*Publish* a case report *Co-author* a paper *Co-author* a chapter Submit abstract: • ISHLT • NATCO • ITNS	Quality courses Six Sigma *Back to college* - Nurse Practitioner - DNP - PhD - MBA Request attendance at one national educational program each year

AST, American Society of Transplantation; ASTS, American Society of Transplant Surgeons; DNP, Doctor of Nursing Practice; ISHLT, International Society for Heart and Lung Transplantation; ITNS, International Transplant Nurses Society; MBA, Master of Business Administration; NATCO, The Organization for Transplant Professionals; OPO, Organ Procurement Organization; PhD, Doctor of Philosophy; Six Sigma, A method used to improve business processes by reducing errors or defects; SRTR, Scientific Registry of Transplant Recipients; UNOS, United Network for Organ Sharing; VAD, Ventricular Assist Device (a mechanical pump that helps a weakened heart circulate blood).

and patient satisfaction provide additional insight into care impact. Workforce measures, such as 12- and 24-month retention, time to autonomy, and internal transfers compared with program departures—reflect sustainability of the nursing workforce, while financial indicators may include avoidable utilization, authorization cycle times, and cost avoidance associated with standardized TC/APRNs interventions. Establishing a shared transplant nurse benchmarking collaborative with a collective data dictionary and common quarterly dashboards would further standardize reporting and accelerate learning. Finally, incorporating access and standardized metrics, including referral-to-evaluation time, interpreter utilization, and telehealth engagement, ensures that measurement reflects the full scope of nursing impact. This measurement framework highlights the robust link between nursing capability and patient outcomes[18] and supports the National Academy of Sciences, Engineering, and Medicine (NASEM) call to explicitly connect nursing contributions to health and equity goals.[44]

5.8. Consensus statement

- *Professional development:* Career ladder frameworks linked to specialty certification, advanced degrees and funded continuing education opportunities are essential for recruitment and retention.

5.9. Theme 5: Clinical processes and protocols

Standardized, nurse-driven protocols covering themes such as insulin titration, immunosuppression adjustments, and rapid clinical escalation have been shown to improve timeliness and consistency of care.[55–60] Standardizing pathways in transplant care improves adherence to guidelines, reduces variation, and enhances patient outcomes, particularly in complex post-operative management, although further research is needed to establish long-term benefits and ensure an appropriate balance with individualized care.[61–65] Where complex desensitization therapy is offered, the plan is most commonly managed by transplant pharmacists (31%), APRNs (20%), and TCs (18%), underscoring the need for clearly scoped, protocolized tasks.

Standardizing the clinical processes in which inconsistent practice most threatens safety or delays care is both a safety and efficiency imperative, and it must be carried out within each clinician's licensure and scope. New ISHLT candidate selection guidance further emphasizes structured, team-based processes with explicit inclusion/exclusion criteria and oversight pathways.[66] Our Consensus 2025 discussions support TC- and APRN-executed protocols governed by standing orders, competency verification, and defined escalation. Transplant programs face greater clinical complexity and after-hours coordination. Standardized workflows reduce unwarranted variation and provide performance consistency.

Table 5 Consensus Statements Derived from the 2025 Conference.

Overarching themes	Consensus statement	Strategies for achieving the consensus statement
Staffing Models & Workload	*Staffing models*. Acuity-driven staffing ratios, flexible hybrid in-house/on-call coverage models, and the selective use of outsourced donor-call services are endorsed to provide continuous 24/7 coverage while minimizing staff fatigue, reducing burnout, improving retention, and maintaining a sustainable transplant workforce.	• Adopt acuity- and complexity-adjusted, phase-specific ratios (referral, evaluation, waitlist, peri-transplant, early/late post-transplant) rather than static benchmarks. • Establish hybrid call structures with protected post-call recovery and rotation across in-house, remote, and vendor models. • Selectively contract outsourced donor call, retrieval, and perfusion vendors with auditable workflows and shared accountability standards. • Use a responsibility matrix (Table 2) to delineate TC vs. APRN scope and identify duplication. • Offload non-clinical tasks (scheduling, prior authorization, regulatory data, equipment ordering) to dedicated administrative, data, and authorization personnel (Table 3).
Work Environment & Retention	*Work environment*. A healthy transplant program provides autonomy, supportive nurse leadership in collaboration with medical directors, shared governance and dedicated essential administrative assistance.	• Apply the AACN Healthy Work Environment standards (skilled communication, collaboration, decision-making, appropriate staffing, meaningful recognition, authentic leadership). • Establish shared governance councils with TC and APRN representation. • Ensure transplant nurse leaders co-lead programmatic decisions with medical directors. • Allocate dedicated program administrative assistant support to every team. • Benchmark culture and engagement annually using the AACN HWE Assessment Tool.
	Retention & resilience. Burnout can be reduced through flexible or hybrid schedules, formal mentoring, visible recognition and evidence-based resilience training continuing educational programs, opportunities/ encouragement to participate in national transplant memberships/programs.	• Adopt flexible scheduling models such as 4 × 10 shifts, hybrid/ remote arrangements, and guaranteed post-call recovery. • Implement 12-month structured onboarding and transition-to-practice programs. • Establish formal mentorship pipelines and longitudinal peer support. • Deliver tailored resilience training addressing allocation, critical illness, and post-transplant stressors. • Track 12- and 24-month retention, time to autonomy, internal transfers vs. exits, burnout indices, and after-hours/portal workload. • Implement visible recognition programs (peer, leadership, and program-level).
Workforce, Roles & Qualifications	*Role scope & qualifications*. Every adult thoracic transplant nurse is expected to hold at least a BSN or equivalent, with an MSN or higher (or equivalent) for advanced practice roles, and to meet a common, competency-based certification standard.	• Require BSN or equivalent as entry-level preparation for TCs and MSN or DNP (or equivalent) for APRN roles. • Link ABTC credentials (CCTC, CCTN), or comparable national credentialing where available to hiring, advancement, and pay differentials. • Maintain ongoing competence through recertification cycles and periodic skills validation. • Partner with ISHLT and ITNS to define a common competency-based certification standard.
	Job description & title clarity. Internationally harmonized job titles and detailed descriptions for transplant coordinator, advanced practice registered nurse and related roles are needed to guide staffing benchmarks and reduce confusion.	• Develop ISHLT-endorsed harmonized job descriptions anchored in core program functions rather than uniform titles. • Define permissible task mixes for international role variations (e.g., UK retrieval-active TCs, prescribing vs. non-prescribing APRN models). • Specify role-specific training, RN/APRN oversight at clinical decision points, and clear escalation triggers. • Maintain auditable role-outcome documentation to support comparability across centers.
	Workload & responsibilities. Programs are encouraged to proactively assess coordinator and APRN workload using standardized measures that account for patient caseload and acuity, clinical practice responsibilities, administrative work, after-hours call, outpatient follow-up, remote monitoring, and program growth. Auditable operational, workforce, and clinical outcomes should be defined within each program to identify workload imbalance and establish objective triggers for staffing model review and resource allocation.	• Apply the responsibility matrix and workload tracking framework (Table 2). • Quantify clinical, administrative, after-hours, and outpatient follow-up time when setting caseloads. • Use stratified benchmarking by program size and phase of care. • Publish responsibility grids defining scope of decision-making and transfers of care. • Address "work creep" by pairing each new responsibility with a corresponding resource or offload action.
	Program structure. Clear delineation of responsibilities supported by policy across multidisciplinary teams (LVAD, pediatric/adult, inpatient/outpatient) prevents role overlap and improves efficiency.	• Establish written policies delineating responsibilities across MCS/ LVAD, pediatric/adult, and inpatient/outpatient teams. • Document interdisciplinary handoffs and transfer-of-care expectations. • Define escalation pathways and decision authority by role. • Audit workflow adherence and revise based on near-miss review.

Continued

Table 5 Consensus Statements Derived from the 2025 Conference.

Overarching themes	Consensus statement	Strategies for achieving the consensus statement
Professional Development & Impact Measurement	*Professional development*. Career ladder frameworks linked to specialty certification, advanced degrees, and funded continuing education opportunities are essential for recruitment and retention.	• Implement Coordinator I–III and Senior/Lead ladders with a parallel APRN track and transparent advancement criteria. • Create lateral expert tracks (education specialist, transplant quality manager, data/research lead) to recognize advanced non-managerial expertise. • Provide protected time, mentorship pipelines, and seed grants for nurse-led QI and research. • Fund annual specialty conference attendance and continuing education. • Apply the growth strategies framework (Table 4) for committee, publication, and educational pathways.
	Coordinator impact measurement. Centers should track nurse-sensitive indicators on a dashboard that links transplant nursing activities to patient outcomes, staff retention, and financial performance.	• Build a nurse-sensitive dashboard spanning process (protocol adherence), clinical (30-day readmits, rejection, infection, ED visits, inpatient days/patient-year), workforce (retention, time to autonomy), financial (avoidable utilization, authorization cycle times), and standards (referral-to-evaluation time, interpreter use, telehealth engagement) themes. • Establish a shared transplant nurse benchmarking collaborative with a common data dictionary and quarterly dashboards. • Align measurement with the ANA Nursing Human Capital Value Model to make nursing's contribution visible.
Clinical Processes & Protocols	*Policy & guidelines*. Standardized nurse-led protocols (e.g., insulin titration, immunosuppression adjustment) and structured "reason for decline" fields in donor offer systems should be embedded in daily practice.	• Develop nurse-led protocols governed by standing orders, competency verification, and defined escalation. • Implement inpatient hypoglycemia monitoring and insulin titration protocols aligned with ADA Standards of Care. • Implement protocolized tacrolimus and immunosuppression adjustment per therapeutic drug monitoring guidance, where prescriptive privileges exist. • Pair clear inclusion/exclusion criteria with countersignature rules, periodic skills validation, and routine near-miss review. • Embed structured "reason for decline" fields in donor offer documentation to support analytics and quality review.
Technology & Innovation	*Technology & tools*. Telehealth, EMR smart phrases, electronic checklists, and other digital solutions should be deployed to streamline documentation, workflow, and reduce duplication of effort.	• Deploy EMR smart phrases, e-checklists, and a single standardized transfer-of-care note for transplant workflows. • Integrate telehealth with structured triage (emergent, urgent, routine, administrative) and explicit response-time standards. • Track coordinator work (offer reviews, prior authorization packets, message handling) so administrative load is visible and fairly resourced. • Adopt e-visit billing where permitted to recognize portal/inbox workload. • Reduce documentation duplication through automation, templated fields, and EMR analyst partnership.
	Organ offer process. Digital donor offer platforms that capture point-and-click acceptance/decline reasons improve transparency, data quality, and allocation algorithms.	• Adopt UNOS/OPTN Offer Filters where available and advocate for thoracic-specific expansion. • Implement click-select decline reasons with accompanying free-text justification fields. • Standardize timestamps for "offer in," "first touch," and "decision" to support benchmarking. • Define explicit after-hours transfer-of-care protocols specifying responsibility and required information exchange. • Enforce consistent vendor and internal-team accountability standards. • Use refusal/decline analytics to identify patterns by reason, time of day, and donor type.

Continued

Table 5 Consensus Statements Derived from the 2025 Conference.

Overarching themes	Consensus statement	Strategies for achieving the consensus statement
Patient Access & Standardization	*Education (patient & caregiver)*. A universal, modular transplant education curriculum—delivered at evaluation, admission, discharge, and follow-up—should be adopted across centers.	• Adopt a modular curriculum of 10–30 minute sessions with organ-specific add-ons. • Deliver education at evaluation, admission, discharge, and follow-up. • Display education completion and comprehension on a quality dashboard. • Employ dedicated transplant educators to standardize delivery and reduce coordinator redundancy. • Apply teach-back to confirm comprehension.
	Patient education access. Shared care pathways, telehealth checklists, and language- and literacy-appropriate materials are required to ensure equitable follow-up for recipients who live remotely or relocate, with measurement of completion, comprehension, and impact on outcomes.	• Standardize professional interpreter use and integrate interpreters into telehealth platforms. • Provide pre-visit tech checks and digital literacy support for patients with limited English proficiency or limited device access. • Develop language- and literacy-appropriate education materials. • Use remote monitoring with structured EMR fields, triage rules, and clear escalation paths to protect nurse time. • Implement shared care pathways for recipients who relocate or live remotely. • Track no-show rates, referral-to-evaluation time, interpreter utilization, and navigator caseload/outcomes as standard indicators.

BSN, Bachelor of Science in Nursing; EMR, Electronic Medical Record; LVAD, Left Ventricular Assist Device; MSN, Master of Science in Nursing.

Nurse driven protocols in thoracic transplant may include standardized transplant evaluation pathways, lab monitoring, in-patient nurse-initiated hypoglycemia monitoring, management and insulin titration grounded in the American Diabetes Association Standards of Care.[67] Immunosuppression is also amenable to protocolized APRN action in areas where nurses have prescriptive privileges. Drug adjustment of medications such as tacrolimus can be safely aligned with therapeutic drug monitoring guidance with a protocol.[68] From the North American perspective, implementation should pair clear inclusion/exclusion criteria with countersignature rules, periodic skills validation, and near-miss reviews to sustain provider trust, which was an issue raised repeatedly during the conference. Internationally, nurse-led management of transplant recipients varies according to national regulatory frameworks and institutional practice. In some countries, including Ireland and New Zealand, advanced practice nurses with prescribing authority may titrate immunosuppressive medications according to approved protocols. Canadian programs also reported protocol-based outpatient immunosuppression titration and diagnostic test ordering by experienced transplant registered nurses under formal medical directives. In contrast, these medication adjustments are generally performed by physicians in the United Kingdom and Australia, and exclusively by physicians in Austria, where nurses do not hold prescriptive authority for immunosuppressive therapy. These differences underscore the importance of aligning nursing responsibilities with local regulations, institutional policies, and collaborative practice models.

5.10. Consensus statement

- *Policy and guidelines:* Standardized nurse led protocols (e.g., insulin titration, immunosuppression adjustment) and structured "reason for decline" fields in donor offer systems should be embedded in daily practice.

5.11. Theme 6: Technology and innovation

Evidence from health system studies shows that telehealth growth has increased time spent in the EMR during and outside scheduled hours, underscoring the need for streamlined templates and automation to prevent shifting burden onto TCs and APRNs.[32,69–71] Standardized checklists and handoff bundles, defined as structured transfer-of-care tools, improve reliability and safety principles directly applicable to EMR smart phrases, e-checklists, and a single standardized transfer-of-care and responsibility note for transplant workflows.[72–74] Participants emphasized the importance of "maximizing technology and reducing duplication" and called for improved "tracking of coordinator work" (e.g., offer reviews, prior authorization packets) so administrative workload is visible and fairly resourced.

Digital organ offer pathways demonstrate how structured data streamlines workflow and accelerates care delivery.[75,76] Although United Network for Organ Sharing/Organ Procurement and Transplantation Network (UNOS/OPTN) Offer Filters enable programs to exclude offers they will not accept, thoracic filtering options remain more limited than those developed for abdominal allocation Updating and monitoring refusal or decline codes enhances analytics for allocation and program quality, allowing teams to identify patterns by reason, time of day, and donor type.[77,78] Beyond allocation information technology, formal collaborations with industry partners have become increasingly common, with approximately 69% of centers now outsourcing one or more components of donor procurement. These partnerships often involve the use of commercial organ preservation or transport systems and external teams that manage logistics, perfusion, or data reporting functions. While such arrangements can improve efficiency and expand donor utilization, they may also introduce variability in processes, communication, and accountability across programs. To mitigate these challenges, the consensus panel emphasized the importance of standardized and auditable workflows, including structured digital documentation with click-select decline reasons and accompanying free-text justification fields, uniform timestamps that capture key decision points such as “offer in,” “first touch,” and “decision,” and explicit after-hours transfer-of-care protocols that clearly define responsibility and required information exchange. Together, these measures align with the UNOS/OPTN Offer Filters and refusal code framework, promoting transparency, traceability, and performance benchmarking across centers while ensuring that both internal teams and external vendors adhere to consistent standards for timeliness, completeness, and communication fidelity throughout the donor procurement process.

Documentation of donor offers and declined organ acceptances likewise varies internationally. Participating centers in Ireland, the United Kingdom, Canada, Australia, New Zealand, and Austria all maintain structured records of donor offers, acceptance or decline decisions, and multidisciplinary review processes, using combinations of national electronic donor records, institutional databases, coordination logs, quality review meetings, and organ offer reports generated by organ procurement organizations. Canadian programs additionally reported routine weekly reports summarizing accepted and declined donor offers, reasons for decline, recipient allocation, and whether organs were ultimately transplanted elsewhere. Austrian centers record every donor offer and its final outcome (e.g., accepted, transplanted, or declined) in an institutional log. These practices reinforce the importance of automated standardized documentation and quality assurance regardless of the specific information system employed.

As communication volumes increase, structured triage systems (emergent, urgent, routine, administrative) and response time standards are recommended, along with patient education on appropriate after-hours communication and queue routing enabling clinicians to work at the top of their license. Early evaluations indicate that e-visit billing can modestly reduce message volume and remain acceptable to clinicians.[32,79]

5.12. Consensus statements

- *Technology and tools:* Telehealth, EMR smart phrases, electronic checklists and other digital solutions should be deployed to streamline documentation, workflow and reduce duplication of effort.
- *Organ offer process:* Digital donor offer platforms that capture point and click acceptance/decline reasons improve transparency, data quality and allocation algorithms.
- *Coordinator impact measurement:* Centers should track nurse-sensitive indicators on a dashboard that links transplant nursing activities to patient outcomes, staff retention and financial performance.

5.13. Theme 7: Patient education access

Structured, modular education delivered at evaluation, waitlisting, procedures, admission, discharge, and follow-up improves self-management and adherence in transplant populations.[67,80–82] Repeated, personalized, and multidimensional education is an effective way to improve medication adherence in solid organ transplant recipients.[6,83,84] Ladin et al. reported that telehealth-enabled education enhances access, particularly for rural patients, though preferences vary and digital literacy remains a barrier.[85] Consensus participants called for a standardized, modular approach to transplant education, delivered as concise 10–30 minute sessions with organ-specific add-ons. Rather than repeating a single curriculum at every encounter, they recommended that each module be mapped to a specific trajectory phase (evaluation, admission, discharge, and follow-up), so that

content is standardized across centers while the educational focus differs by phase to match the patient's needs at that stage. They further recommended integrating this approach into every care plan and displaying completion on a quality dashboard for routine metric review. Programs that employ dedicated transplant educators described more consistent delivery of patient education and fewer redundant tasks for transplant coordinators. This support frees coordinators to focus on other aspects of care and helps sustain top-of-license practice. Dedicated transplant educators strengthen the workforce by leading staff orientation, competency assessment, continuing education, and dissemination of evolving regulatory and practice standards. By promoting a well-prepared and consistently trained workforce, these roles support the quality and consistency of patient education delivered by the clinical team, facilitate adoption of evidence-based practices, and enhance program readiness for regulatory and accreditation requirements. National guidance similarly urges organizations to hardwire access equity into standard work and measurement, and to normalize the use of professional interpreters and health literacy practices such as teach-back to reduce preventable misunderstandings.[44,86,87]

Telehealth is emerging as a routine approach to education when clinically appropriate to preserve quality while reducing travel burden. Solid organ literature supports remote follow up and home monitoring in kidney and lung transplantation. Studies show that patients with limited English proficiency use video less often without targeted supports highlighting the need for interpreter enabled platforms and pre-visit tech checks.[88,89] Remote monitoring provides data on vitals, spirometry, and symptom checks and should be entered in the EMR as *structured fields* with triage rules and escalation paths that protect nurse time. Nurses make a positive impact on patient outcomes through patient teaching.[90] Participants recommended standardization of nurse-sensitive indicators to include transplant specific health-related quality of life indicators. Tracking no-show rates, time from referral to evaluation, interpreter utilization, and navigator caseload/outcomes are helpful metrics to monitor patient responsibility and nursing impact.

5.14. Consensus statements

- *Education (patient and caregiver):* A universal, modular transplant education curriculum—delivered at evaluation, admission, discharge and follow-up should be adopted across centers.
- *Patient Education Access:* Shared care pathways, telehealth checklists and language language/literacy-appropriate materials are required to ensure equitable follow up for recipients who live remotely or relocate, measurement of completion, comprehension, and impact on outcomes.

6. SUMMARY

The 2025 ISHLT Nursing Consensus Conference brought together thoracic transplant nurses from 8 countries through a survey, virtual roundtables, and facilitated in-person sessions. Its most consistent finding was convergence. Despite wide international variation in titles, prescribing rights, educational preparation, and care models, participants identified the same core threats to the workforce. These were driven not by clinical complexity itself but by structural factors: the incremental accumulation of duties without added resources ("work creep"), ambiguity between coordinator and advanced practice roles, administrative and after-hours burden, and the absence of clear career structures. Across every data source, nurses described themselves as the institutional memory holding fragmented systems together, performing essential work that staffing models and productivity metrics rarely capture.

Because these pressures are systemic rather than incidental, the panel concluded that they require system-level redesign rather than further redistribution of tasks. The resulting consensus statements cohere around a consistent set of principles: matching staffing to acuity and phase of care, protecting recovery within modernized call structures, offloading non-clinical work to dedicated personnel, clarifying and harmonizing roles while preserving flexibility for diverse program models, linking competency-based career ladders to certification, and using technology and standardized education to reduce duplication rather than add to it. Underlying all of them is one priority shared across regions and program sizes: sustaining the thoracic transplant nursing workforce through retention, role clarity, work–life balance, and recognition. That goal depends, in turn, on making nursing's contribution visible through patient outcomes, not labor costs alone.

7. LIMITATIONS

This consensus document should be interpreted in the context of several limitations. First, it is recognized that although small, our sample size was similar in country representation and number of conference participants when compared to that of the first Nursing Consensus conference of 2015. All perspectives shared were valuable and resonated with attending participants but they reflect the experiences of individual nurses rather than systematic national or institutional viewpoints. Outreach extended to thoracic transplant nursing communities in Asia Pacific, Latin America, Africa, and much of Europe, yet response and attendance from these regions remained limited, with the cost and logistics of international travel likely a principal contributor. Language barriers at the live components were limited: Interprefy,[91] a real-time AI-based translation tool was used during the virtual roundtables, and the single in-person participant who required language support was accommodated through a mobile translation application and a bilingual colleague. The survey, however, was offered only in English and Spanish, which likely constrained survey response among nurses in regions where neither is a primary professional language. Building on this experience, future consensus efforts could broaden participation by extending AI-based translation to survey dissemination and scaling real-time translation across all formats. Realizing that potential will require validating medical translations, retaining human oversight, and accounting for differences in digital access so that the technology broadens rather than narrows representation. Second, survey respondents were predominantly North American (77.3%), with European participation at 12.3%. Findings therefore reflect a North American weighted view of practice patterns, workload, and workforce priorities. Any application of these findings must account for differences in international healthcare systems, local regulatory frameworks, economic contexts, and care delivery models. Notwithstanding the geographic differences in practice, the themes identified in the conference resonated with participants across regions, allowing the group to reach consensus on the issues raised and the recommendations proposed.

Third, although survey responses informed conference discussions and consensus recommendations, efforts were made to minimize inherent transplant program biases through group-based consensus determination for each proposed recommendation. In addition, self-reported estimates of workload, job satisfaction, and burden may not fully reflect objective conditions across the broader transplant workforce; however, these findings provide a strong rationale for further investigation.

Finally, consensus was established through open deliberation and voting rather than an anonymized, quantified process such as a formal Delphi method; agreement thresholds were not pre-specified, and vote tallies were not recorded. The degree of agreement for individual statements therefore cannot be quantified, and recommendations should be interpreted as consensus-derived expert guidance informed by survey and roundtable data.

8. CONCLUSION

Consensus is a starting point, not an endpoint. Several of the gaps surfaced in 2025, including role ambiguity, absent career structures, and the under-recognition of nursing's value, were already named a decade ago and will persist unless deliberate action follows. Many of the directions endorsed here, however, are consensus-derived and now require dedicated exploration and data to support their adoption. Foremost among these is the move from static benchmarks to acuity- and phase-specific staffing: realizing this shift will depend on developing and validating acuity-weighting tools, quantifying workload across the referral, evaluation, waitlist, peri-transplant, and post-transplant phases, and linking staffing intensity to patient and workforce outcomes before fixed ratios can be responsibly replaced. The same evidentiary work applies to competency-based career ladders, modernized call structures with protected recovery, and the dedicated administrative, educational, and technological support intended to keep nurses practicing at the top of their license, each warrants prospective study to confirm its effect on retention, top-of-license practice, and patient outcomes. The rich information generated by this one-day conference is intended to begin framing that direction of focus, not to complete it. Defining and validating the outcome measures against which these recommendations should be judged was beyond the scope and design of a conference convened to build consensus on practice and value; it is dedicated methodological work that lies ahead.

Recipient acuity will continue to rise, and donor technologies will continue to outpace existing staffing models. The question is therefore no longer whether the thoracic transplant nursing workforce must be strengthened, but

how quickly the field can generate the evidence to guide that strengthening and act on it. Converting these consensus statements into measurable change over the coming decade is the surest way to sustain the workforce on which transplant patients ultimately depend.

CONFLICTS OF INTEREST STATEMENT

The authors report no conflict of interest for this paper.

APPENDIX 1

Consensus Conference Participants:

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APPENDIX A. SUPPORTING MATERIAL

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.healun.2026.09.024.

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