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Implementation and Scale-Up of a Telemedicine-Enabled Disability Certification Pathway in Peru: A National Real-World Evaluation

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Implementation and Scale-Up of a Telemedicine-Enabled Disability Certification Pathway in Peru: A National Real-World Evaluation

Abstract

Objectives: To describe the implementation and scale-up of a national telemedicine-enabled disability certification pathway in Peru, compare certification volume and output per certifying physician with broader activity, and characterise the demographic, severity and diagnostic profile of people certified through the pathway.

Methods: We conducted an observational comparative study using data from the national disability-certification registry (REUNIS) and the CENATE dashboard from 10 March 2025 to 31 July 2026. National, EsSalud and CENATE were treated as nested levels. Proportions were compared using chi-square tests with Cramér's V; selected diagnoses were compared using prevalence ratios (PR) with 95% confidence intervals (CI). Year-on-year growth used day-aligned 10 March-31 July periods.

Results: CENATE issued 2,244 certificates, representing 11.2% of EsSalud and 1.33% of national certification activity. In matched 10 March-31 July periods, CENATE volume increased from 241 to 925 certificates (+283.8%), compared with +18.3% in EsSalud and +4.5% nationally. From January-July 2026, CENATE issued 673.5 certificates per certifying physician versus 31.5 nationally; physician time and supporting resources were unavailable, so this is an output measure rather than comparative productivity. CENATE included more adults aged >=60 years (34.0% vs 25.5%) and more moderate disability (41.7% vs 27.1%).

Conclusions: A centrally organised telemedicine pathway scaled rapidly within EsSalud and became its highest-volume certification establishment, demonstrating the feasibility and potential of telemedicine to expand disability certification capacity within a national health system. Further evaluation incorporating resource use, patient location, travel, waiting times and patient-reported experience will help determine the model’s broader impact on access, efficiency and equity.

Keywords: telemedicine; disability certification; digital health; health policy; service implementation; Peru

Introduction

For people with disability, formal certification can determine access to rehabilitation, social protection, education and employment benefits in Peru (1-3). National data indicate a persistent gap between the number of people living with disability and those holding a valid certificate (3,4). This gap is especially important for people who face mobility, transportation and organisational barriers when access to an authorised certifying physician depends on in-person attendance (1,5-7).

Disability certification in Peru is governed by a national technical standard. Authorised certifying physicians evaluate the underlying diagnosis together with impairment, activity limitation and participation restriction, and classify disability severity before issuing the medical-legal certificate (9). The same regulatory standard applies across certifying organisations. In this study, 'national' refers to all certificates registered in Peru, 'EsSalud' to the subset issued within Peru's social health insurance system, and 'CENATE' to the subset of EsSalud certificates issued through its national telemedicine centre. These are therefore nested levels of the same national certification system rather than separate issuing authorities.

Within EsSalud, the service challenge was the uneven distribution of certification capacity. Institutional programme documents described certifying physicians as concentrated in a limited number of facilities and cities, leaving some local facilities without an authorised professional able to complete certification. The telemedicine model was designed to separate the location of the patient from the location of the authorised certifier: local staff could support the encounter, while the certification decision remained with an authorised CENATE physician. This organisational redesign is distinct from changing the legal eligibility threshold or assessment standard.

On 10 March 2025, the Centro Nacional de Telemedicina (CENATE), EsSalud's national telemedicine centre, launched a synchronous telecertification service under the national disability-certification standard and telehealth regulatory framework (9-12). This study aimed to describe its implementation and early scale-up, compare certification volume and output per certifying physician with broader national and EsSalud activity, and characterise the demographic, severity and diagnostic profile of people certified through the telemedicine pathway. The study did not directly evaluate comparative efficiency, physician time, travel distance, geographic accessibility, waiting time or downstream access to disability-related benefits.

Methods

Study design and data sources

We conducted an observational, descriptive, comparative study using secondary, de-identified administrative data. The primary source was a record-level extract from the Registro Nacional de Informacion en Salud (REUNIS), the Ministry of Health's national disability-certification registry. CENATE operational data were obtained from the service dashboard. The analytic study period began on 10 March 2025, the date of CENATE's first telecertification, and ended on 31 July 2026.

Certification framework and comparison structure

Conventional and telemedicine-based certification were governed by the same national technical standard (NTS No. 127-MINSA/2016/DGIESP and subsequent amendments) (9). Telecertification therefore changed the mode and location of the assessment, not the regulatory definition of disability, severity categories, or the authority required to issue the certificate. National counts included all certificates registered in REUNIS; EsSalud counts were a subset of national activity; and CENATE counts were a subset of EsSalud activity. Comparisons were interpreted accordingly and were not treated as three independent populations.

Telecertification model

CENATE operated through two synchronous pathways (10). In tele-interconsultation, the insured person attended a nearby EsSalud facility. A local health professional confirmed identity, facilitated the videoconference, supported documentation, and, when required, performed a directed physical examination under guidance from the remote CENATE certifying physician. The local professional was not necessarily authorised to issue a disability certificate; the final evaluation, severity classification and certification decision were made by the authorised CENATE physician.

In direct teleconsultation, the insured person connected remotely, generally from home, and identity was verified using a facial-biometric application. The CENATE physician explained the procedure, obtained consent, reviewed the existing clinical record and conducted the structured diagnostic interview. In both pathways, the assessment addressed diagnosis, impairment, activity limitation and participation restriction in accordance with the national standard. The classification was registered in SIHCE-Discapacidad; the certificate was generated on the Ministry of Health platform, digitally signed, issued with a QR verification code and delivered electronically (9,10). The institutional procedure explicitly supports a directed physical examination within tele-interconsultation when required. It does not specify a standardised rule for mandatory conversion to conventional in-person certification; therefore, conversion or referral rates could not be analysed in this study.

Variables and statistical analysis

For each certificate, we analysed issuing level, sex, age group, disability severity and the first-listed ICD-10 diagnostic code. Age was grouped as 0-11, 12-17, 18-29, 30-59 and >=60 years. Descriptive statistics are reported as absolute and relative frequencies. Proportions were compared using chi-square tests, with Cramer's V for global effect size. For selected first-listed ICD-10 families, prevalence ratios (PR) with

95% CI compared CENATE with non-CENATE certifications. Because CENATE began on 10 March 2025, year-on-year growth was estimated using day-aligned 10 March-31 July windows in 2025 and 2026. Diagnostic comparisons were exploratory and p values were not adjusted for multiple testing.

Certificates per certifying physician were calculated as a descriptive output indicator. Because data on physician full-time-equivalent effort, consultation duration, case complexity and supporting staff were unavailable, this indicator was not interpreted as comparative productivity or efficiency.

Ethical considerations

The analysis used secondary de-identified registry data and involved no direct patient contact. The REUNIS extract contained no patient name or national identity number. The study received a waiver from the Institutional Review Board of Hospital Nacional Edgardo Rebagliati Martins (approval code 0012720260000021).

Results

Implementation and scale-up within the certification system

During the 17-month study period, 169,283 disability certificates were issued nationally, including 20,064 within EsSalud. CENATE issued 2,244 certificates, representing 11.2% of EsSalud certification activity and 1.33% of national activity. Monthly CENATE volume rose from 58 certificates in March 2025 to a peak of 258 in April 2026, with sustained monthly activity thereafter (Table 1; Figure 1).

Period	National, n	EsSalud, n	CENATE, n	CENATE / EsSalud	CENATE / national
10 Mar-31 Dec 2025	99,503	11,003	897	8.2%	0.90%
Jan-Jul 2026	69,780	9,061	1,347	14.9%	1.93%
Total	169,283	20,064	2,244	11.2%	1.33%

Table 1. Disability certification activity during the study period. National, EsSalud and CENATE are nested levels; the study period begins on CENATE's launch date, 10 March 2025.

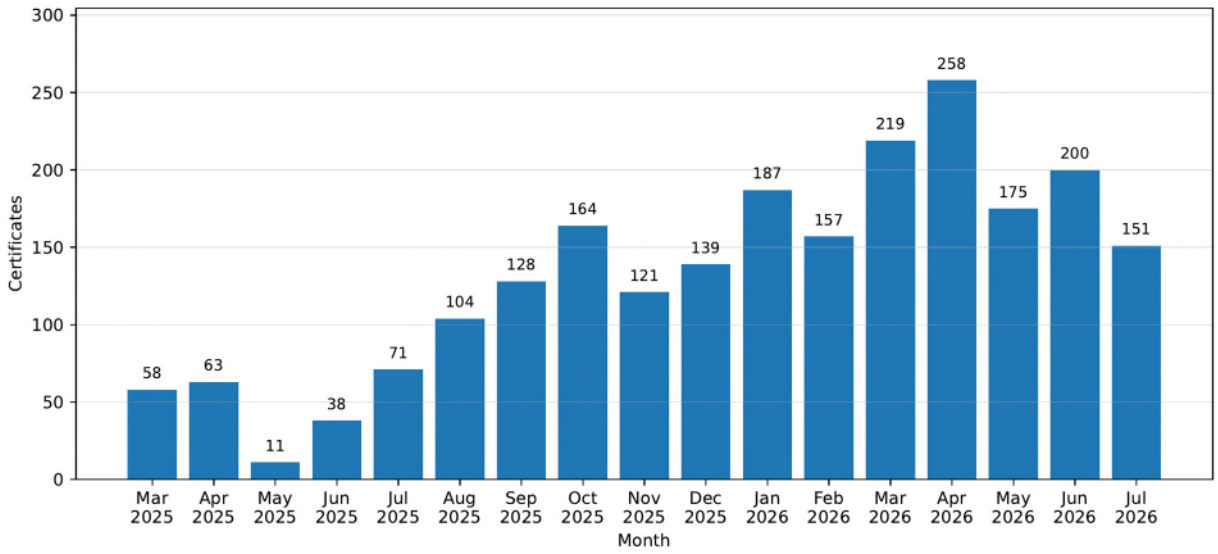

Figure 1. Monthly disability certificates issued by CENATE, March 2025-July 2026.

Year-on-year growth

Certification activity increased at all three nested levels in the day-aligned 10 March-31 July comparison, but the magnitude differed markedly. National activity rose from 49,484 to 51,700 certificates (+4.5%),

EsSalud from 5,322 to 6,296 (+18.3%), and CENATE from 241 to 925 (+283.8%). CENATE's share of EsSalud activity increased from 4.5% to 14.7%, while its share of national activity rose from 0.49% to 1.79% ($p<0.001$ for both proportional changes). By January-July 2026, CENATE was the highest-volume individual EsSalud establishment for disability certification (Table 2).

Indicator	10 Mar-31 Jul 2025	10 Mar-31 Jul 2026	Change
National certificates	49,484	51,700	+4.5%
EsSalud certificates	5,322	6,296	+18.3%
CENATE certificates	241	925	+283.8%
CENATE / EsSalud	4.5%	14.7%	+10.2 pp
CENATE / national	0.49%	1.79%	+1.30 pp

Table 2. Day-aligned year-on-year comparison. pp, percentage points; $p<0.001$ for changes in CENATE/EsSalud and CENATE/national proportions.

Certification output per certifying physician

From January to July 2026, 2,215 certifying physicians nationally issued 69,780 certificates, corresponding to 31.5 certificates per physician. Over the same period, CENATE's two certifying physicians issued 1,347 certificates, or 673.5 per physician (21.4-fold the national descriptive benchmark) (Figure 2). This comparison describes certification output only. Physician working time, full-time-equivalent allocation, consultation duration, case complexity and supporting resources were not available, so the difference cannot be interpreted as greater productivity or efficiency.

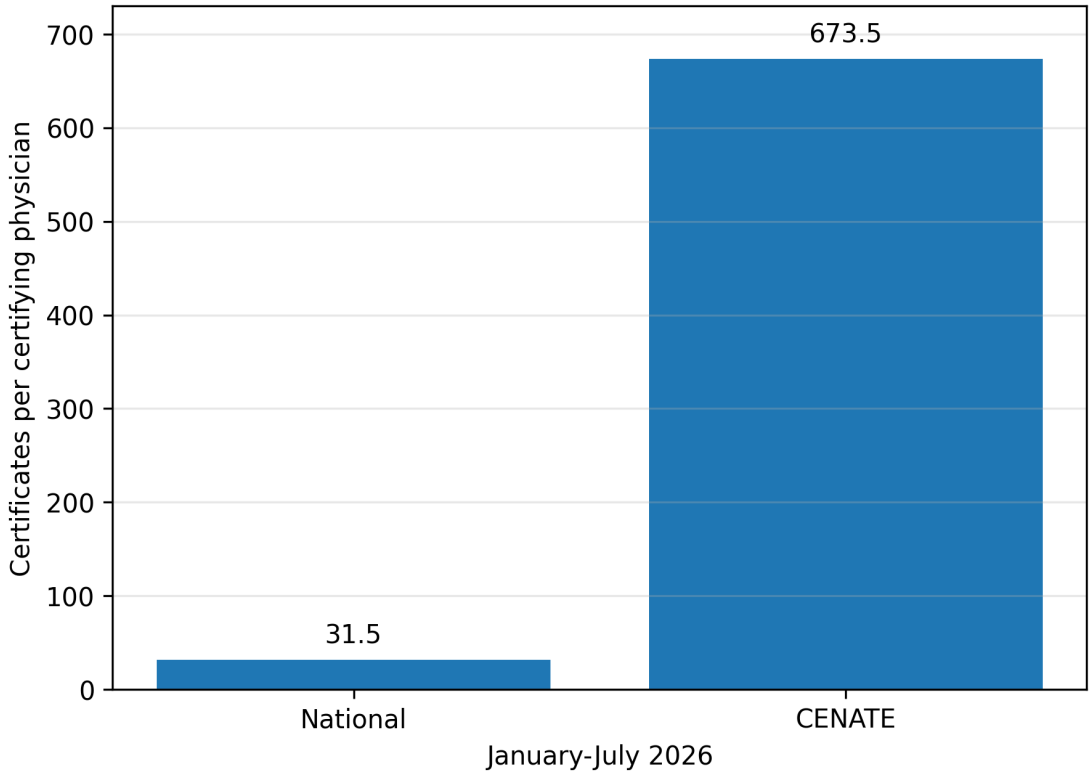

Figure 2. Certificates issued per certifying physician. The figure is a descriptive output comparison; it does not adjust for physician time, full-time-equivalent allocation, case complexity or supporting resources.

Age and disability severity

Age distribution differed between CENATE and non-CENATE certifications (global chi-square p<0.001; Cramer's V=0.029), although the effect size was small. Adults aged >=60 years accounted for 34.0% of CENATE certificates versus 25.5% of non-CENATE certificates, while adults aged 18-29 years were less represented (5.4% vs 11.6%). Median age was 50 years (IQR 15-64) at CENATE and 40 years (IQR 15-60) outside CENATE.

Disability severity also differed (global p<0.001; Cramer's V=0.037), again with a small effect size. Severe disability accounted for 49.8% of CENATE certifications versus 62.7% of non-CENATE certifications, moderate disability for 41.7% versus 27.1%, and mild disability for 8.6% versus 10.2%, respectively (Table 3; Figures 3 and 4).

Characteristic	CENATE, n (%)	Non-CENATE, n (%)	p value
Age: 0-11 years	411 (18.3%)	30,792 (18.3%)	0.938
Age: 12-17 years	225 (10.0%)	16,877 (10.0%)	0.971
Age: 18-29 years	122 (5.4%)	19,608 (11.6%)	<0.001
Age: 30-59 years	723 (32.2%)	58,392 (34.6%)	0.018
Age: >=60 years	763 (34.0%)	43,039 (25.5%)	<0.001
Severity: severe	1,117 (49.8%)	105,751 (62.7%)	<0.001
Severity: moderate	935 (41.7%)	45,774 (27.1%)	<0.001
Severity: mild	192 (8.6%)	17,183 (10.2%)	0.011

Table 3. Age and disability-severity distributions: CENATE versus non-CENATE certifications. Global effect sizes were small (age Cramer's V=0.029; severity Cramer's V=0.037).

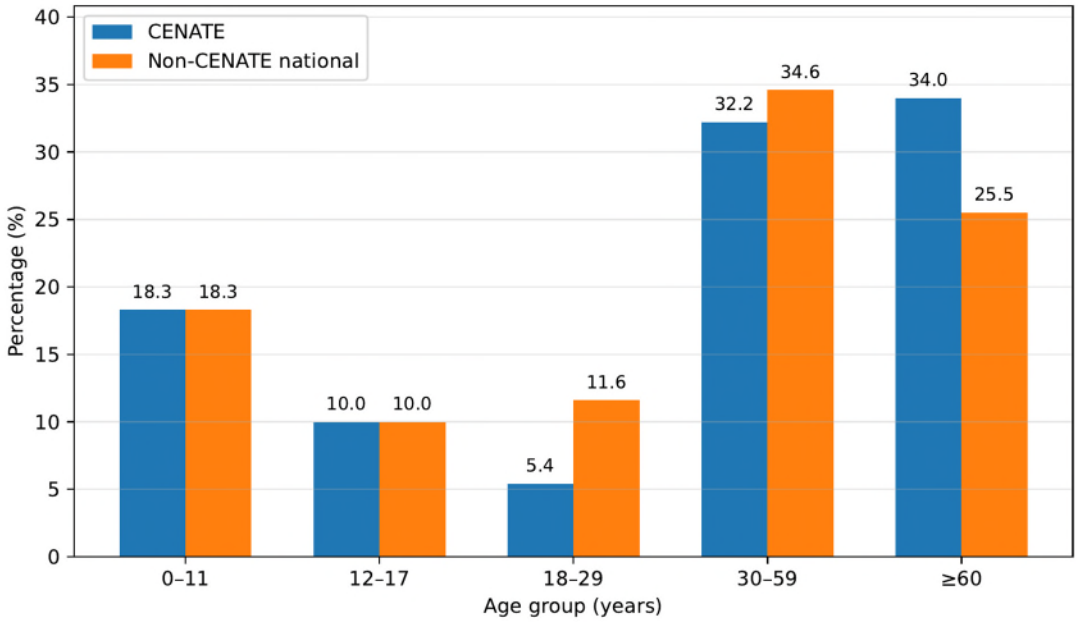

Figure 3. Age distribution of CENATE and non-CENATE disability certifications.

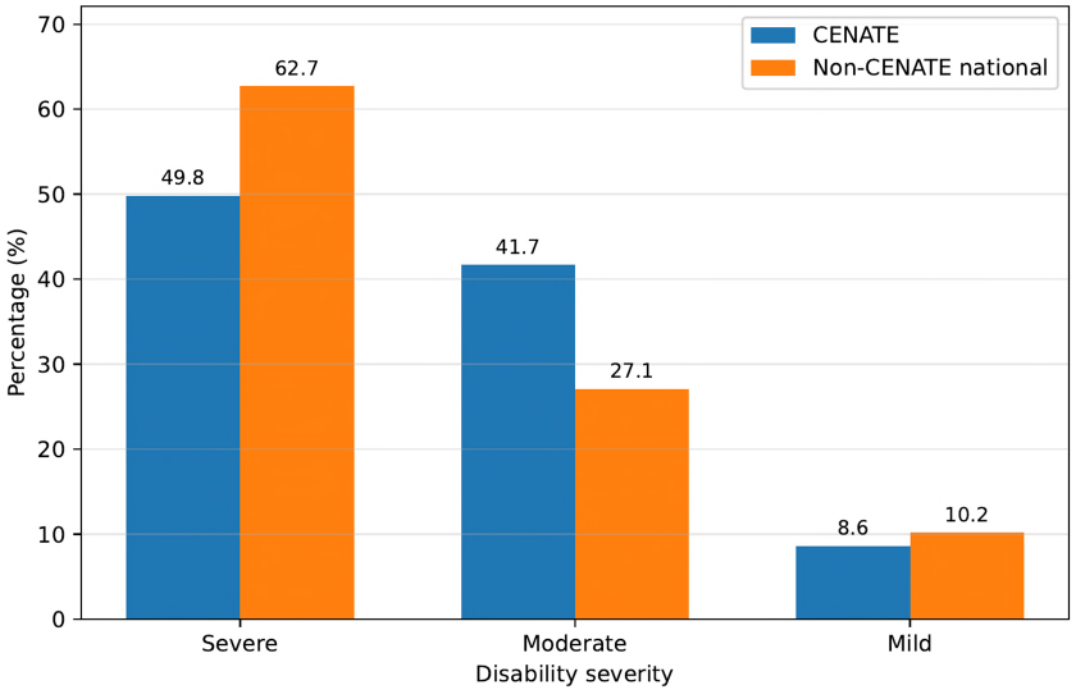

Figure 4. Disability-severity distribution of CENATE and non-CENATE certifications.

Diagnostic case-mix

The largest relative differences involved neurodevelopmental and mobility-related diagnoses. Autism-spectrum and related pervasive developmental disorders (F84) were more frequent at CENATE (14.3% vs 8.1%; PR 1.77, 95% CI 1.60-1.96), as were hemiplegia (G81; 4.1% vs 2.2%; PR 1.87, 95% CI 1.53-2.28) and gait or mobility abnormalities (R26; 10.8% vs 8.8%; PR 1.23, 95% CI 1.09-1.39). Moderate intellectual disability, visual impairment and schizophrenia were less frequent. These comparisons were exploratory and were not adjusted for multiple testing (Table 4; Figure 5).

ICD-10	Diagnostic family	CENATE	Non-CENATE	PR (95% CI)	p value
F84	Autism / pervasive developmental disorders	14.3%	8.1%	1.77 (1.60-1.96)	<0.001
R26	Abnormalities of gait and mobility	10.8%	8.8%	1.23 (1.09-1.39)	<0.001
H54	Blindness and visual impairment	7.7%	9.1%	0.84 (0.73-0.97)	0.016
F71	Moderate intellectual disability	5.1%	7.7%	0.66 (0.55-0.79)	<0.001
G81	Hemiplegia	4.1%	2.2%	1.87 (1.53-2.28)	<0.001
F20	Schizophrenia	1.4%	3.6%	0.39 (0.27-0.55)	<0.001

Table 4. Selected first-listed ICD-10 diagnostic families. PR, prevalence ratio; exploratory comparisons, unadjusted for multiple testing.

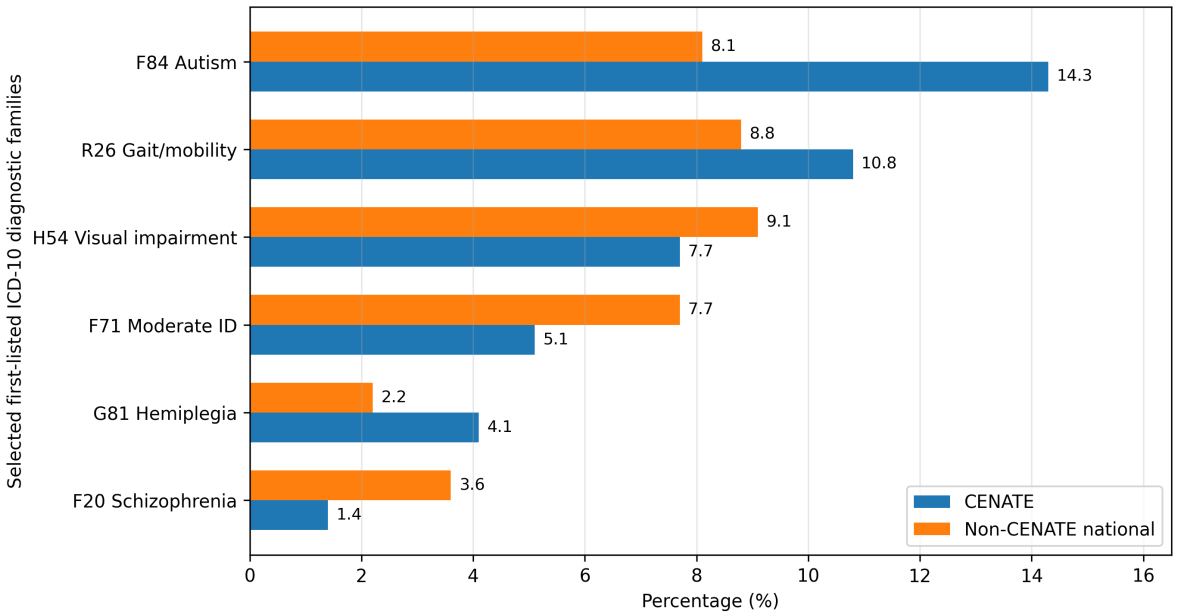

Figure 5. Selected first-listed ICD-10 diagnostic families in CENATE and non-CENATE certifications.

Sex distribution within CENATE was stable over time: 55.0% male and 45.0% female in March-December 2025, compared with 54.6% and 45.4% in January-July 2026. Because sex was unavailable in the updated national extract, no inferential national comparison was performed.

Discussion

This study demonstrates the successful implementation and rapid scale-up of a telemedicine-enabled disability certification pathway within Peru's social health insurance system. Within 17 months, CENATE accounted for an increasing share of EsSalud certification activity and became its highest-volume individual certifying establishment. These findings show that a centrally organised group of authorised certifying physicians can deliver a regulated certification function at scale through synchronous telemedicine across a broader service network.

A major strength of the model is that it preserves the national certification standard while changing how authorised expertise is delivered. Conventional and CENATE certification followed the same technical requirements and disability criteria. In tele-interconsultation, local health professionals supported identity confirmation, documentation and directed physical examination when required, while the authorised CENATE physician retained responsibility for the final assessment and certification decision. In direct teleconsultation, patients could connect remotely without attending a certifying facility. This organisational design enabled specialist certification expertise to be provided beyond the physical location of the authorised physician and offers a practical approach to addressing uneven distribution of certifying capacity.

Certification output per CENATE physician was substantially higher than the national descriptive benchmark. Although this measure cannot be interpreted as comparative efficiency in the absence of physician-time, staffing and cost data, it indicates that a small centralised team was able to manage a considerable certification volume. Centralised scheduling, workflow standardisation, digital documentation and supporting resources may all have contributed to this performance. Future evaluations incorporating physician time, resource use and costs will help determine the extent to which these organisational advantages translate into measurable efficiency gains.

The characteristics of patients using the telecertification pathway also provide insight into how the service was adopted. Older adults and people with moderate disability were relatively more represented at CENATE, and selected neurodevelopmental and mobility-related diagnoses were more frequent.

Although the overall differences in age and severity were modest, the findings suggest that the telemedicine pathway was used across a broad clinical spectrum and may have been particularly useful for patients whose evaluation could be supported by existing clinical documentation, structured interview and remote examination.

The rapid increase in telecertification volume also demonstrates the potential of the model to reduce dependence on the physical co-location of patients and authorised certifying physicians. Patient residence and travel distance were not available in the registry, so the present study cannot quantify geographic access directly. Nevertheless, the ability to deliver certification through remote specialist assessment represents an important organisational capability in systems where authorised expertise is unevenly distributed. Future studies incorporating patient location, travel avoided, waiting times and patient-reported experience can determine the extent to which this capability translates into improved geographic access and equity.

From a health-policy and technology perspective, the intervention provides an example of how digital infrastructure can reorganise a regulated clinical-administrative function without changing its underlying legal or clinical standard. The model integrates synchronous telemedicine, electronic clinical-record review, identity verification, registration in the national disability information system, digital signature and QR-verifiable certificate delivery. This combination allowed certification expertise to be centralised while service delivery could occur remotely or through local facilities. Similar approaches may be relevant to other health systems in which authorised professional functions are concentrated in a limited number of locations.

The findings also identify clear priorities for the next phase of evaluation. Prospective studies should incorporate physician time, resource utilisation, consultation duration, costs, patient residence, travel distance, waiting time and patient-reported outcomes. These measures would allow future research to determine whether the substantial scale-up observed here is accompanied by gains in efficiency, accessibility, equity and patient experience.

Several limitations should be acknowledged. The observational design does not establish causality, and comparative data on physician time, resource inputs, patient location and patient experience were unavailable. Age and severity differences were statistically significant but small in magnitude, while diagnostic comparisons were exploratory and based on the first-listed ICD-10 code. These limitations primarily affect interpretation of efficiency and access outcomes rather than the central finding that a regulated disability-certification pathway was successfully implemented and scaled through telemedicine within a national social health insurance system

Conclusions

CENATE's telecertification pathway scaled rapidly within EsSalud and became its highest-volume individual disability-certification establishment during the study period. The service achieved high certification output per authorised certifying physician and served a case-mix that differed modestly from non-CENATE certification. These findings demonstrate implementation and scale-up of a technology-enabled pathway, but do not establish greater productivity, efficiency, geographic access or equity. Future evaluations should incorporate physician time, resource use, patient location, travel distance, waiting time, costs, digital accessibility and patient-reported outcomes to determine whether service scale translates into improved system performance and patient access.

Generative artificial intelligence disclosure

OpenAI ChatGPT was used to assist with language editing and with development and formatting of code for selected data visualisations. All analyses, numerical values, citations and graphical outputs were independently checked by the authors against the original study data and sources. Generative AI was not used to generate, alter or infer study data or statistical results, and the authors take responsibility for the final manuscript.

References

1. World Health Organization. Global report on health equity for persons with disabilities: executive summary. Geneva: WHO; 2022.
2. Congreso de la Republica del Peru. Ley No. 29973, Ley General de la Persona con Discapacidad. Lima; 2012.
3. Instituto Nacional de Estadistica e Informatica. Peru: Caracterizacion de las Condiciones de Vida de la Poblacion con Discapacidad, 2022. Lima: INEI; 2022.
4. Observatorio Nacional de la Discapacidad. Situacion de las personas con discapacidad: Indicadores Observatorio 2024. Lima: CONADIS; 2024.
5. Annaswamy TM, Verduzco-Gutierrez M, Frieden L. Telemedicine barriers and challenges for persons with disabilities: COVID-19 and beyond. Disabil Health J. 2020;13(4):100973. doi:10.1016/j.dhjo.2020.100973.
6. Zhou L, Parmanto B. Reaching people with disabilities in underserved areas through digital interventions: systematic review. J Med Internet Res. 2019;21(10):e12981. doi:10.2196/12981.
7. Park HN, Kang G, Nam HJ, Lee S, Kim B, Lee H, et al. The use of telehealth for people with disabilities: a systematic literature review and narrative synthesis. J Adv Nurs. 2025;81(3):1241-1258. doi:10.1111/jan.16470.
8. Hollander JE, Carr BG. Virtually perfect? Telemedicine for Covid-19. N Engl J Med. 2020;382(18):1679-1681. doi:10.1056/NEJMp2003539.
9. Ministerio de Salud del Peru. Norma Tecnica de Salud No. 127-MINSA/2016/DGIESP para la Evaluacion, Calificacion y Certificacion de la Persona con Discapacidad, as amended. Lima: MINSA; 2016.
10. Centro Nacional de Telemedicina (CENATE), EsSalud. Procedimiento PM.2.1.3-CENATE: Telecertificacion de discapacidad, version 02. Lima: EsSalud; 2026.
11. EsSalud. EsSalud implementa servicio digital para facilitar la obtencion del certificado de discapacidad. Lima: EsSalud; 2026.
12. Congreso de la Republica del Peru. Ley No. 30421, Ley Marco de Telesalud; Decreto Legislativo No. 1490; Decreto Supremo No. 005-2021-SA. Lima; 2021.