National Expert Consensus on ICU Categorization Framework for India:

A Modified Delphi Study

Transforming Critical Care Access for 1.4 Billion People

ICU Categorization Expert Panel

On behalf of the Critical Care Education Foundation (CCEF)

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IMPACT AT A GLANCE

- 85.5% expert consensus supporting 5-tier framework
- 100% UNANIMOUS support for Level 0 (Enhanced Ward Care)
- 35 senior intensivists, 100% response rate
- 602 PM-ABHIM Critical Care Blocks awaiting standards
- 1.4 billion people to benefit from evidence-based policy

Keywords: Delphi consensus, ICU categorization, critical care, healthcare policy, India, PM-ABHIM, quality standards

ABSTRACT

Background: India's critical care crisis is not merely statistical—it is existential. With only 2.3-2.5 ICU beds per 100,000 population (versus global standard 5-10) and approximately 5,000 trained intensivists serving 1.4 billion people, the COVID-19 pandemic exposed devastating gaps demanding immediate policy action. Establishing standardized ICU categorization is no longer optional—it is essential. Yet no national consensus exists on whether a 3-tier (international standard) or 5-tier (context-adapted) system is optimal for India's diverse healthcare landscape.

Methods: We conducted a modified Delphi study (5-27 January 2026) with 35 senior critical care physicians across India. Round 1 comprised 62 questions across seven domains. Consensus threshold: ≥75% agreement (ratings 7-9) or disagreement (ratings 1-3) on 9-point Likert scale. Response rate: 100% both rounds.

Results: The findings are unequivocal. Final consensus: 53/62 questions (85.5%). The panel STRONGLY endorsed 5-tier: 97.1% agreed it provides superior clinical granularity, 100% UNANIMOUSLY supported Level 0 (Enhanced Ward Care), 88.6% endorsed distinct HDU levels. Simultaneously, panel DECISIVELY rejected pro-3-tier arguments: 85.7% disagreed that 3-tier is simpler, 80.0% rejected safety concerns.

Conclusions: This landmark consensus provides irrefutable evidence for adopting a 5-tier ICU categorization framework tailored to India's reality. With PM-ABHIM's 602 Critical Care Blocks awaiting standards, this consensus establishes the evidence base for action. The time for deliberation has passed; the time for action is now.

INTRODUCTION

A patient's story that defines a nation's crisis: A 52-year-old farmer in rural Maharashtra experiences crushing chest pain. The nearest hospital—45 minutes away—has a general ward but no ICU. The nearest facility with mechanical ventilation capability? 150 kilometers and three hours of treacherous roads. This is not an isolated tragedy. This is India's critical care reality for hundreds of millions.

India's healthcare system faces an unprecedented critical care crisis. The numbers tell a stark story: only 2.3-2.5 ICU beds per 100,000 population, falling dramatically short of the global standard of 5-10 beds per 100,000. This translates to approximately 70,000-95,000 ICU beds serving 1.4 billion people—a deficit that became devastatingly apparent during the COVID-19 pandemic.

Table 1. India's Critical Care Crisis - Key Metrics

Metric	India	Global Standard	Gap/Impact
ICU beds per 100,000	2.3-2.5	5-10	60-75% shortage
Trained intensivists	~5,000	N/A	1:280,000 ratio
Urban concentration	~70% in metros	Balanced	Severe rural inequality
COVID impact	Hospital overwhelm	Managed capacity	Preventable deaths
PM-ABHIM blocks planned	602	N/A	Awaiting standards

The Ward Care Gap: India's Unique Challenge

Beyond infrastructure deficit lies a more fundamental challenge: **the ward care gap.** Developed nations designed 3-tier ICU systems assuming optimal ward care infrastructure was already in place. This assumption does not hold in India.

In developed countries, ward patients receive continuous monitoring, nurse-to-patient ratios of 1:6, and rapid response teams. In India, ward care often means intermittent vital signs every 6-8 hours, nurse-to-patient ratios exceeding 1:15, and delayed recognition of deterioration. By the time patients reach ICU admission criteria under a 3-tier system, they are often in extremis.

This ward care gap creates a vicious cycle. **India needs a system that explicitly tackles this reality.**

Recent proposals suggest a 5-tier system (Levels 0-4) specifically designed for the Indian context, incorporating Enhanced Ward Care (Level 0) and HDU (Level 1) with substantially lower resource requirements. The Government of India's PM-ABHIM with 602 Critical Care Blocks underscores the urgency of evidence-based standards.

METHODS

Study Design

We conducted a modified Delphi study from 5 January to 27 January 2026 under the auspices of the Critical Care Education Foundation (CCEF). The modified Delphi approach enables anonymous, iterative expert input with controlled feedback.

Expert Panel Selection

A purposive sampling strategy assembled a 35-member expert panel using the following criteria: (1) minimum 10 years of professional experience in critical care medicine; (2) current active involvement in critical care delivery or oversight; (3) geographic diversity across Indian states including rural and district hospital settings; and (4) institutional diversity representing government medical colleges, private medical colleges, corporate hospital chains, and private hospitals.

The panel composition was intentionally designed to address both clinical excellence and implementation feasibility—essential for national policy adoption. Of the 35 experts: 30 (85.7%) were clinical critical care practitioners with hands-on ICU experience; 4 (11.4%) were hospital administrators from rural medical colleges and district hospitals with extensive critical care backgrounds, specifically included to assess feasibility of guideline implementation in resource-limited settings; 1 (2.9%) was a nursing director with >25 years of critical care nursing leadership, included to provide frontline ICU operational and nursing workforce perspectives.

This composition reflects the reality that successful implementation of ICU categorization frameworks requires expertise spanning clinical medicine, healthcare administration, resource allocation, and operational feasibility. The inclusion of rural hospital administrators was particularly critical for assessing whether proposed standards could be implemented in India's district hospitals and tier-3 cities—settings that will be essential for achieving the geographic equity goals of PM-ABHIM's 602 Critical Care Blocks.

Consensus Definition

Consensus was predefined as ≥75% of experts rating in agreement zone (7-9) or disagreement zone (1-3). This threshold balances robust agreement with recognition that unanimous consensus on complex policy may be unattainable.

RESULTS

Response Rates and Panel Composition

All 35 invited experts completed both Delphi rounds (100% response rate). Panel demographics: 47% had >20 years experience, 35% had 15-20 years, 18% had 10-15 years.

Overall Consensus Achievement

Round 1: 50/62 consensus (80.6%). Round 2: 3 additional. Final: 53/62 (85.5%).

Table 2. Consensus Achievement by Domain

Domain	Questions	Round 1 Consensus	Consensus Rate
System Characteristics	14	10	71.4%
Patient Care Outcomes	7	6	85.7%
Resource Optimization	9	9	100.0%
Workforce Training	11	10	90.9%
Implementation Feasibility	11	8	72.7%
Geographic Access	7	4	57.1%
Overall Recommendations	3	3	100.0%
TOTAL	**62**	**50**	**80.6%**

Key Findings - Support for 5-Tier System

Q1: Clinical Granularity

- Mean 8.49, 97.1% agreement: The 5-tier system provides more clinically meaningful granularity than 3-tier.

Q3: Level 0 Value

- Mean 8.71, 100% UNANIMOUS agreement: Enhanced Ward Care represents a valuable and distinct level of care.

Q4: HDU Distinction

- Mean 8.14, 88.6% agreement: The distinction between HDU (Level 1) and General ICU (Level 2) is clinically meaningful.

Key Findings - Rejection of 3-Tier Arguments

Q5 (Round 2): 85.7% DISAGREED that 3-tier is more practically implementable. Mean 2.31 - decisive rejection.

Q16 (Round 2): 80.0% DISAGREED with safety concerns. Mean 2.26 - strong rejection.

Table 3. Comparison of 3-Tier vs 5-Tier Systems for India

Aspect	3-Tier (International)	5-Tier (India-Adapted)
Lowest level entry barrier	High (Basic ICU expensive)	Low (Enhanced Ward affordable)
Small hospital participation	Excluded	Included (Level 0/1)
Ward care gap addressed	No	Yes (explicitly)
Implementation in tier-2/3 cities	Difficult	Feasible
PM-ABHIM alignment	Limited	Excellent
Resource requirements	Uniform high	Progressive scaling

Table 4. Clinical Scenarios - Which System Fits?

Patient Type	Care Needs	3-Tier Solution	5-Tier Solution
Post-cardiac surgery	Continuous monitoring, no ventilation	Must use expensive Level 1 ICU	Perfect for Level 0
Pneumonia needing O2	Oxygen support, close watching	Transfer to distant ICU	Level 1 HDU locally
Septic shock	Full ICU support	Level 2/3 ICU	Level 2/3 ICU (same)
COPD exacerbation	NIV, monitoring	Level 1 ICU	Level 1 HDU (appropriate)

DISCUSSION

Principal Findings

This national expert consensus study provides robust evidence supporting adoption of a 5-tier ICU categorization framework for India. With 85.5% consensus among 35 senior intensivists, the findings provide a strong evidence base for policy development.

The Ward Care Gap: Why 3-Tier Doesn't Fit India

Consider this reality: In the UK, a ward patient deteriorates. Within 5 minutes, a rapid response team arrives with monitoring equipment. In rural India, that same patient deteriorates unnoticed for hours because the nurse is managing 20 patients across three wards. By the time deterioration is recognized, the patient is critically ill—requiring Level 2 or Level 3 ICU when Level 1 intervention hours earlier might have prevented it.

The panel's 100% unanimous support for Level 0 (Enhanced Ward Care) reflects expert recognition that India needs intermediate capabilities between ward and ICU. This isn't about lowering standards—it's about creating a context-appropriate framework.

Real-World Impact: What This Means in Practice

For a District Hospital Director in Uttar Pradesh: Instead of choosing between no critical care capacity (ward only) or a prohibitively expensive full ICU (₹2 crore), you can now establish Level 0 for ₹30 lakhs—immediately improving patient outcomes while building toward Level 1 within 2 years.

For the Ministry of Health: PM-ABHIM's 602 Critical Care Blocks can be strategically allocated: Level 0/1 in 400 underserved districts, Level 2/3 in 150 district hospitals, Level 4 in 52 medical colleges—maximizing impact per rupee invested.

For Patients: A 55-year-old with pneumonia needing oxygen no longer requires a 200km transfer. Level 1 HDU in the district hospital—30 minutes away—provides the needed support.

Implementation Challenges and Mitigation

The panel's acknowledgment of transition safety concerns (77.1% agreement) reflects realistic appraisal of change management. Mitigation strategies include: phased implementation, comprehensive training programs, clear accreditation standards, technology integration including telemedicine, and robust referral protocols.

Table 5. Implementation Roadmap by Phase

Phase	Timeline	Key Activities	Target Facilities
Foundation	Year 1	Accreditation criteria, training curricula	All states
Pilot	Year 1-2	3-5 states, Level 0/1 rollout	50-100 hospitals
National Rollout	Year 2-5	Scale nationally, referral networks	602 PM-ABHIM blocks

Table 6. Resource Requirements by Level

Level	Equipment Cost	Staffing	Suitable For
Level 0	₹20-30 lakhs	Enhanced ward nurses + Rapid Response Team	District hospitals
Level 1 (HDU)	₹50-75 lakhs	1:4 nurse ratio	Sub-district hospitals
Level 2 (ICU)	₹1.5-2 crores	1:2 ratio, intensivist	Tertiary care

CONCLUSIONS

This modified Delphi study establishes robust national expert consensus supporting adoption of a 5-tier ICU categorization framework for India. With 85.5% of questions achieving consensus among 35 senior intensivists, the findings provide irrefutable evidence for policy development.

The 5-tier system's transformative potential lies in creating intermediate care levels (Enhanced Ward Care and HDU) with dramatically lower resource requirements than traditional ICUs. The panel's 100% unanimous endorsement of Level 0 is unprecedented and speaks volumes about the critical need this level addresses.

The panel decisively rejected arguments favoring 3-tier systems (85.7% disagreement on implementation simplicity, 80.0% disagreement on safety concerns), while acknowledging that implementation challenges exist. These challenges—workforce distribution, infrastructure barriers, training standardization—require strategic investment and phased implementation, not framework abandonment.

With PM-ABHIM's 602 Critical Care Blocks awaiting implementation standards and 1.4 billion lives in the balance, this consensus establishes the foundation for transforming India's critical care delivery. The evidence is clear, the expert agreement is overwhelming, and the time for action is now.

Key Recommendations:

1. Adopt 5-tier framework as national ICU categorization standard
2. Develop level-specific accreditation criteria and quality indicators
3. Create comprehensive training and certification programs
4. Establish insurance reimbursement structure aligned with categorization
5. Prioritize Level 0/1 development in underserved geographic areas
6. Invest in telemedicine infrastructure for remote intensivist support
7. Build robust referral networks connecting all levels
8. Implement phased rollout with continuous quality monitoring

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APPENDIX

Expert Panel Composition and Demographics

This consensus study was conducted by a 35-member expert panel representing senior critical care physicians from across India. Of these, 34 experts consented to public acknowledgment and listing, while 1 expert preferred to remain anonymous but contributed equally to the consensus. Panel composition ensured comprehensive diversity across geographic regions, institutional types, practice settings, and experience levels.

Panel Composition Rationale

The expert panel was intentionally composed to reflect the multidimensional requirements of developing a national ICU categorization framework. While the majority (85.7%) were clinical critical care practitioners ensuring clinical rigor, the panel strategically included hospital administrators and nursing leadership to address implementation realities.

Hospital administrators from rural medical colleges and district hospitals: These four experts were specifically included to assess whether proposed categorization standards could be realistically implemented in India's resource-limited district hospitals and tier-3 cities. Their expertise in managing ICU operations with constrained budgets, limited workforce, and infrastructure challenges was essential for ensuring recommendations are actionable rather than purely theoretical. Given that 57.1% of the expert panel represented tier-3/rural areas, and PM-ABHIM's 602 Critical Care Blocks target underserved regions, this administrative perspective on rural implementation feasibility was critical.

Nursing director with critical care expertise: Critical care nursing constitutes the frontline ICU workforce. Including nursing leadership perspective ensured that categorization standards account for nurse-to-patient ratios, nursing competency requirements, and operational realities of ICU care delivery. India faces a critical shortage of trained critical care nurses, making the nursing workforce perspective essential for feasible implementation.

This multidisciplinary approach distinguishes policy-oriented Delphi studies (focused on implementable national standards) from purely clinical protocol development. The 85.7% clinical majority maintained scientific rigor while the 14.3% implementation/nursing perspectives ensured recommendations address real-world constraints—particularly critical for a national framework targeting India's diverse healthcare landscape from metropolitan tertiary centers to rural district hospitals.

Geographic Distribution

The expert panel demonstrated exceptional geographic diversity, with representation from 15 states across India. Importantly, 57.1% of experts practice in tier-3 cities and rural areas, ensuring recommendations reflect ground realities beyond metropolitan centers.

Geographic Classification	Number	Percentage
Metro/Tier-1	6	17.1%
Tier-2	9	25.7%
Tier-3/Rural	20	57.1%

State	Number of Experts
1. Maharashtra	8
2. Kerala	4
3. Madhya Pradesh	4
4. Gujarat	3
5. Telangana	3
6. Jammu and Kashmir	2
7. Delhi	2
8. Karnataka	2
9. Chhattisgarh	1
10. Andhra Pradesh	1
11. Haryana	1
12. Gujurat	1
13. Uttar Pradesh	1
14. Rajasthan	1
15. Meghalaya	1

Institutional Diversity

Panel members represent diverse institutional settings, ensuring recommendations are applicable across India's varied healthcare infrastructure.

Institution Type	Number	Percentage
Private Hospital	17	48.6%
Private Medical College	9	25.7%
Corporate Hospital Chain	6	17.1%
Government Medical College	3	8.6%

Sector	Number	Percentage
Government	3	8.6%
Private	32	91.4%

Category	Number	Percentage
Medical Colleges (Govt + Private)	12	34.3%
Corporate Hospital Chains	6	17.1%
Private Hospitals	17	48.6%

Experience Profile

All panelists had minimum 10 years of clinical critical care/administrative experience. The panel included substantial representation of highly experienced intensivists.

Experience Level	Number	Percentage
More than 25 years	10	28.6%
20-25 years	8	22.9%
15-20 years	10	28.6%
10-15 years	7	20.0%

Professional Qualifications

Panel members held diverse critical care qualifications and certifications including:

- Indian Diploma in Critical Care Medicine (IDCCM)
- Indian Fellowship in Critical Care Medicine (IFCCM)
- Fellowship of the College of Critical Care Medicine (FCCCM)
- European Diploma in Intensive Care (EDIC)
- Advanced Fellowship in Intensive Care (AFIC)
- DNB (Diplomate of National Board) in Critical Care
- International fellowships from institutions in USA, Canada, UK, and Australia

Expert Panel Members - Complete List

The following 34 experts consented to public acknowledgment and listing in this consensus statement (listed alphabetically). One additional expert preferred to remain anonymous but contributed equally to achieving consensus.

Sr.	Name	Qualifications	Institution & Location
1	Dr Aditi Jain	MBBS, DNB (Medicine - Hinduja), Advanced Critical care Fellowship (Toronto, Canada), EDIC (London, UK), Advanced Fellowship in Intensive Care Medicine (College of Critical Care Medicine, India)	Gleneagles Hospital, Mumbai, Maharashtra
2	Dr Atul Adaniya	MBBS, MHA	Sagar Multispecialty Hospital, Bhopal , Madhya Pradesh
3	Dr B Saroj Kumar Prusty	MBBS, MD(General Medicine), Fellowship (Critical Care)	Apollo Hospital, Hyderguda , Hyderabad , Telangana
4	Dr Bhagyesh Panchal	MBBS , FCCCM	SPAN Critical Care Pvt Ltd , Ahmedabad , Gujarat
5	Dr Darshan G. Shukla	MD (Anaesthesia), PGDHHM, PGDMLS	Shri Bajarangdasbapa Arogyadham, Bhavnagar, Gujarat
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7	Dr Pravin Suryawanshi	DNB FRCS	MGM Medical College and Hospital , Chh Sambhajinagar , Maharashtra
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9	Dr S Rahul Kumar Agarwal	MBBS, FCCCM, AFIC, MD. HM	Care Institute of Medical Sciences, Hyderabad , Telangana
10	Dr Shyam Sundar Purushothaman	MBBS, DA, DNB, EDIC	Amrita Institute of Medical Sciences , Kochi, Kerala
11	Dr Sudhesh S Rao	DA, FCCM	A J Hospital and Research Centre , MANGALORE , Karnataka
12	Dr Suman Banerjee	MBBS, FCCCM, EDIC	Pushpawati Singhania Research Institute , New Delhi, Delhi
13	Dr Sunana Gupta	MBBS, M.D (Anaesthesiology) CCEPC , MNAMS	All India Institute of Medical Science, Vijaypur Jammu, Jammu, Jammu and Kashmir
14	Dr T A R Srinivasa Varma	MBBS, MD (Anaesthesiology),M.B.A (Hospital administration)	KIMS Hospital, Seethammadhara , Visakhapatnam , Andhra Pradesh
15	Dr Yatin Arvind Jadhav	MBBS, DV &D, AFIH, Post Graduate Diploma in Preventive and Promotive Health Care	Aparant Hospital, Chiplun, Maharashtra
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18	Dr. Anurag Mahajan	MD Medicine	PSRI Hospital, NEW DELHI, NEW DELHI, NEW DELHI
19	Dr. Bhavya Nathani	MD Anesthesia	King George's Medical University Lucknow, Lucknow, Uttar Pradesh
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27	Dr. Vivek Vasantlal Baxi	MD,PCCCM,FCCCM,AFIC,PGCDM	Shalby Hospitals, Ahmedabad, Gujarat
28	Ms. Sai Bala M	MSc Nursing ,PG Diploma in Hospital Administration	Amrita Institute of Medical Sciences,Kochi , Kochi , Kerala
29	Prof (Dr) Pankaj Kumar Omar	MBBS MD (Anaesthesia)	Shree narayana hospital, Raipur, Chhattisgarh
30	Prof Dr Rajesh Bhagchandani	MD MEDICINE	APEX HOSPITAL BHOPAL, BHOPAL, Madhya Pradesh
31	Prof. Dr. Renu Wakhloo	MD Anaesthesia	Government medical college Jammu, Jammu, Jammu and Kashmir
32	Prof. Dr Meeta Mehta	MBBS, DA, FCCCM,AFIC, PGDMLE	Free lancing, Mumbai , Maharashtra
33	Prof. Dr. Mahendra Madhav Joshi	MBBS, MD (Gen. Medicine), Fellowship ICU, P.G.Diploma Geriatric Medicine, Fellowship Sports Science	L.N. MEDICAL COLLEGE, BHOPAL, BHOPAL, Madhya Pradesh
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