World Health Organization

European Region

Support tool to strengthen telemedicine:

resource for assessment, strategy development, and strengthening of telemedicine services

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Abstract:
This resource presents a comprehensive framework designed to enhance and streamline telemedicine services within health-care systems. It addresses the critical need for accessible and effective telemedicine solutions, especially in the face of global health challenges and the evolving demands on health-care infrastructures. It outlines a multidimensional strategy that includes an assessment of the current health-care ecosystem, strategic visioning for telemedicine integration, organizational change management, development of telemedicine services, and continuous monitoring, evaluation, and optimization. It emphasizes the importance of considering the unique needs of diverse populations and ensuring equitable access to telemedicine technologies. By leveraging global best practices and empirical evidence, the document aims to guide stakeholders through the lifecycle of telemedicine service implementation—from conceptualization to maturity. Intended for health-care decision-makers, policy-makers, and telemedicine practitioners, the framework supports the development of high-quality telemedicine services at various levels of the health system. It facilitates a collaborative approach, encouraging alignment and coordination among different stakeholders to achieve a common goal: building a resilient, patient-centred, and technologically advanced health-care system.

Document number: WHO/EURO:2024-9548-49320-73720

Designed by: PELLEGRINI

Corrigendum

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Document number: WHO/EURO:2024-9548-49320-73720

The following corrections were made in the electronic file on 8 August 2024:

- **The Acknowledgments section** was edited to include acknowledgment of the technical contributions provided by the WHO Country Office in Georgia, as well as the financial assistance of the European Union.
- **Inclusion of Recommendation for Indicator C1.D1.Q1:** The recommendation provided by the tool when the minimum required for indicator C1.D1.Q1 is not met has been added. This recommendation was inadvertently omitted in the previous version.
- **Update of Scores in Radar Charts:** Theoretical scores obtained in the radar charts for all COREs (1–5) have been included. This allows for the visualization of obtained results (e.g., a score of 1 in all items, displayed in blue) alongside the minimum required scores for each item (in green).
- **Review of Maturity Levels:** Maturity levels (theoretically) for each of the COREs (1–5) have been updated, as the scores were below the minimum possible score according to the actual operation of the tool.

Contents

Acknowledgements

The WHO Regional Office for Europe would like to thank the Data and Digital Health Unit in the Division of Country Health Policies and Systems for its key role in the development of this guidance under the technical guidance of Natasha Azzopardi-Muscat, Helen Caton-Peters and David Novillo Ortiz (editor-in-chief).

The main authors were Francesc Saigí-Rubió, Che Riva Katz, Noemí Robles, Keti Ivanovska, and José Ángel Bernal Bermejo. Furthermore, the following experts provided technical review and feedback during the development of this document: Karthik Adapa, Cholpon Imanalieva, Eric Sutherland, Arturs Mietulis, Clayton Hamilton, Tyrone Reden Sy, Yerbol Spatayev, Tigest Tamrat, Elena Val, Ahmed Mohamed Amin, and Maria Cristina Profili. DG Sante has provided technical review and feedback during the development of this document.

The WHO Regional Office for Europe extends heartfelt gratitude to the 45 participants of the Delphi study. Their invaluable expertise, diverse backgrounds, and steadfast dedication to advancing telemedicine implementation have greatly enhanced the depth and quality of our study.

We acknowledge the technical contributions of the WHO Country Office in Georgia during the early conceptualization phases of the tool.

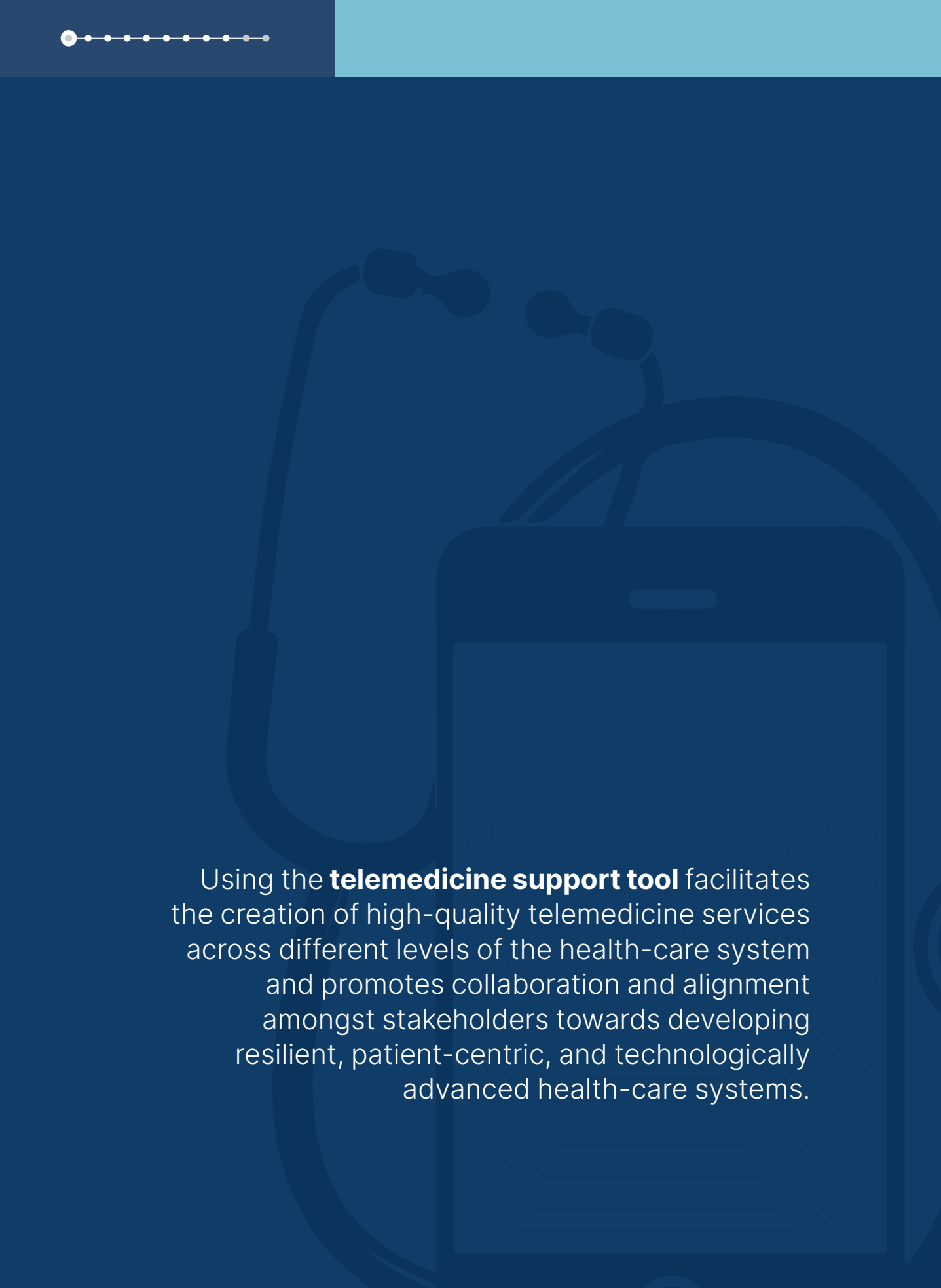
This document was developed with financial support from the European Union.

Abbreviations

COVID-19	coronavirus disease
UOC	Universitat Oberta de Catalunya
WHO	World Health Organization

Executive summary

This publication provides both a description and a comprehensive set of instructions for the support tool to strengthen telemedicine, designed to improve and streamline telemedicine services within health systems. The support tool addresses the pressing need for accessible and efficient telemedicine solutions, particularly in light of global health challenges and evolving health-care demands. It encompasses various dimensions, including assessing the current health-care landscape, strategic planning for telemedicine integration, organizational change management, service development, and ongoing monitoring and optimization. It underscores the importance of catering to the unique needs of diverse populations and ensuring equitable access to telemedicine technologies. Drawing upon global good practices and empirical evidence, the support tool offers guidance to stakeholders throughout the telemedicine service lifecycle—from conception to maturity. Targeted at health-care decision-makers, policy-makers, and telemedicine practitioners, the tool supports the creation of high-quality telemedicine services across different levels of the health-care system. It promotes a collaborative approach, fostering alignment and coordination among stakeholders to achieve a shared objective: establishing a resilient, patient-centric, and technologically advanced health-care system.



Using the **telemedicine support tool** facilitates the creation of high-quality telemedicine services across different levels of the health-care system and promotes collaboration and alignment amongst stakeholders towards developing resilient, patient-centric, and technologically advanced health-care systems.

Introduction

This publication explains the support tool to strengthen telemedicine and how to use it, along with a brief explanation of how the tool was developed and the evidence base that informed it. The tool assists implementation and integration of telemedicine services into the health system from feasibility through to design, development, deployment, and optimization of services. Providing the constructs, or building blocks of a telemedicine service, the tool is a resource that guides telemedicine interventions throughout the life cycle, from start-up through to assessing maturity of existing telemedicine services. It facilitates collaboration across the health system and strengthens alignment of different stakeholders to achieve the goal of building a resilient, patient-centred, and technologically advanced health-care system.

Support tool with assessment sheets is available in two different formats: in Annex 1 and in Excel format as a Web annex.[1]

[1] Support tool to strengthen telemedicine: resource for assessment, strategy development, and strengthening of telemedicine services. Web annex: assessment item sheets. Copenhagen: World Health Organization; 2024 (https://iris.who.int/handle/10665/378151, accessed 11 July 2024).

Background

Demographic shifts and changing health-care needs, along with health emergencies, conflicts and climate-related impacts, put significant pressure on health systems around the world. An increasingly ageing population, and the changing patterns of disease resulting in a growing prevalence of complex and costly chronic conditions also challenges health delivery. Health-care access barriers faced by rural and remote communities due to uneven distribution of health services, and difficulties of retaining the rural health workforce, create obstacles to equitable service delivery. All these competing demands on the health system point to the need for new, complimentary ways of delivering health care. Telemedicine is demonstrated to be an accessible and cost–effective medical system that provides high-quality care and reduces morbidity and mortality *(1–7)*. During the coronavirus disease (COVID-19) pandemic, the rapid adoption of telemedicine, digital solutions, and technological tools played an important part in responding to the enormous pressure experienced by health-care systems globally *(8–11)*. However, despite the evidence supporting telemedicine, the adoption of telemedicine services remains uneven and requires further consolidation *(1)*.

There is no universally agreed definition of telemedicine *(7,12)*, and often people use terms like "telehealth" and "telecare" interchangeably with telemedicine, whilst others define each term differently *(13-15)*. This document adopts the World Health Organization (WHO) definition of telemedicine, subsumed under the "digital health" umbrella as a component of "telehealth". This definition encompasses both remote clinical synchronous or asynchronous communication, between those separated by distance, either client-to-provider or provider-to-provider. **Client-to-provider** telemedicine involves a virtual communication between a health provider and their patients via secure confidential digital platforms, such as phone, email, and video conferencing. **Provider-to-provider** telemedicine supports a virtual platform for providers to connect with other health providers or clinical specialists for case management, sharing of clinical records and images, or gaining clinical second opinion.

WHO has long recognized the pivotal role of telemedicine, as first presented in the 2010 report by the WHO Global Observatory for eHealth titled Telemedicine: opportunities and developments in Member States *(16)*. This was re-emphasized in the 2012 publication by WHO and the International Telecommunication Union titled National eHealth strategy toolkit *(17)*. In 2020, this was complemented by the release of *WHO's Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)* and the 2021 launch of WHO's *Global strategy on digital health 2020–2025* to promote appropriate and sustainable adoption of digital health technologies in the context of national strategies *(19)*.

As part of the Regional digital health action plan of the WHO European Region 2023–2030, a strategic priority is to support Member States in developing quality telemedicine services through the provision of technical assistance and knowledge translation tools and resources *(20)*. In response to the identified need for a tool to support stakeholders in the implementation of telemedicine, the telemedicine support tool has been created using the best available international telemedicine know-how packaged into a simple-to-use resource to help those designing, developing, implementing, optimizing, and evaluating the implementation of a telemedicine service.

Telemedicine: the delivery of health-care services where distance is a critical factor, by all health-care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, all in the interests of advancing the health of individuals and their communities.

Telemedicine is a component of **telehealth**, which is a broader application of technologies to distance education and other applications wherein electronic communications and information technologies are used to support health-care services.

How was the Support tool to strengthen telemedicine developed?

The Support tool was created through a consecutive and robust research process with the findings of each phase building on the subsequent phase and feeding into further refining and strengthening the tool and the methodology for its use. A four-step research process informed the tool. The first step involved a robust literature review to identify the state of the art of telemedicine implementation, which included synthesizing the facilitators and barriers to implementation *(1)*, along with analysing the evidence base for the constructs of telemedicine implementation. This also informed the theoretical underpinnings of the tool, including incorporating various telemedicine and digital health theoretical and conceptual models *(21–30)*, readiness assessment frameworks *(31–33)*, maturity models *(34–36)*, and evaluation tools *(37, 38)*. Drawing on this evidence base, in the second step, the tool was defined at different levels of depth, encompassing the main constructs to address the design, implementation, and integration of telemedicine services within the health-care system (Core, Domain, and Items or Subdomains). Step three involved an expert review of the constructs of the draft tool using a modified Delphi methodology, whereby experts ranked the constructs and formed a consensus on their importance *(39)*. Based on the findings of this study, in the fourth step, a final draft of the tool was developed by further refining the constructs, weighting their importance, and developing them into an easy-to-use tool.

What is the purpose of the Support tool to strengthen telemedicine?

The tool primarily aims to develop high-quality telemedicine services at different levels of the health system, from national to health facility level. It responds to lessons learned and needs expressed by telemedicine stakeholders, that a telemedicine system requires more than technological deployment, with stakeholders often underestimating the organizational change required, and not fully understanding the many other components needed to realize a telemedicine vision *(40–45)*. The tool helps the user to understand the telemedicine landscape, plan, implement and optimize services for success, considering the many challenges faced at the individual, organizational, clinical, economic, technological and regulatory levels *(1)*. Although various toolkits exist to guide different aspects of telemedicine development, there is a lack of an easy-to-use, robust, and evidence-based resource, which identifies all the constructs of a telemedicine service *(46–48)*. The support tool to strengthen telemedicine sets out to fill this gap, helping the user bring a telemedicine vision into practice.

In essence, the tool assists telemedicine stakeholders to answer the following questions:

(i) What is the current situation or level of readiness of the health ecosystem for a telemedicine service?

(ii) What is the strategic vision for a telemedicine service as an integrated part of the health system and digital health transformation?

(iii) What organizational changes are required to implement and maintain the telemedicine service?

(iv) What resources, skills and infrastructure are required to develop the telemedicine service?

(v) How to monitor, evaluate, and optimize the telemedicine service?

Importantly, the support tool works in unison with, complements, and builds on the broader digital health agenda of Member States. Therefore, it is suggested that the tool be understood in the context of WHO's strategic documents as follows:

- ***Digital implementation investment guide (DIIG): integrating digital interventions into health programmes*** *(18)*
- ***Global strategy on digital health 2020–2025*** *(19)*
- ***Regional digital health action plan for the WHO European Region 2023–2030*** *(20)*
- ***Consolidated telemedicine implementation guide*** *(49)*.

Every health-care ecosystem is unique, and the support tool is created to assist nationally-led telemedicine interventions to build on the global evidence base whilst providing flexibility to adapt interventions to the local context, needs, and available resources. The process of translating telemedicine knowledge to a local context requires the collaboration of a diverse team to co-create, align, and coordinate towards a common vision and implementation strategy. The tool facilitates a conversation between different stakeholders to harmonize thinking towards a common goal, building on the status quo, and responding to local realities to develop a relevant, feasible and high-quality telemedicine service.

The support tool is not context-, disease-, user group-, or setting-specific; rather it provides a generic resource that describes all the building blocks required for the development of a telemedicine service and can be used across different contexts, by various stakeholders, at all levels of the health system. Furthermore, it is not a step-by-step toolkit, as these resources already exist, which provide case studies, examples, proformas and other guidelines for telemedicine service development *(21, 49-55)*. Links to some of these resources can be found in Annex 2. It should also be acknowledged that telemedicine is increasingly transcending national borders, particularly for people displaced by conflicts, affected by pandemics or other national emergencies. Although the specific complexities and challenges of the increasing globalization of telemedicine are outside the scope of this tool, nevertheless, using the tool will support cross-border communication by providing a standardized conceptual model and language for international collaboration.

The tool is informed by several principles, some of which are listed below.

- **Evidence-based** – grounded in the best available global telemedicine evidence, applied field-based experience, theoretical models, and resources.
- **Human-centred** – focused on the needs of users. Ensuring that telemedicine service design and delivery are based on the preferences, needs, and values of end-users, and that health care is patient-centred and provided responsively and respectfully.
- **Leaving no one behind** – supports telemedicine implementation that promotes equity and universal access, with particular attention to those who are more vulnerable and marginalized.
- **Practical** – emphasizing the translation of evidence into easily understood content and providing useful recommendations that can be applied in real-world contexts.
- **Contextually adaptable** – the user can adapt the tool to the local context and level of telemedicine maturity.
- **Multidisciplinary** – simple to understand and pitched at those who are not necessarily experts in telemedicine services.
- **Continuous improvement** – an evolving resource which will continue to grow and adapt with ongoing learning through testing and feedback.

Who is the Support tool to strengthen telemedicine for?

The support tool will be helpful for anyone involved in developing a telemedicine service at national, regional, local or international level, particularly those in leadership positions designing, developing, implementing, monitoring, evaluating, or optimizing telemedicine services. Specifically, the tool is designed to support:

- **Telemedicine leaders** – decision-makers and project managers at ministries of health and regional public health authorities, including directors, policy-makers, and advisers;
- **Telemedicine implementers and champions** – public sector health workforce at primary, secondary, tertiary, and community level, particularly telemedicine champions, health facility managers, health insurance experts, and the wider health workforce involved in telemedicine service implementation, such as doctors, nurses, allied health professionals, and health information technology workforce;
- **Private sector telemedicine stakeholders** – private health-care providers partnering with the government on national telemedicine services, such as private clinics and laboratories; and
- **Other telemedicine stakeholders** – other international or national telemedicine stakeholders, including WHO officers, technology consultants and organizations, academic and research institutes, nongovernmental organizations involved in telemedicine services, and public and patient representative organizations.

The Support tool to strengthen telemedicine

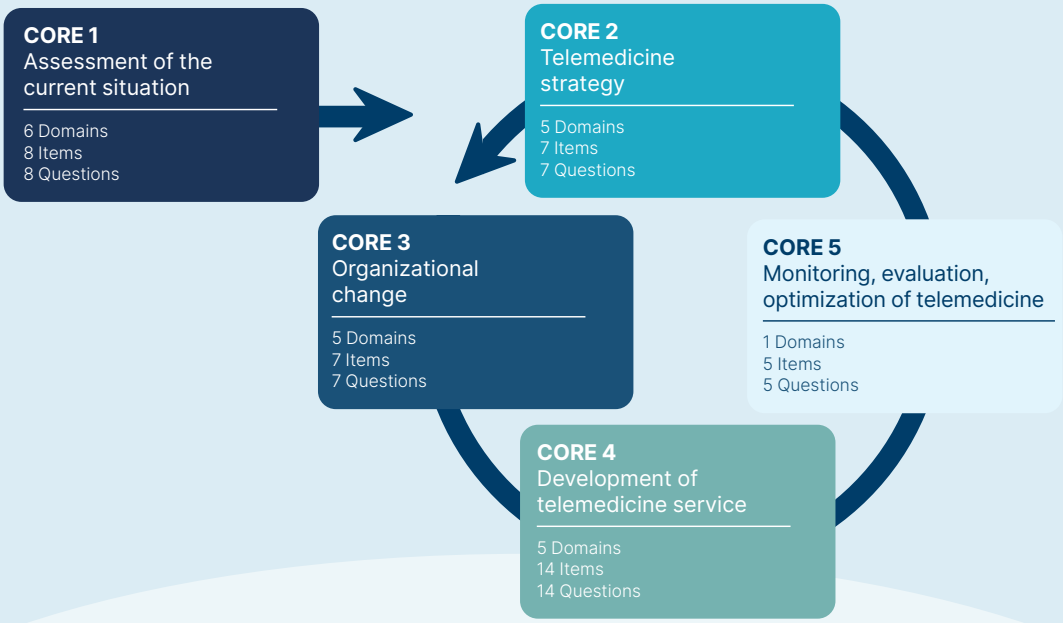
Support tool with assessment sheets is available in two different formats: in Annex 1 and in Excel format as a Web annex.[2]

Conceptual overview

The support tool is constructed in the form of a grid or matrix, comprising three main constructs. For a conceptual overview of the support tool see Fig. 1.

[2] Support tool to strengthen telemedicine: resource for assessment, strategy development, and strengthening of telemedicine services. Web annex: assessment item sheets. Copenhagen: World Health Organization; 2024 (https://iris.who.int/handle/10665/378151, accessed 11 July 2024).

Fig. 1. Conceptual overview of the telemedicine support tool



First, it incorporates fundamental dimensions that form the pillars or foundations of a telemedicine service **(Core)**. These dimensions are then organized into thematic areas representing different aspects of telemedicine implementation **(Domains)**. Finally, these areas are further broken down into detailed components that specify the various elements of a telemedicine system **(Items)**.

Cores, Domains, and Items

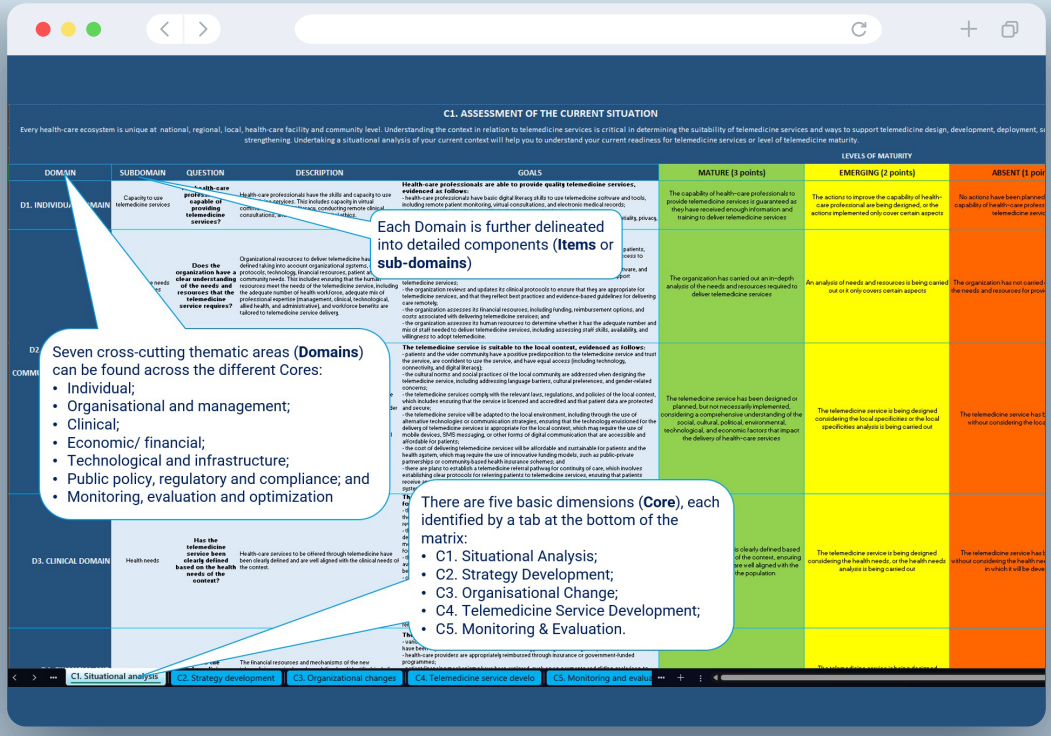
Exploring the tool matrix in more detail (see Fig. 2), there are five fundamental dimensions **(Core)**. Each one is identified by a tab along the bottom of the matrix. These comprise:

(i) **Assessment of the current situation:** what is the current situation or level of readiness of the health ecosystem for a telemedicine service?
(ii) **Development of the telemedicine strategy:** what is the strategic vision for a telemedicine service as an integrated part of the health system and digital health transformation?
(iii) **Creating organizational change:** what organizational changes are required to implement and maintain the telemedicine service?
(iv) **Development of telemedicine services:** what resources, skills and infrastructure are required to develop the telemedicine service?
(v) **Monitoring, evaluation and optimization:** how to monitor, evaluate and optimize the telemedicine service?

Within each Core tab, the tool comprises seven cross-cutting thematic areas (Domains) which traverse the micro, meso, and macro levels of the health system. The Domains are specific to the requirements of each Core, with most being relevant to multiple Cores. The Domains are indicated down the first column of the matrix of each Core. There are 7 Domains across the tool as follows:

(i) Individual
(ii) Organizational and management
(iii) Clinical
(iv) Economic/financial
(v) Technology and infrastructure
(vi) Public policy, regulatory and compliance
(vii) Monitoring, evaluation and optimization.

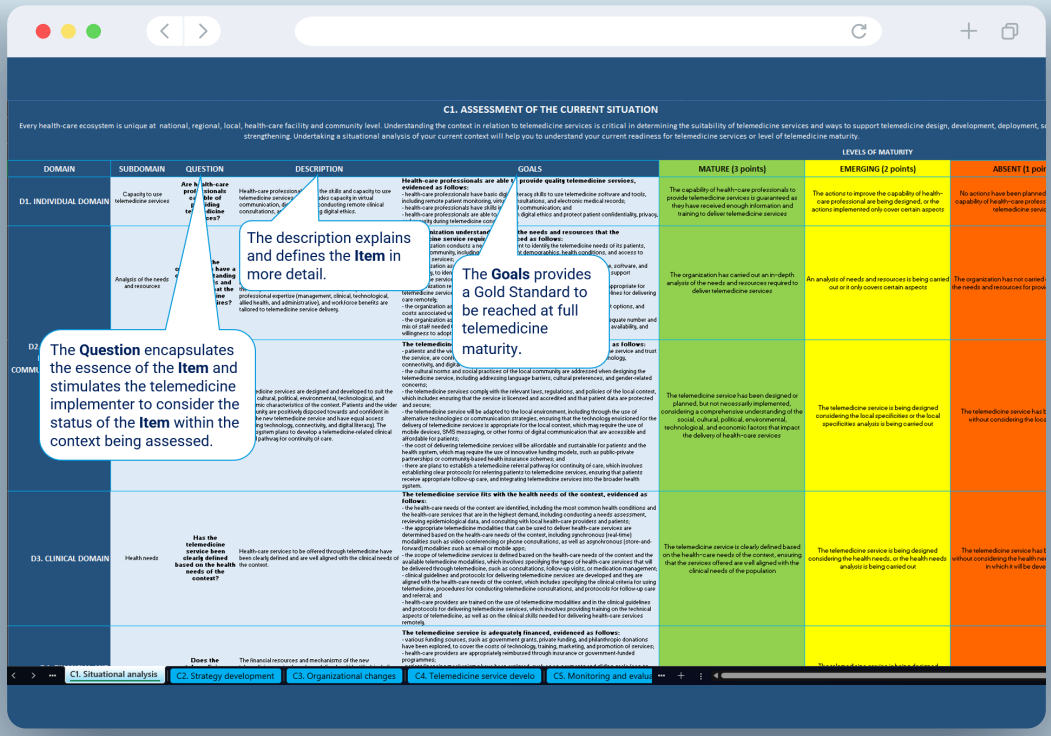
Fig. 2. Screenshot of the support tool to strengthen telemedicine matrix **(Core, Domain and Items)**



Each Domain is further delineated into detailed components (Items). There are 41 Items in the tool. Each Item reads across a row of the matrix, and is explored through a telemedicine implementation **Question**, **Description**, and **Goal** (see Fig. 3).

- **Question** – This encapsulates the essence of the Item and helps the user to consider the status of the Item in the context being assessed.
- **Description** – The description explains and defines the Item in more detail.
- **Goal** – This expands on the description, explaining the gold standard, or what a mature telemedicine will look like when the goal is reached.

Fig. 3. Screenshot of the Telemedicine support tool matrix **(Question, Description and Goal)**

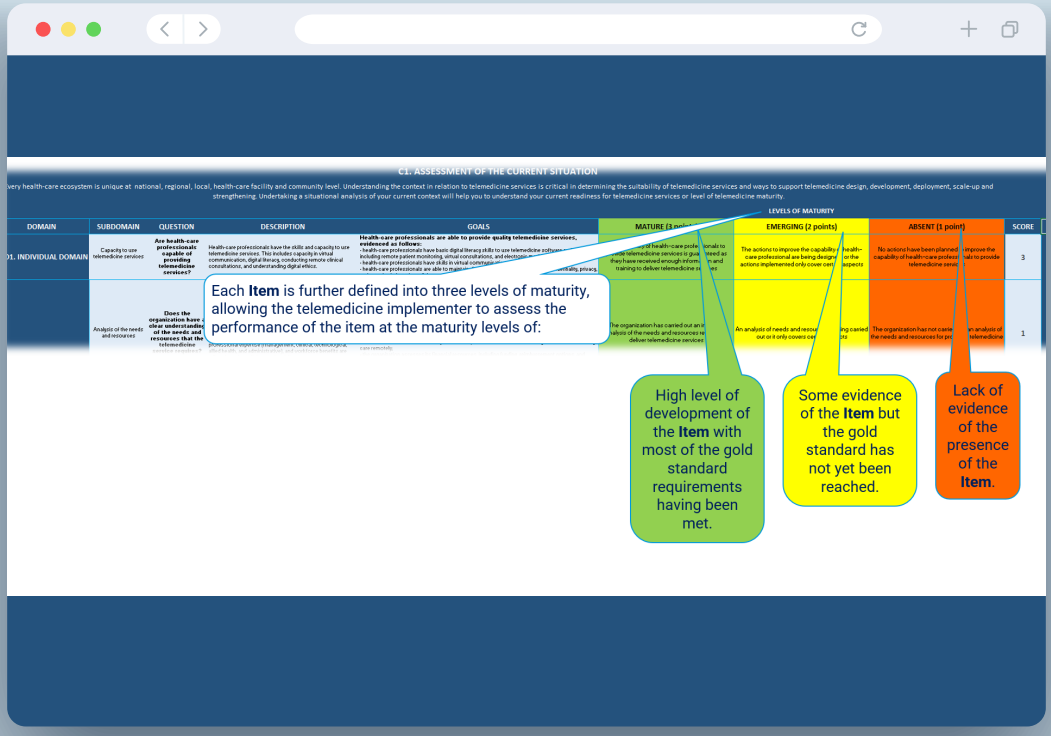


Scoring

Moving across each Item, the user can score their telemedicine context at three levels of maturity by assessing the performance of each Item according to the resources available and the local context (see Fig. 4). The levels of maturity are:

- **Absent (score 1):** A lack of evidence of the presence of the Item.
- **Emerging (score 2)**: Some evidence of progress towards the Item but the gold standard has not yet been reached.
- **Mature (score 3):** A high level of development of the Item, with most of the gold standard requirements being met.

Fig. 4. Screenshot of the Support tool to strengthen telemedicine matrix **(Maturity and Score)**



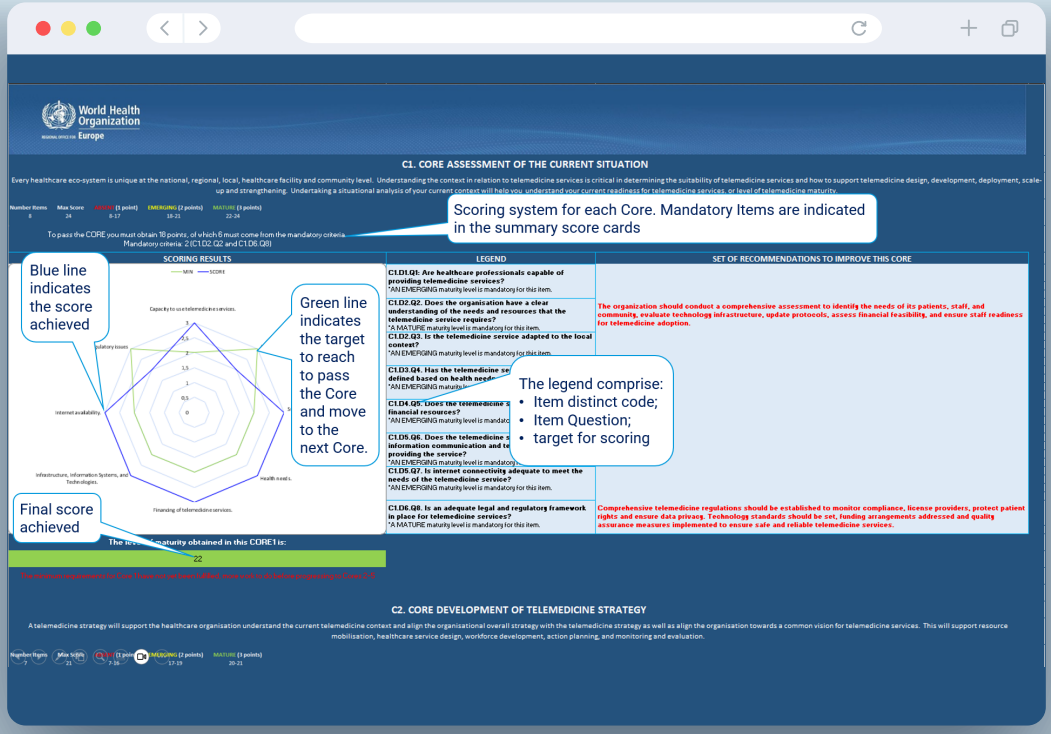
It is suggested that the user works through each Item of each Core of the tool in a logical sequence by self-assessing their context and scoring each Item in the 'score' column, as Absent (1 point), Emerging (2 points), or Mature (3 points). The tool aims to help the user understand what a gold standard or mature telemedicine context looks like, and what they need to do to reach the goal.

Once the user has scored the maturity level in the Core tab, the final score of the Core is summarized in the final tab of the tool, labelled "scores and recommendations" (see Fig. 5.). All the scores of each Core are automatically calculated here, running in sequence, down the page, with a summary of each Core.

The results of each Core are displayed in a simple radar chart (spider diagram). The blue spider line indicates the user score, whilst the green line indicates the goal to meet the minimum requirements to pass the Core and move to the next Core. A distinct code identifies each Item comprising its Core number, Domain number and Question number; enabling the user to identify and discuss it easily. For instance:

C1:D1:Q1 = Core 1:Domain 1:Question 1 = Are health-care professionals capable of providing telemedicine services?

Fig. 5. Screenshot of the Support tool to strengthen telemedicine and scores



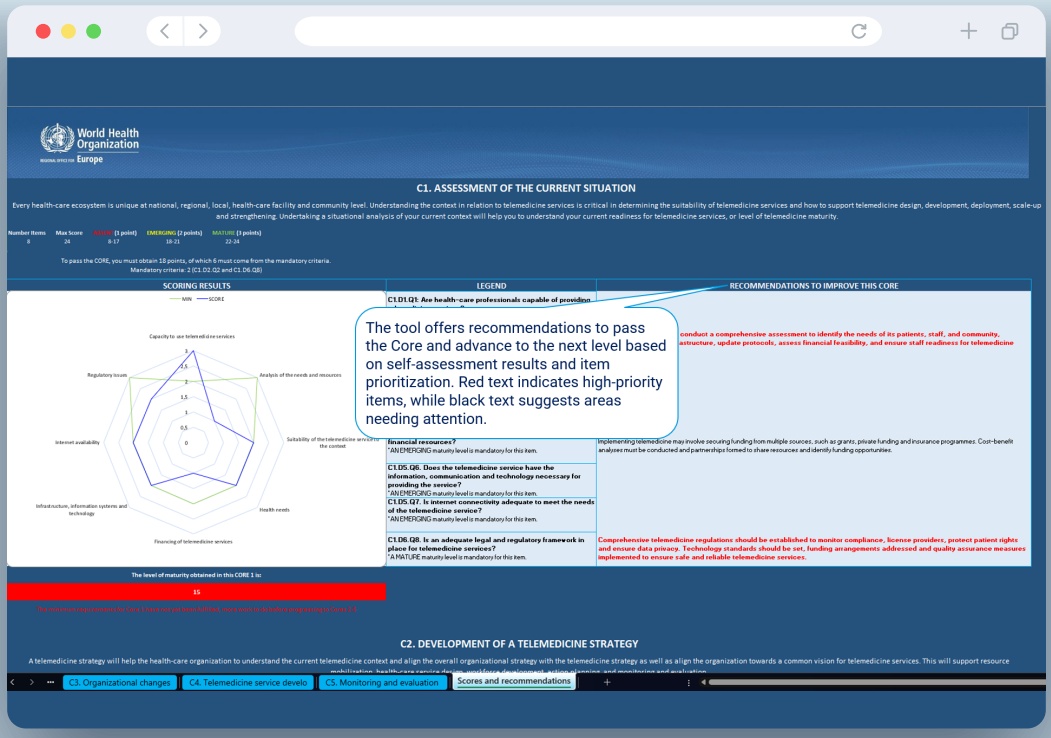
All the Items in the tool are important to the success of a telemedicine system. However, some Items are considered critical and highest priority for the implementation process. These Items have been given a higher weighting in the tool, and are determined to be mandatory, and should reach the maximum maturity level (score 3) before they can be considered fulfilled. Other Items are important, but may be a work in progress, and should reach at least an Emerging level (2 points). To pass the entire Core, it is recommended to reach a Mature level on the mandatory Items (3 points) and at least an Emergent level (2 points) on the other Items. Any score below the Emerging level threshold is considered Absent level. Refer to Table 1 for a summary of the scoring system by Core.

Based on the results of the self-assessment and the prioritization of Items, the support tool provides recommendations to the user about what they need to do to strengthen their telemedicine service to pass the Core and move on to the next Core. The recommendations in red text are highest priority to focus on, whilst the items in black text need some attention, but it is appreciated that these may take longer to reach full maturity and may be a work in progress for some time. It is suggested that the user does not move on to working on the next Core until they have met the minimum requirements to pass the Core being assessed.

Table 1. Summary of the Support tool to strengthen telemedicine score

Core	Number of Items	Number of mandatory Items	Absent	Emerging	Mature
Assessment of the current situation	8	2	8–17	18–21	22–24
Development of the telemedicine strategy	7	3	7–16	17–19	20–21
Development of organizational changes	7	4	7–17	18–19	20–21
Development of the telemedicine service	14	10	14–37	38–40	41–42
Monitoring, evaluation, and optimization of the implementation of telemedicine	5	1	5–10	11–13	14–15

Fig. 6. Screenshot of the Support tool to strengthen telemedicine recommendations



How to use the Support tool to strengthen telemedicine?

The Support tool is a collaborative tool which helps teams and different telemedicine stakeholders gain detailed insights into the strengths of the telemedicine context, the weaknesses that could become barriers to the development of the telemedicine service, and the gaps that need to be addressed to enable the telemedicine service to achieve the goals set. The scores reached in the tool guide future telemedicine implementation planning, prioritizing, resourcing, scheduling, and monitoring.

There are various ways in which the tool can be used to assist the development of a telemedicine service, irrespective of the level of maturity of the telemedicine landscape, the context, clinical focus, or the setting of focus (such as national-level implementation down to health-care facility-level). For instance, for a more mature telemedicine service, the tool can be used to optimize telemedicine services. Alternatively, if a telemedicine service is in a start-up phase and being assessed for feasibility or being designed, the tool guides the development process.

It is suggested that the tool is completed by multiple telemedicine stakeholders, preferably in teams, to facilitate a dialogue across all levels of the health system. The value of the support tool is to identify where there is alignment across the health systems, and where differences of perspective lie. Inevitably there will be a degree of subjectivity by those using the tool, with different users potentially scoring their contexts differently on the maturity scale. However, this is not considered a problem, as the tool is not to be used as an accreditation or evaluation tool. Rather it is a guide to help telemedicine decision-makers and implementers to honestly reflect on, and understand, the strengths and weaknesses of their context. Areas of perceived discrepancy are a basis for important discussions and deeper reflection to align stakeholders to a common interpretation of the context. In essence, the tool is a conversational instrument that allows diverse stakeholders to structure a comprehensive and consistent dialogue about the telemedicine implementation context and processes into a logical sequence, to align the telemedicine service vision.

Although on the surface the tool appears linear, it can also be used as a dynamic, iterative, and continuous learning and improvement tool with no endpoint. However, the following recommendations are provided for those working through the tool.

- First, assess Core 1 to understand the context and degree of readiness and to determine the suitability of a telemedicine service or its level of maturity in the context.
- Once the first Core is passed, it is no longer necessary to go through it again. The support tool then becomes a cyclical tool composed of four Cores to pass the different Items successively and reach the optimal maturity level for the successful design and development of the telemedicine service.
- Both the design and implementation of telemedicine must be undertaken step by step, so it is not necessary to assess all five Cores at the same time, but to manage the successive Cores as the implementation process progresses.
- In each Core there are mandatory requirements. Not reaching them implies that the Core has not yet been fulfilled and it is suggested to continue working on these Items until they reach maturity, before moving to the next Core.
- To pass a Core, it is necessary to reach a minimum Emerging score (2 points) and obtain the maximum score in the mandatory Items (3 points).
- Passing Core 5: Monitoring, evaluation, and optimization provides the necessary information to initiate a new cycle, as required.

As the user works through the tool, they may find that the maturity levels of Items in their own context may not follow a logical sequence as outlined in the tool – for instance, an Item in Core 5 may be fulfilled before an Item in Core 3. This is to be expected, as health systems are complex ecosystems which do not follow logical sequences, and different parts of the system may advance at different rates. Although it is suggested that the user follow the sequence from Cores 1 to 5, the tool can also be used in a more dynamic way moving back and forth between the Cores, as the user requires, to obtain an overall picture of the telemedicine context.

Finally, it is important to emphasize that the support tool will continue to evolve as evidence grows in the fast-moving field of telemedicine. Therefore, a telemedicine service that is assessed as mature today may be considered emerging in the future, if it does not continue to optimize and improve towards the continuously advancing gold standard.

The Support tool is a collaborative tool which helps teams and different telemedicine stakeholders gain detailed insights into the strengths of the telemedicine context, the weaknesses that could become barriers to the development of the telemedicine service, and the gaps that need to be addressed to enable the telemedicine service to achieve the goals set. The scores reached in the tool guide future telemedicine implementation planning, prioritizing, resourcing, scheduling, and monitoring.

Closing comments

The Support tool to strengthen telemedicine helps leaders, managers, policy-makers and other telemedicine stakeholders to self-assess their telemedicine context, and design and optimize telemedicine services based on the best available global evidence. It explores the context across the telemedicine life cycle from conception to maturity, including assessing the current health-care landscape, strategic planning for telemedicine integration, organizational change management, service development, and ongoing monitoring and optimization. It stresses the importance of focusing on equity of access and the needs of diverse populations. The Tool facilitates the creation of high-quality telemedicine services across different levels of the health-care system and promotes collaboration and alignment amongst stakeholders towards developing resilient, patient-centric, and technologically advanced health-care systems.

Helpful resources

Essential reading to understand telemedicine within digital health transformation	
Name	**Description**
Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)	Provides a practical guide to the digital health landscape including telemedicine services. The resource includes guidelines, tools and recommendations; and helps to develop an understanding of the integrations that telemedicine requires within broader health system digital transformation.
Global strategy on digital health 2020–2025 (19)	Guides a strategic vision for digital health transformation integrating telemedicine services.
WHO Digital Health Atlas *(56)*	An online resource which maps progress of national digital health interventions and progress (including telemedicine) around the globe.

Telemedicine resources to guide the implement of each Core of the telemedicine support tool	
Core	**Resources**
Core 1 – Assessment of the current situation	• *Consolidated telemedicine implementation guide (49)* [pages 9–17, 29–30; also review Annex-Case studies on pages 44–57 to learn more about how other countries have developed telemedicine services] • *Planning National Telemedicine and Health Hotline Services: A Toolkit for Governments (50)* [Chapter 2–4] • *Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)* [Chapter 2–4] • WHO Digital Health Atlas *(56)* – to identify relevant telemedicine services to learn from and collaborate with.
Core 2 – Telemedicine strategy	• *Planning National Telemedicine and Health Hotline Services: A Toolkit for Governments (50)* [Chapter 5 and parts of Chapters 2–4] • *Consolidated telemedicine implementation guide (49)* [pages 18–34 describe action/implementation planning but also have some relevance to strategic planning] • *Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)* [Chapter 5–7] • *Framework for the Implementation of a Telemedicine Service (21).*

Telemedicine resources to guide the implement of each Core of the telemedicine support tool	
Core	**Resources**
Core 3 – Organizational change	• *Consolidated telemedicine implementation guide (49)* [pages 11, 23, 29–30, 40–41; also review Annex-Case studies pages 44–57 to learn more about telemedicine development in different country contexts]. • *Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)* [page 18, 75–76, 113–116]. • A systematic scoping review of change management practices used for telemedicine service implementation, provides an overview of change management approaches used in telemedicine implementation *(57)*. To learn more about telemedicine change champions, see: • Inside help: An integrative review of champions in healthcare-related implementation *(58)*; • Champions in context: Which attributes matter for change efforts in healthcare? *(59)*.
Core 4 – Development of telemedicine service	• *Planning National Telemedicine and Health Hotline Services: A Toolkit for Governments (50)* [Chapter 5–10] • *Consolidated telemedicine implementation guide (49)* [page 18–34] • *Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)* [Chapter 5] • *WHO-ITU global standard for accessibility of telehealth services (55)* – for considerations of the special needs of people with disabilities • *Telehealth quality of care tool (60)* Theories and models that have commonly been used to guide telemedicine service development include the following: • Technology Acceptance Model *(61)* • Unified Theory of Acceptance and Use of Technology *(62)* • Diffusion of Innovations *(28)* • Normalization Process Theory *(27)*.
Core 5 – Monitoring, evaluation and optimization of telemedicine	• *Consolidated telemedicine implementation guide (49)* [page 35–43] • *Digital implementation investment guide (DIIG): integrating digital interventions into health programmes (18)* [Chapter 8] Tools commonly used to evaluate the implementation, service and/or patient outcomes of telemedicine services include: • RE-AIM Model (Reach, Effectiveness, Adoption, Implementation, Maintenance) *(63)* • Model for Assessment of Telemedicine (MAST) *(64)* • Consolidated Framework for Implementation Research *(65)*

Telemedicine toolkits and guidelines to further support needs assessment, strategy, design and implementation, and monitoring and evaluation	
Name	**Description**
Consolidated telemedicine implementation guide (49)	A detailed implementation guide produced by WHO to support each stage of the telemedicine implementation process.
Telehealth quality of care tool (60)	The telehealth quality of care tool (TQoCT) is a tool to assess quality of care of telehealth services. The tool aims to stimulate reflection and action, helping users on their journey to safe and high-quality telehealth service provision.
Planning National Telemedicine and Health Hotline Services (50) *A Toolkit for Governments* *A Toolkit for Service Providers Working with Governments*	This resource comprises two toolkits, one targeted to government telemedicine implementers and one focused on organizations supporting the government to implement telemedicine services, such as technology companies, nongovernmental organizations, academic institutions etc. The resource includes many useful tools, tips, examples, templates and other useful aids for implementing telemedicine services.
Telehealth Implementation Playbook (52)	This toolkit is produced by the American Medical Association to support telemedicine service development and implementation.
Telemedicine guidelines for specific needs groups	
Name	**Description**
WHO-ITU global standard for accessibility of telehealth services (55)	This Guideline provides important specific considerations standards for making telemedicine services accessible to people with disabilities, including those with: vision impairment and blindness, people who are deaf and hard of hearing, speech difficulties, mobility impairment, mental health and psychosocial disabilities, developmental and intellectual disabilities, and learning disabilities
A Guide to Telemedicine in Primary Healthcare (54)	This UNICEF guideline focuses on developing primary health-care level telemedicine, providing regulations, tools and tips for how to implement telemedicine at the primary health-care level of the health system.
Telehealth Toolkit (53)	This toolkit is designed especially for rural health telemedicine service development in the United States but could also be helpful for other country contexts.
Telemedicine evaluation tools to assess implementation, service and patient outcomes	
Tool name	**Description**
Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) *(63)*	The RE-AIM model focuses on monitoring and evaluating implementation outcomes and guides data collection to measure: reach, effectiveness, adoption, quality of implementation, and maintenance or embedding the service into routine care.

Model for Assessment of Telemedicine (MAST) *(64)*	This tool provides guidance on how to monitor and evaluate telemedicine services in relation to quality of care, clinical outcomes, health-care performance, regulatory and ethical outcomes, and sustainability of the service.
Consolidated Framework for Implementation Research *(65)*	This framework guides the assessment of the implementation processes and outcomes of complex health system innovations, and has also been used to design, develop and assess telemedicine services.
Defining evaluation indicators for telemedicine as a tool for reducing health inequities *(37)*	This tool provides recommendations on which indicators need to be considered to address access and equity issues in telemedicine services.

Commonly used telemedicine theories, models and frameworks	
Theory, model or framework name	**Description**
Telemedicine Hat *(21)*	A model known as the telemedicine hat which provides a conceptual overview of the telemedicine architecture from situational analysis, to strategic planning, development of the telemedicine service, and monitoring, evaluation and optimization of the telemedicine service.
Technology Acceptance Model (TAM) *(61)*	Sets out to answer the question: what predicts or promotes the intention to use telemedicine? This theory proposes that telemedicine acceptance and use are affected by an individual's perceived ease of use, perceived usefulness, and subjective norms.
Unified Theory of Acceptance and Use of Technology (UTAUT) *(62)*	This theory builds on the Technology Acceptance Model, by adding new dimensions to the model to better understand the individual predispositions that predict use, including the individuals' characteristics, their social influences, and other facilitating conditions within their context.

Commonly used telemedicine theories, models and frameworks (contd)	
Diffusion of Innovations Theory *(28)*	This theory explains the uptake of telemedicine describing how a telemedicine innovation gains momentum and diffuses through the population, starting with innovators, followed by early adopters, early majority, late majority and lastly laggards. This process is affected by the innovation itself, time, channels of communication, and an individual's social system.
Normalization Process Theory (NPT) *(27)*	The Normalization Process Theory is helpful in guiding implementation processes and activities in health organizations to move telemedicine from innovation to being embedded into routine health service practice and operations. This theory focuses on the creation of social norms and group processes that support coherence, cognitive participation, collective action, and reflexive monitoring. Normalization Process Theory helps to support the creation of learning organizations and communities of practice that are supportive of change and integration.

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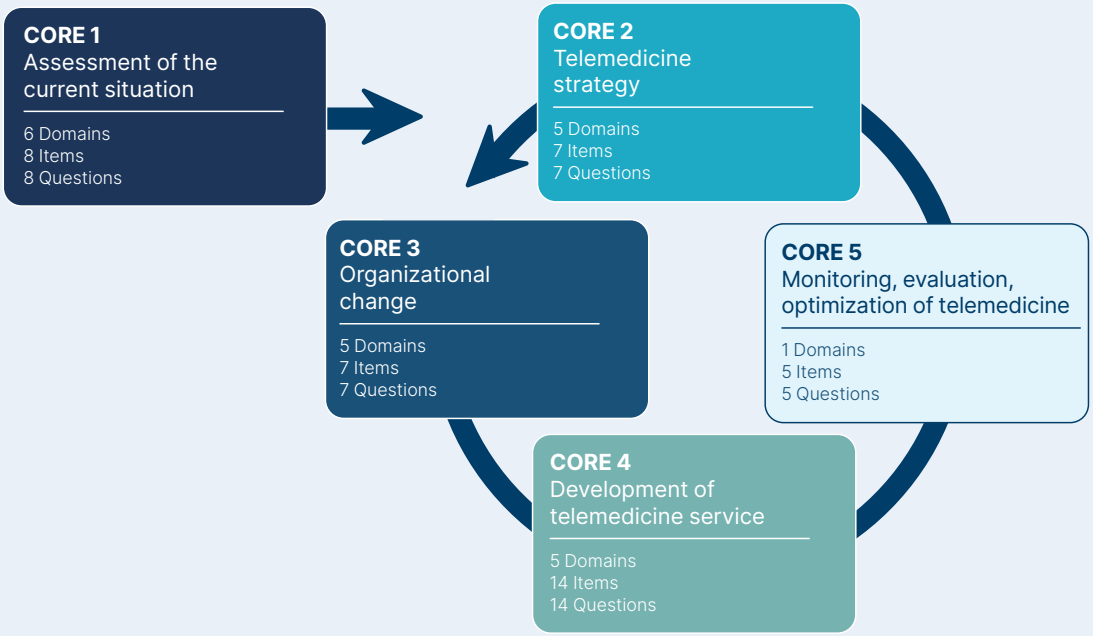
Annex 1 – Telemedicine assessment item sheets for the core module

Telemedicine support tool

Welcome to the support tool to strengthen telemedicine, an easy-to-use tool that helps to guide your telemedicine programme design, implementation, monitoring, evaluation and optimization.

The support tool is explained in detail in the Support tool to strengthen telemedicine: guideline for telemedicine assessment and strategy development, which explains the purpose of the tool, its theoretical underpinnings, how it was developed, and provides suggestions for its use. It is recommended to consult the Guideline before using the tool to fully understand how to use it.

A summary of the logic, core dimensions, and domains of the support tool are outlined in the following figure:



Welcome and overview

In this support tool you will find the following seven tabs:

Welcome and overview: brief instructions and explanation about the support tool (for a more detailed explanation, refer to the Guideline for telemedicine assessment and strategy development)

C1. Situational analysis: an assessment tool that outlines the core constructs for conducting a situational analysis of telemedicine service

C2. Strategy development: core constructs to consider in the development of a telemedicine strategy

C3. Organizational change: core constructs to consider in undertaking the required organizational change required for a telemedicine service

C4. Development of a telemedicine service: core constructs in developing a telemedicine service at health facility level

C5. Monitoring, evaluation, and optimization of telemedicine: core constructs to consider in developing a monitoring and evaluation framework and optimizing the telemedicine service

Scores and recommendations: a summary of the assessment scores by domain, along with a list of recommendations for improvements to be made for each domain

The use of the support tool is based on the following principles.

1) It is mandatory to first assess Core 1 to understand the context and degree of readiness and to determine the suitability of the telemedicine service or its level of maturity in this field.
2) Once the first Core is passed, it is no longer necessary to go through it again. The tool then becomes a cyclical tool composed of the following four Cores in order to pass the different items successively and reach the optimal maturity level for the successful design and development of the telemedicine service.
3) Both the design and implementation of telemedicine must be evaluated step by step. Therefore, it is not necessary to evaluate all five Cores at the same time. Instead, it is important to manage the successive Cores as the implementation process progresses.
4) In each Core there are mandatory requirements at the highest level, and not reaching them is an indication that the Core has not been passed. In this case, it is recommended to continue working in these areas until the optimum level of maturity is reached, in order to move on to the next Core.
5) To pass a Core, it is necessary to reach a minimum emerging score and obtain the maximum score in the mandatory items.
6) Passing Core 5: Monitoring and evaluation provides the information needed to initiate a new cycle.

Welcome and overview

How to use the Support tool

Assess each item in the C1. Situational analysis tab. Start by reviewing the QUESTION (column C) and work your way across the row to look at the DESCRIPTION (column D) and the ultimate GOAL (column E). Assess the context according to the level of maturity for each item; is it MATURE (score 3), EMERGING (score 2) or ABSENT (score 1)? Based on your assessment, score each item in Column J. The score is calculated and summarized automatically in a radar chart (spider diagram) in the final Scores and recommendations tab (rows 2–40). Here you will find the minimum required score against each domain (green line in the spider diagram) and will be able to compare this with the actual score received in the assessment (blue line in the spider diagram). Note that some items need to reach at least a mature level and others need to reach at least an emerging level before the context is ready to move to the next Core. In column C, for each item, you can find a set of recommendations and steps to be taken to improve the item. Note that any recommendation in red text needs to be prioritized. The final score for Core 1 is provided in cell A:39. If the cell is green, you can proceed, and if it is red, it means there are items that need to be addressed before the context is ready to move forward with a telemedicine service.

If the context scores green in Core 1. Situational analysis (cell A:39), the telemedicine context has the foundations to move to the next Core. Cores 2 to 5 (tabs C2 to C5) are set up in the same way as C1, containing item QUESTIONS (column C) and you can work your way across the row to look at the DESCRIPTION (column D) and the ultimate GOAL (column E). Assess the items according to the level of maturity for each item, whether it is MATURE (score 3), EMERGING (score 2) or ABSENT (score 1). Based on your assessment, score each item in Column J. In the final Scores and recommendations tab, you will find a summary of the results of each Core along with recommendations. These can be analysed as outlined above in Instruction 1.

Continue to work through the Cores (2 to 5), Domains and Items to identify what has been achieved and what needs to be done to develop the telemedicine service further, which feeds into the telemedicine implementation process and telemedicine workplans. As the telemedicine service strengthens, the support tool will continue to be useful for reflection and evaluation of the progress and gaps.

A telemedicine service is fully mature when it has reached a score of 3 across every item in every Core.

C1. Assessment of the current situation

C1. Assessment of the current situation

Every health-care ecosystem is unique at national, regional, local, health-care facility and community level. Understanding the context in relation to telemedicine services is critical in determining the suitability of telemedicine services and ways to support telemedicine design, development, deployment, scale-up and strengthening. Undertaking a situational analysis of your current context will help you to understand your current readiness for telemedicine services or level of telemedicine maturity.

Domain	Subdomain	Question	Description	Goals
D1. Individual domain	Capacity to use telemedicine services	**Are health-care professionals capable of providing telemedicine services?**	Health-care professionals have the skills and capacity to use telemedicine services. This includes capacity in virtual communication, digital literacy, conducting remote clinical consultations, and understanding digital ethics.	**Health-care professionals are able to provide quality telemedicine services, evidenced as follows:** • health-care professionals have basic digital literacy skills to use telemedicine software and tools, including remote patient monitoring, virtual consultations, and electronic medical records; • health-care professionals have skills in virtual communication; and • health-care professionals are able to maintain digital ethics and protect patient confidentiality, privacy, and security during telemedicine consultations.
D2. Organizational, management and communication domain	Analysis of the needs and resources	**Does the organization have a clear understanding of the needs and resources that the telemedicine service requires?**	Organizational resources to deliver telemedicine have been defined taking into account organizational systems, clinical protocols, technology, financial resources, patient and community needs. This includes ensuring that the human resources meet the needs of the telemedicine service, including the adequate number of health workforce, adequate mix of professional expertise (management, clinical, technological, allied health, and administrative), and workforce benefits are tailored to telemedicine service delivery.	**The organization understands clearly the needs and resources that the telemedicine service requires, evidenced as follows:** • the organization conducts a needs assessment to identify the telemedicine needs of its patients, staff, and community, including analysing patient demographics, health conditions, and access to health-care services; • the organization assesses its existing technology infrastructure, including hardware, software, and connectivity, to identify gaps and determine what additional technology is needed to support telemedicine services; • the organization reviews and updates its clinical protocols to ensure that they are appropriate for telemedicine services, and that they reflect best practices and evidence-based guidelines for delivering care remotely; • the organization assesses its financial resources, including funding, reimbursement options, and costs associated with delivering telemedicine services; and • the organization assesses its human resources to determine whether it has the adequate number and mix of staff needed to deliver telemedicine services, including assessing staff skills, availability, and willingness to adopt telemedicine.

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Domain	Subdomain	Question	Description	Goals
D2. Organizational, management and communication domain	Suitability of the telemedicine service to the context	**Is the telemedicine service adapted to the local context?**	Telemedicine services are designed and developed to suit the social, cultural, political, environmental, technological, and economic characteristics of the context. Patients and the wider community are positively disposed towards and confident in using the new telemedicine service and have equal access (including technology, connectivity, and digital literacy). The health system plans to develop a telemedicine-related clinical referral pathway for continuity of care.	**The telemedicine service is suitable to the local context, evidenced as follows:** • patients and the wider community have a positive predisposition to the telemedicine service and trust the service, are confident to use the service, and have equal access (including technology, connectivity, and digital literacy); • the cultural norms and social practices of the local community are addressed when designing the telemedicine service, including addressing language barriers, cultural preferences, and gender-related concerns; • the telemedicine services comply with the relevant laws, regulations, and policies of the local context, which includes ensuring that the service is licensed and accredited and that patient data are protected and secure; • the telemedicine service will be adapted to the local environment, including through the use of alternative technologies or communication strategies, ensuring that the technology envisioned for the delivery of telemedicine services is appropriate for the local context, which may require the use of mobile devices, SMS messaging, or other forms of digital communication that are accessible and affordable for patients; • the cost of delivering telemedicine services will be affordable and sustainable for patients and the health system, which may require the use of innovative funding models, such as public-private partnerships or community-based health insurance schemes; and • there are plans to establish a telemedicine referral pathway for continuity of care, which involves establishing clear protocols for referring patients to telemedicine services, ensuring that patients receive appropriate follow-up care, and integrating telemedicine services into the broader health system.
D3. Clinical domain	Health needs	**Has the telemedicine service been clearly defined based on the health needs of the context?**	Health-care services to be offered through telemedicine have been clearly defined and are well aligned with the clinical needs of the context.	**The telemedicine service fits with the health needs of the context, evidenced as follows:** • the health-care needs of the context are identified, including the most common health conditions and the health-care services that are in the highest demand, including conducting a needs assessment, reviewing epidemiological data, and consulting with local health-care providers and patients; • the appropriate telemedicine modalities that can be used to deliver health-care services are determined based on the health-care needs of the context, including synchronous (real-time) modalities such as video conferencing or phone consultations, as well as asynchronous (store-and-forward) modalities such as email or mobile apps;

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Domain	Subdomain	Question	Description	Goals
				• the scope of telemedicine services is defined based on the health-care needs of the context and the available telemedicine modalities, which involves specifying the types of health-care services that will be delivered through telemedicine, such as consultations, follow-up visits, or medication management; • clinical guidelines and protocols for delivering telemedicine services are developed and they are aligned with the health-care needs of the context, which includes specifying the clinical criteria for using telemedicine, procedures for conducting telemedicine consultations, and protocols for follow-up care and referral; and • health-care providers are trained on the use of telemedicine modalities and in the clinical guidelines and protocols for delivering telemedicine services, which involves providing training on the technical aspects of telemedicine, as well as on the clinical skills needed for delivering health-care services remotely.
D4. Financial and economic domain	Financing of telemedicine services	**Does the telemedicine service have adequate financial resources?**	The financial resources and mechanisms of the new telemedicine service have been defined and identified, including consideration of costs of technology, training, marketing, and promotion of services, health-care provider reimbursements, and patient financing mechanisms.	**The telemedicine service is adequately financed, evidenced as follows:** • various funding sources, such as government grants, private funding, and philanthropic donations have been explored, to cover the costs of technology, training, marketing, and promotion of services; • health-care providers are appropriately reimbursed through insurance or government-funded programmes; • patient financing mechanisms have been explored, such as co-payments and sliding-scale fees, to ensure that patients can afford telemedicine services, particularly those who are uninsured or underinsured; • a cost–effectiveness analysis has been conducted to determine the economic benefits of telemedicine services, such as reducing health-care costs, improving patient outcomes, and increasing access to care; and • partnerships with other health-care providers, organizations, and agencies have been established to share resources, expertise, and funding opportunities.

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Domain	Subdomain	Question	Description	Goals
D5. Technology and infrastructure domain	Infrastructure, information systems and technology	**Does the telemedicine service have the information, communication and technology necessary for providing the service?**	The information communication and technology infrastructure is aligned with the needs, design, and context (including social, cultural, environmental, and economic) of the new telemedicine service. This includes considerations of the choice of telemedicine hardware and software platforms, interoperability with other e-health infrastructure (i.e. Electronic Health Records), and scalability and sustainability of telemedicine technology solutions.	**The health centre has the information, communication and technology necessary to provide the new telemedicine service, evidenced as follows:** • a needs assessment has been conducted to determine the specific requirements for the telemedicine service, including the necessary hardware and software platforms, as well as any other technology and infrastructure requirements; • Electronic Health Records and health information systems are in place; • the appropriate technology and infrastructure have been selected, based on the needs assessment, and ensuring that the technology is aligned with the design and social, cultural, environmental, and economic context of the service, which includes selecting hardware and software platforms that are user-friendly, accessible, and reliable; • the chosen technology platforms are interoperable with other e-health infrastructures, such as Electronic Health Records; and • the chosen technology platforms are scalable and sustainable to meet the needs of the service in the long term, including through selecting technology that can be easily upgraded or expanded, as well as ensuring that the service is financially sustainable.
	Internet availability	**Is internet connectivity adequate to meet the needs of the telemedicine service?**	The internet broadband and bandwidth are adequately reliable to meet the needs of the new telemedicine service, including adequate internet coverage, distribution, and quality of connectivity.	**Internet connectivity meets the needs of the telemedicine service design, evidenced as follows:** • an assessment of internet availability is conducted in the area where the telemedicine service is provided, which includes assessing the broadband and bandwidth availability, coverage, distribution, and quality of connectivity, and considers the needs of the telemedicine service, such as the number of concurrent video calls that may be required, and the data transfer requirements for sharing medical images and records; • gaps in internet availability are identified, and solutions are proposed, including upgrading the existing internet infrastructure, for example, by increasing broadband capacity or installing additional internet access points, or exploring alternative internet connectivity solutions, such as satellite or cellular networks; • partnerships with local internet service providers, telecommunications companies, or other organizations have been established, providing support for improving internet connectivity in the area; and

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Domain	Subdomain	Question	Description	Goals
				• monitoring and maintenance of internet connectivity options is provided, ensuring that it remains reliable and meets the needs of the service, which includes regular testing of internet speed and reliability, as well as having contingency plans in place for any internet outages or disruptions.
D6. Public policy, regulatory and compliance domain	Regulatory issues	**Is an adequate legal and regulatory framework in place for telemedicine services?**	The regulations for telemedicine services are in place, including consideration of telemedicine regulatory authorities, what types of telemedicine services can be offered (and what the limitations of telemedicine are), who is authorized to provide telemedicine services, patient protection (including informed consent, privacy of data, and confidentiality), technology standards, financing regulations, accreditations, quality assurance, and quality control measures.	**A legal and regulatory framework for telemedicine services is in place, evidenced as follows:** • regulatory authorities have been established to oversee telemedicine services and ensure compliance with the regulations, including national or regional bodies responsible for licensing and monitoring telemedicine providers; • the regulations outline who is authorized to provide telemedicine services, such as licensed health-care professionals, and establish any additional training or certification requirements for these providers; • telemedicine regulations are aligned with existing data protection laws such as GDPR and address issues such as secure transfer of patient data, and ensure patient protection, including informed consent, privacy of data, and confidentiality; • telemedicine regulations establish technology standards for telemedicine providers to ensure interoperability, safety, and reliability, including standards for data transmission, encryption, and remote monitoring devices; • telemedicine regulations address financing arrangements, including reimbursement policies for telemedicine services, public and private payers, as well as regulations around fee-for-service models; • telemedicine providers are subject to accreditation processes to ensure they meet quality standards and comply with regulatory requirements; and • telemedicine regulations establish quality assurance and control measures to ensure that telemedicine services meet minimum quality standards and that patient outcomes are tracked and measured.

C2. Development of a telemedicine strategy

A telemedicine strategy will support the health-care organization to understand the current telemedicine context and align the overall organizational strategy with the telemedicine strategy, as well as align the organization towards a common vision for telemedicine services. This will support resource mobilization, health-care service design, workforce development, action planning, and monitoring and evaluation.

Domain	Subdomain	Question	Description	Goals
D1. Individual domain	Health workforce training strategy	**Is there a strategy to support telemedicine skills development of the health workforce?**	A strategy for training and continuous development of the telemedicine-related health workforce supports the process of developing telemedicine competencies. This includes developing capacity in virtual communication, digital literacy, conducting remote clinical consultations, and understanding digital ethics. Health-care providers, both clinical and non-clinical, at all levels of the health system who engage with telemedicine services, must be included.	**There is a strategy in place to support the development of health workers' competencies in the field of telemedicine services, evidenced as follows:** • the strategy includes the development of telemedicine service competencies across the areas of virtual communication, digital literacy, conducting remote clinical consultations, security, and digital ethics; • a needs assessment is conducted to identify the current knowledge and skill level of the health workforce in telemedicine, helping to identify gaps and areas that require further development; • to address the identified gaps in knowledge and skills, a comprehensive curriculum is developed, in line with the specific needs of the health workforce, taking into account their different roles and responsibilities; • the health workforce undergoes an interactive, engaging training, relevant to its daily work, using a variety of methods, including e-learning, webinars, workshops, and on-the-job training; • quality assurance mechanisms are developed to monitor and evaluate the effectiveness of the training, ensuring that the training is meeting its objectives and that the health workforce is earning the necessary skills and knowledge; • ongoing training and support to the health workforce are provided to ensure that they stay up to date with the latest developments in telemedicine, which includes providing access to online resources, mentorship programmes, and opportunities for further education and training; and • collaboration and partnerships between the various telemedicine stakeholders, including health-care workforce associations, telemedicine service providers, and academic institutions, are encouraged, ensuring that training and development efforts are aligned with the needs of the health-care workforce and the health-care system.

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Domain	Subdomain	Question	Description	Goals
D1. Individual domain	Patient and public engagement strategy	**Is there a strategy to support patient and public engagement in the telemedicine service?**	A strategy is supportive of patient and public engagement, including consideration of building trust, level of willingness to use telemedicine services, access to technology and digital literacy, and equitable access to telemedicine services. Involving patients and the public in the design, implementation, and monitoring of telemedicine services will strengthen the willingness of patients and the public to use telemedicine services.	**A strategy is in place to support patient and public engagement in the telemedicine service, evidenced as follows:** • the patient and public groups who will benefit from the telemedicine service are identified, considering the specific needs, preferences, and expectations of each group to develop tailored engagement strategies; • communication mechanisms are in place to build trust between health professionals and patients in the adoption of telemedicine services, ensuring that patients and the public understand the benefits and limitations of telemedicine services, and addressing any concerns or misconceptions they may have; • patients and the public are involved (through patient and public advisory groups, focus groups, surveys, and other engagement methods) in the design, implementation, and monitoring of telemedicine services, helping to ensure that telemedicine services are patient-centred and responsive to their needs; • the barriers to access to technology and digital literacy that may prevent some patients and the public from accessing telemedicine services are addressed through training and support programmes, targeted outreach efforts, and partnerships with community organizations; • telemedicine services are accessible and available to all patients, regardless of their location, income, or socioeconomic status, involving telemedicine services in underserved areas or the provision of financial assistance to patients who may not be able to afford telemedicine services; and • the availability and benefits of telemedicine services to patients and the public are promoted and communicated through a variety of channels, including social media and patient information materials.
D2. Organizational, management and communication domain	Strategic alignment	**Is the telemedicine strategy aligned with the health system strategy?**	The telemedicine strategy has been developed through the participation of telemedicine stakeholders, is aligned with the health-care organizational strategy, and clearly articulates the goals, objectives, and strategic directions for the telemedicine service, which will support implementation and action planning.	**The telemedicine service strategy is well aligned with the health system strategy, evidenced as follows:** • the telemedicine service strategy is aligned with the health-care organizational strategy and clearly states the goals, objectives, and strategic directions of the telemedicine service (including a set of requirements, processes, and procedures); • the telemedicine service strategy supports the telemedicine service implementation and action planning across the health system;

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Domain	Subdomain	Question	Description	Goals
D2. Organizational, management and communication domain			The relative advantages and disadvantages of telemedicine services vs alternative modes of health-care service delivery have been considered in the strategic planning process.	• the telemedicine service strategy considers the advantages and disadvantages of telemedicine service compared to alternative modes of health-care service delivery; • the telemedicine service strategy has been developed through the participation of telemedicine service stakeholders (health-care providers, managers etc); • stakeholders (including health-care providers, patients, technology providers, and policy-makers) are invited to continuously collaborate in the telemedicine service and in all phases of the strategic planning process; • the existing health system priorities and goals are analysed to ensure that the telemedicine strategy aligns with and supports these priorities; • opportunities that telemedicine can offer to the health system, such as improved access to care, increased efficiency, and reduced costs are identified, in addition to potential barriers or challenges to implementing telemedicine services; • the goals and objectives of the telemedicine strategy are clearly articulated, including specific targets for improving patient outcomes, increasing access to care, and reducing costs; and • the telemedicine services that will be offered are prioritized, based on their potential impact on the health system goals and objectives, as well as their feasibility for implementation.
	Governance mechanisms	**Does the telemedicine strategy include governance mechanisms?**	A governance structure has been articulated in the telemedicine strategy, which includes identified regulatory authorities, public policy regulations, management structures, monitoring and evaluation systems, corporate communications modalities, risk management strategy, and continuous improvement mechanisms.	**The telemedicine service strategy includes governance mechanisms, evidenced as follows:** • regulatory authorities responsible for overseeing telemedicine services in the relevant jurisdiction are identified, including health regulators, technology regulators, and privacy regulators; • public policy regulations that provide a framework for the implementation of telemedicine services are developed, covering areas such as data privacy and security, informed consent, and quality assurance; • management structures to oversee the implementation of telemedicine services are established, including a dedicated telemedicine department or committee responsible for overseeing the development and implementation of telemedicine services; • monitoring and evaluation systems to track the implementation and effectiveness of telemedicine services are implemented, enabling health-care providers and policy-makers to identify areas for improvement and make necessary changes;

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Domain	Subdomain	Question	Description	Goals
				• corporate communications modalities that enable effective communication with all stakeholders involved in telemedicine services are developed, including health-care providers, patients, and policy-makers; • a risk management strategy to identify and manage potential risks associated with telemedicine services is established, including strategies to address issues such as data breaches, technology failures, and medical errors; and • continuous improvement mechanisms are implemented to ensure that telemedicine services are continually evolving and improving to meet the changing needs of patients and health-care providers.
D3. Clinical domain	Evidence-based medicine	**Is the telemedicine strategy informed by the best available telemedicine clinical evidence?**	The telemedicine strategy is built on sound scientific clinical evidence, drawing on evidence-based medicine principles, which includes consideration of clinical pathways, continuity of care, case management, provision for the expert opinion of clinical specialists, and quality of care.	**The telemedicine service strategy is informed by the best available telemedicine service-related clinical knowledge, evidenced as follows:** • a literature review of the existing clinical evidence on telemedicine is conducted, identifying the most effective telemedicine interventions and best practices for their implementation; • the quality of the evidence is evaluated, including the study design, sample size, and statistical analysis; • any gaps in the evidence are identified, including areas where further research is needed; • clinical specialists are consulted to gather expert opinions and insights on the implementation of telemedicine services in clinical practice; • clinical pathways are developed, incorporating telemedicine services, and ensuring that these pathways are aligned with the best available clinical evidence; • telemedicine services ensure continuity of care, facilitating patients' access to their usual health-care professionals and maintaining accurate medical records; • case management processes are implemented to ensure that patients receive appropriate follow-up care and that any issues or concerns are addressed in a timely manner; and • the quality of care provided through telemedicine services is monitored, using appropriate quality indicators and feedback mechanisms.

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Domain	Subdomain	Question	Description	Goals
D5. Technology and infrastructure domain	Technology and infrastructure strategic considerations	**Does the strategy adequately consider the information, communication and technology needs of the telemedicine service?**	The telemedicine strategy involves consideration of the technology needs of the telemedicine service (including hardware and software), health information systems, interoperability with other e-health infrastructure (i.e. Electronic Health Records), security, technical support, and scalability and technological sustainability of telemedicine solutions.	**The strategy includes the information, communication, and technology needs of telemedicine service, evidenced as follows:** • the communication needs of the telemedicine service are considered, such as the need for real-time communication between health-care providers and patients, secure messaging, and video conferencing; • the types of information needed to support the telemedicine service are determined, such as patient medical records, test results, and other clinical data; • the technology requirements needed to support the communication and information needs of the telemedicine service are assessed, including hardware, software, and network infrastructure; • the telemedicine technology is interoperable with other e-health infrastructures, such as Electronic Health Records, to support seamless communication and data exchange; • security and privacy concerns associated with the telemedicine technology are addressed, such as data encryption, user authentication, and secure data storage; • technical support mechanisms are established to ensure that any technical issues can be resolved in a timely manner; and • a plan for the scalability and sustainability of the telemedicine technology is established, including future upgrades, maintenance, and replacement.
D6. Public policy, regulatory and compliance domain	Regulatory, legal, and ethical strategic considerations	**Does the strategy incorporate regulatory, legal and ethical requirements of telemedicine?**	The telemedicine strategy incorporates legal considerations, including in-house legal advice, ethical considerations (i.e. informed consent, data sharing, data security, confidentiality of patient records, and privacy), and regulatory requirements (such as licensing, client-patient relations, online prescribing, and reimbursements). There are also standard operating procedures in place, and systems for updating the health workforce on changes.	**The telemedicine service strategy incorporates the regulatory, legal, and ethical requirements of telemedicine service, evidenced as follows:** • the regulatory requirements for telemedicine in the country or region where the service is offered are identified, including licensing, accreditation, and certification requirements; • the legal considerations that govern the practice of telemedicine are understood, including malpractice liability, informed consent, and data protection laws; • ethical guidelines for the telemedicine service that address issues are developed, such as confidentiality, privacy, and data sharing; • the telemedicine service is compliant with all regulatory and legal requirements, such as those related to licensing, prescribing, and reimbursement; • mechanisms are in place to monitor and report on compliance with regulatory, legal, and ethical requirements, and to address any issues of non-compliance;

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Domain	Subdomain	Question	Description	Goals
				• policies and procedures are regularly reviewed and updated ensuring that they are current and reflect changes in regulatory, legal, and ethical requirements; and • training and education are provided to all staff involved in the telemedicine service on regulatory, legal, and ethical requirements, and ensuring that they are aware of their responsibilities and obligations.

C3. Organizational changes

Telemedicine services are a new way of delivering health care and therefore have an impact across the health system. The success of telemedicine implementation relies on managing the essential changes in the health-care workforce, organizational systems, as well as the consumer behaviour changes required to realize this new modality of health-care delivery.

Domain	Subdomain	Question	Description	Goals
D2. Organizational, management and communication domain	Organizational support	**Is there a supportive organizational environment for telemedicine implementation?**	There is strong engagement of the organization in the telemedicine implementation process (including usability assessments, system selection, and implementation processes). This includes a dedicated workforce to manage the implementation and drive telemedicine services forward, including telemedicine champions and other designated personnel. Communication systems are in place to keep the health workforce informed of telemedicine service development.	**A supportive organizational environment for the telemedicine service implementation is identified, evidenced as follows:** • the organization is actively involved in the telemedicine implementation process, including usability assessments, system selection, and implementation processes; • there is a dedicated workforce to manage the implementation and drive telemedicine services forward; • there is clear, identifiable, and proactive leadership (champion), with clearly defined roles and responsibilities; • the champion has the resources and training to support organizational change and is empowered to be proactive, helping to support the implementation process effectively; • effective communication systems are in place to keep the health workforce informed of telemedicine service development, which includes regular updates, training sessions, and other forms of communication to ensure that the health workforce is aware of the benefits of telemedicine and how it can be used effectively; • strategies are implemented to engage staff in the planning and implementation process, providing incentives and recognition for the successful adoption of telemedicine solutions; and • evidence-based change management strategies are implemented to create a positive and supportive environment for telemedicine solutions, engaging with the workforce and addressing any concerns or questions they may have about telemedicine.

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Domain	Subdomain	Question	Description	Goals
D5. Technology and infrastructure domain	Technological development process	**Are there mechanisms to upgrade technology according to the needs of the telemedicine service?**	Telemedicine technology (hardware and software) continues to evolve over the life cycle of the telemedicine service depending on the maturity of the telemedicine service, the needs of the health-care providers and patients, and the growth of the telemedicine industry and associated technological solutions.	**Mechanisms are in place to upgrade technology according to the needs of the telemedicine service, evidenced as follows:** • regular technology assessments carried out by a dedicated telemedicine team or other stakeholders integrated into the implementation process, ensuring that upgrades and changes are managed effectively and that the telemedicine service continues to provide high-quality care over time; • stakeholder engagement (including surveys, focus groups, or other forms of feedback addressed to health-care providers, patients, and technology vendors) to identify areas where upgrades or changes are necessary to improve the telemedicine service; • technology roadmaps to plan for future upgrades or changes to telemedicine technology, ensuring that upgrades are planned and implemented in a timely and effective manner; and • collaboration with technology vendors to ensure that the telemedicine technology is kept up to date with the latest industry developments and trends.
	Organizational interoperability	**Is organizational interoperability addressed in the telemedicine service implementation?**	Addressing organizational interoperability in telemedicine implementation requires a coordinated effort between different organizations and stakeholders. By defining business goals and processes, promoting collaboration and information sharing, establishing a governance structure, using user-centred design principles, and focusing on the needs of users, stakeholders can work together to ensure that telemedicine services are effective, efficient, and accessible to everyone who needs them.	**Organizational interoperability is addressed in the telemedicines service implementation, evidenced as follows:** • business goals and processes are defined in a clear and concise manner, ensuring that everyone involved in the delivery of telemedicine services is working towards the same objectives and following the same processes; • information sharing between different organizations and stakeholders, which may involve standardized processes and protocols for sharing information, as well as using common data elements and terminology to ensure that everyone is speaking the same language; and • a governance structure is established to oversee the implementation of telemedicine services and ensure that everyone is working together effectively. Policies and procedures for collaboration and information sharing could be established, in addition to roles and responsibilities for different stakeholders.

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Domain	Subdomain	Question	Description	Goals
D5. Technology and infrastructure domain	Technology support	**Are IT and technical support services available for the telemedicine service?**	A technical team (virtual and/or on-site) is established to support all telemedicine-related technology (hardware and software), including development and deployment (i.e. setting up systems, establishing technological protocols, programming, equipment maintenance, data security, and technology-related training of the health workforce). This includes a helpdesk for end-users (both health workers and clients) to troubleshoot and resolve technological issues.	**IT and technical support services are available for the telemedicine service, evidenced as follows:** • a dedicated technical team with expertise in programming, networking, security, and other relevant areas is established to support all telemedicine-related technology, including hardware and software development, deployment, maintenance, and security; • the technical team is responsible for developing and deploying telemedicine systems, including setting up equipment, establishing technological protocols, and programming, and ensuring that the systems meet regulatory and security requirements; • the technical team provides ongoing technical support, both virtual and on-site, for the telemedicine service, including maintenance of equipment, troubleshooting technical issues, and resolving any problems that arise; • a helpdesk is established to provide end-users, including health-care workers and clients, with technical support, available during designated hours and able to troubleshoot and resolve technical issues over the phone, via email, or through an online chat system; and • the technical team provides training to the health workforce on how to use telemedicine technology effectively and efficiently, including training on how to use the software, equipment, and protocols, as well as best practices for maintaining the security and privacy of patient data.
D3. Clinical domain	Model of health-care delivery	**Are the health-care delivery modalities adjusted to align with the telemedicine services?**	The health-care service delivery model needs to be adjusted to support telemedicine services, which includes changing clinician workflows, reorganizing workspaces, and coordinating across levels of clinical care (i.e. primary, secondary, and tertiary). This also requires creating new positions and redefining the responsibilities, roles, and functions of the relevant health workforce.	**Health-care delivery modalities are adjusted to align with the telemedicine service, evidenced as follows:** • clinical workflows are adjusted to incorporate telemedicine services, which involves changes to how patient consultations are scheduled, how medical records are reviewed, and how prescriptions are issued; • workspaces are reorganized to support telemedicine services, which involves setting up dedicated telemedicine consultation rooms or areas within the clinic or hospital, in addition to equipping workspaces with the necessary technology and infrastructure to support telemedicine consultations; • coordination across levels of clinical care is established;

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Domain	Subdomain	Question	Description	Goals
				• new positions are created to support telemedicine services, including telemedicine coordinators or telehealth technicians who are responsible for managing telemedicine equipment and infrastructure, as well as providing technical support to clinicians; • roles and responsibilities of the relevant health workforce are redefined to incorporate telemedicine services, including changes to job descriptions, training requirements, and performance indicators.
D4. Financial and economic domain	Reimbursement and incentive mechanisms	**Are there reimbursement and incentive mechanisms in place in the regulatory environment?**	Reimbursement and incentive mechanisms for telemedicine users (health-care providers and consumers) need to be integrated into the health service delivery model.	**Reimbursement and incentive mechanisms are in place, evidenced as follows:** • a clear regulatory environment that supports telemedicine services is established, which includes defining policies and regulations that govern the use of telemedicine and outlining how reimbursement and incentives are provided; • the reimbursement mechanism involves payment for telemedicine services by third-party payers, such as insurance companies or government programmes; • incentive mechanisms include financial or non-financial incentives for health-care providers and consumers to use telemedicine services, such as reduced co-pays or improved access to care; • a collaboration mechanism is established among stakeholders, including policy-makers, health insurers, health-care providers, and consumers; and • clear guidelines are established on how reimbursement and incentive mechanisms are determined, implemented and evaluated over time to ensure their effectiveness.
D6. Public policy, regulatory and compliance	Communication and publicity mechanisms to reach and promote its public adoption	**Are there communication mechanisms to inform and promote patients about telemedicine services?**	Consumers know about telemedicine, feel that it is useful and meets their needs, have positive attitudes towards telemedicine, use the service with confidence, and have a supportive social and technological environment (i.e. good connectivity, technical support, and a secure patient portal), and trust the service.	**Communication mechanisms to inform about and promote telemedicine services to consumers are in place, evidenced as follows:** • a comprehensive marketing plan is developed to promote telemedicine services to potential users, identifying the target audience, the message to be communicated, and the most effective channels for communication; • a variety of communication channels are used, such as social media, email newsletters, website content, and print materials to inform and promote telemedicine services, ensuring that information is available to patients through different platforms and at different times;

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Domain	Subdomain	Question	Description	Goals
			To support this, telemedicine should be publicly promoted. Services should be delivered equitably, and involve consumers in the continuous evaluation of telemedicine.	• partnerships with community organizations such as health advocacy groups, community health centres, and patient support groups to reach underserved populations and ensure that the message is communicated effectively; • staff are trained to communicate effectively about telemedicine services, which involves providing staff with scripts, brochures, and other materials to use during patient interactions; • patients are encouraged to provide feedback on their experience using telemedicine services, which is used to improve the service and inform future marketing efforts; and • patients have access to clear and accurate information about telemedicine services, and are empowered to use the service confidently.

C4. Development of telemedicine services

C4. Development of telemedicine services

Developing a telemedicine service is complex and requires a design that meets the needs of the local context, including technological considerations, procedures and guidelines to support the service, continuous development of the workforce, and alignment and coordination across the health system.

Domain	Subdomain	Question	Description	Goals
D1. Individual domain	Capacity to deliver telemedicine services	**Is the health-care workforce capable of delivering quality telemedicine services?**	The health-care workforce understand their telemedicine roles and responsibilities, and have access to continuous professional development to acquire skills. Telemedicine protocols and guidelines are operational, coordination channels across the health system are established, technology is reliable and there is technical support, the health workforce is informed of service updates, health workers understand how their performance is measured, and remuneration packages recognize telemedicine work.	**Health workers provide quality telemedicine services, evidenced as follows:** • health-care workers have access to regular training to acquire the skills needed to provide effective telemedicine services and cover topics such as telemedicine technology, protocols and guidelines, communication skills, and data privacy; • telemedicine protocols and guidelines on topics such as patient selection, consultation process, documentation and referral pathways are developed and implemented to ensure consistency and quality in service delivery; • effective communication channels and coordination between health-care providers and other stakeholders, such as referral hospitals and laboratories, are established to ensure that telemedicine services are integrated with other health-care services; • technical support is available to health-care workers to address any technical issues that arise during consultations; • health-care workers are kept up to date on any changes to telemedicine services, such as new protocols or guidelines, and technology updates; • health-care workers are informed of how their performance is measured and evaluated in relation to telemedicine services; and • remuneration packages recognize the additional workload associated with telemedicine work.
D6. Public policy, regulations and compliance domain	Informed consent from patients	**Is the patient's informed consent integrated into the telemedicine services?**	Informed consent and the rights and responsibilities of patients are systematically integrated into telemedicine service delivery.	**Patient informed consent is operational in the telemedicine service, evidenced as follows:** • procedures are established to obtain and document informed consent from patients before they access telemedicine services, which includes providing patients with information on the telemedicine service, how it works, and the potential risks and benefits of using it;

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Domain	Subdomain	Question	Description	Goals
			Procedures are established to obtain and document informed consent from patients before they access the telemedicine service, including patients' authorization for use of clinical data obtained through telemedicine services.	• when communicating with patients about telemedicine services and informed consent, plain language is used to make it easy to understand, avoiding technical jargon or medical terms that may be confusing to patients; • patients are required to authorize the use of their clinical data obtained through telemedicine services, and this authorization is obtained at the same time as informed consent; • health-care providers are trained on the importance of informed consent and how to obtain it, and as well as on ways to communicate with patients about telemedicine services and the risks and benefits of using them; and • informed consent, including the patient's authorization for the use of their clinical data obtained through telemedicine services, should be documented in the patient's medical record.
D6. Public policy, regulations and compliance domain	Data protection and security	**Are data protection and security measures integrated into the telemedicine service?**	Protection and security of data is systematically integrated into the telemedicine service. This incorporates regulations, protocols, plans, and guidelines on telemedicine-related data, including the party responsible for the data, the method of storing the data to ensure security and protection of data, the owner of clinical records, and the process deployed in the event of a data breach.	**Data protection and security measures are integrated into the telemedicine service, evidenced as follows:** • telemedicine data protection and security protocols covering topics such as data ownership, storage, access and sharing, as well as data security measures such as encryption and firewalls, are developed and implemented to ensure that patient data are protected and secure; • the responsibility for telemedicine data protection and security is clearly assigned to specific people or departments within the health-care organization, ensuring accountability and helping to prevent data breaches; • data breach response plans that include procedures for reporting data breaches containing the breach and notifying the parties affected are developed and communicated to all stakeholders, including health-care providers, patients, and data protection authorities; • telemedicine technology is secure and complies with data protection regulations, including use of secure communication channels, data encryption, and authentication protocols to ensure that only authorized persons can access patient data; • health-care providers are trained on data protection and security measures, including how to handle patient data, how to detect and report data breaches, and how to ensure that patient data are protected; and • telemedicine data protection and security measures are regularly reviewed and updated to ensure that they remain effective and compliant with changing regulations and standards.

C4 contd

Domain	Subdomain	Question	Description	Goals
D5. Technology and infrastructure domain	Telemedicine service delivery processes and procedures defined	**Are telemedicine standard operating procedures in place?**	Telemedicine service delivery standard operating procedures (including clinical protocols, workflows, referral pathways, guidelines, and reporting systems such as technical incident reporting) guide service delivery. These standard procedures support oversight of the quality of telemedicine implementation and the monitoring of service delivery standards.	**Telemedicine service standard operating procedures are in place, evidenced as follows:** • key stakeholders, including health-care providers, patients, and technical support staff, are identified and involved in the development of telemedicine standard operating procedures, helping to ensure that the standard operating procedures are relevant and meet the needs of all stakeholders; • clinical protocols and workflows are defined to guide telemedicine service delivery, including protocols for patient screening, diagnosis, treatment, and follow-up, as well as workflows for scheduling appointments, conducting consultations, and sharing clinical data; • referral pathways and guidelines are developed to guide the referral of patients to other health-care providers or services as needed, including guidelines for when and how to refer patients, as well as guidelines for communication and follow-up between health-care providers; • reporting systems are established to monitor the quality of telemedicine implementation and service delivery standards, including systems for reporting technical incidents, adverse events, and patient feedback, as well as systems for monitoring key performance indicators (KPIs) such as patient satisfaction, clinical outcomes, and cost–effectiveness; and • telemedicine standard operating procedures are regularly reviewed and updated to ensure that they remain relevant and effective, which includes updating clinical protocols and workflows in response to changing clinical guidelines, updating referral pathways and guidelines based on feedback from health-care providers and patients, and updating reporting systems to capture new KPIs or address gaps in the monitoring of telemedicine service delivery standards.
	Usability and user satisfaction	**How intuitive is the solution?**	The end-users (health-care providers and patients) feel that the telemedicine service meets their needs, is easy to use, has an intuitive design, and they are satisfied with the service.	**The telemedicine service is intuitive and easy to use, evidenced as follows:** • the telemedicine solutions are developed based on the needs and preferences of the end-users, with the design prioritizing ease of use, simplicity, and accessibility, while minimizing technical complexity and barriers to access; • end-users are involved in the development process to provide feedback on the design, functionality, and usability of the telemedicine solutions, including through focus groups, surveys, and usability testing;

C4 contd

Domain	Subdomain	Question	Description	Goals
			The telemedicine service was developed applying user-centred design principles and users were engaged in the development process. Feedback is sought from the end-user through satisfaction reports, usability testing, customer complaint mechanisms, and analysis of the IT helpline.	• the telemedicine solutions are easy to navigate, with clear and concise menus and navigation options, including visual cues, prompts, and tooltips to guide the user through the process; • the telemedicine solutions include clear and concise instructions on how to use the service, including how to access the service, how to prepare for the consultation, and how to troubleshoot common issues; • the telemedicine solutions use technologies that are familiar to the end-user, such as video conferencing platforms and messaging apps; • the telemedicine solutions include technical support for end-users, including an IT helpdesk, user guides, and FAQs; and • user satisfaction is monitored through regular feedback mechanisms, such as satisfaction reports, usability testing, and customer complaint mechanisms, helping to identify areas for improvement and to ensure that the telemedicine solutions continue to meet the end-users' needs.
D5. Technology and infrastructure domain	Technology that supports telemedicine service delivery	**Does the facility have a device at the point of use with audio and video capabilities and a telemedicine platform for delivering telemedicine services?**	Depending on the type of telemedicine service to be provided, the technology requirements for the point of use may include a personal device such as a smartphone or tablet and/or a laptop or desktop computer. Telemedicine platforms should include audio, video, and live-streaming capabilities.	**The facility has a device at the point of use with audio and video capabilities and a telemedicine platform for delivering telemedicine services, evidenced as follows:** • a device at the point of use meets the technical specifications required for telemedicine service delivery (laptop or desktop computer, smartphone or tablet to handle the demands of the telemedicine software); • the device has a high-quality webcam and microphone or headset to enable clear communication between the health-care provider and patient; • a telemedicine platform allows high-quality audio and video transmission, including hardware such as webcams or software solutions such as streaming plugins or applications and telemedicine features offered to health professionals, patients/caregivers, and general and admin users; • the audio and video quality are adequate and the streaming devices work correctly; and • video conferencing functionality is available with the ability to record the consultation and store it securely.

C4 contd

Domain	Subdomain	Question	Description	Goals
	Technology that supports image sharing and peripheral devices	**Is there technology to support image sharing and peripheral devices for remote diagnosis?**	Image-sharing capabilities and peripheral devices assist in virtual diagnosis and treatment. Medical devices to support this may include high-definition video cameras (e.g., to visualize a rash or skin lesions, dermascope); intra-oral cameras; blood pressure monitors, pulse oximeters, and digital stethoscopes (to transmit heart and lung sounds to remote providers); video otoscopes; endoscopes (to examine the digestive tract); ultrasound machines, etc.	**There are medical devices to support sharing of data (image, video or sound) for remote diagnosis and treatment, evidenced as follows:** • high-definition video cameras with zoom function and high resolution (e.g. 1080p) are in place to visualize skin lesions or rashes, and to capture high-quality images for virtual diagnosis; • dermatoscopes are in place to magnify and examine skin lesions or moles in detail; • intra-oral cameras are in place to capture images of the mouth and throat, allowing for virtual dental consultations; • digital stethoscopes are in place to transmit heart and lung sounds to remote providers, allowing for virtual auscultation and diagnosis; • video otoscopes are in place to examine the inner ear and throat for infections or other issues; • endoscopes are in place to exam the digestive tract, and can be used in virtual gastroenterology consultations; and • ultrasound machines are in place for virtual imaging and diagnosis of various medical conditions.
D5. Technology and infrastructure domain	Broadband internet access	**Is there adequate broadband network access to support the telemedicine service?**	Adequate fast and stable broadband network access. The speed of network access determines the quality of the video and data transmission. Variations in speed occur depending on the number of users, location of users, real-time transactions, hardware, and storage technology. A virtual private network (VPN) ensures security, with restricted access based on role definition, which reduces third-party ability to track online activity and steal data. An alternative solution is dual access from different providers.	**There is suitable broadband network access to support the telemedicine service at the relevant facilities, evidenced as follows:** • the network access is high-speed and stable to ensure quality video and data transmission, with the recommended speed for telemedicine depending on the centre: + in a single-physician practice, network access must be available to support practice management functions, manage email and web browsing, remote monitoring, simultaneous use of Electronic Health Records (EHRs) and high-quality video (HD) consultations, with image download not in real time; + in a small medical consulting room (2–4 physicians), network access must be available to support practice management functions, manage email and web browsing, remote monitoring, simultaneous use of EHR and HD video consultations, with image download not in real time; + in a clinic/large medical practice (5–25 physicians), network access must be available to support clinic management functions, manage email and web browsing, simultaneous use of EHR, real-time image transfer, remote monitoring, and HD video consultations;

C4 contd

Domain	Subdomain	Question	Description	Goals
D5. Technology and infrastructure domain				+ in a regional hospital, network access must be available to support hospital management functions, email and web browsing, simultaneous use of EHR, real-time image transfer, continuous remote monitoring, and HD video consultations; and + in a third-level hospital, network access must be available to support hospital management functions, email and web browsing, simultaneous use of EHR, real-time image transfer, continuous remote monitoring, and HD video consultations. • the network has enough bandwidth to accommodate all users; • the location of users does not affect internet speed; • the hardware and storage technology does not affect internet speed, and all the equipment used is up to date and able to support the telemedicine service; • a VPN can be used to restrict access based on role definition, reducing third-party ability to track online activity and steal data; and • alternatively, access from different network providers can be used to ensure a stable internet connection.
	Interoperability	**Are telemedicine service data interoperable with other health system databases?**	The telemedicine service data are interoperable with other relevant health system databases (considering syntactic, semantic, and technical interoperability). This includes the ability to exchange data seamlessly with other elements of the e-health infrastructure, allowing for easy interpretation of information across systems.	**The telemedicine service data are interoperable with other health system databases, evidenced as follows:** • data standards are established promoting syntactic, semantic, and technical interoperability, which includes defining common data elements, data formats, and data exchange protocols that are recognized and accepted by other health system databases; • standardized terminologies are used to ensure that data elements are consistently named and categorized across systems, helping to ensure that data can be easily interpreted and understood by health-care providers and other stakeholders;

C4 contd

Domain	Subdomain	Question	Description	Goals
				• data exchange protocols are implemented to enable seamless data exchange between the telemedicine service and other relevant health system databases, which involves implementing application programming interfaces or other technologies that enable real-time data exchange; • data governance policies are established to promote data quality, accuracy, and privacy, which includes defining roles and responsibilities for data management, establishing data quality assurance processes, and ensuring compliance with data privacy regulations; and • standardized data capture tools are used to promote consistent data collection across systems, helping to ensure that data are collected in a uniform and standardized manner, making it easier to interpret and analyse.
D5. Technology and infrastructure domain	Reliability of the technology	**Is the telemedicine technology reliable?**	The telemedicine technology is reliable, safe, and technically secure. There is ongoing monitoring, maintenance and upgrading of technology hardware and software. Systems are in place for prevention of risks (i.e. phishing, viruses etc.) and reporting protocols are in place for technical failures or incidents. The telemedicine health-care workforce is continuously trained and informed of safety and security of telemedicine services and data.	**The telemedicine service technology is reliable, evidenced as follows:** • telemedicine technology is regularly maintained and updated to ensure that it is functioning optimally and any potential issues are addressed promptly; • regular back-ups of data are created to ensure that the data are not lost in the event of a system failure; • robust cybersecurity measures such as encryption, firewalls, and multifactor authentication are implemented to prevent hacking, phishing, or other cyber attacks; • adequate technical support is available to assist health-care providers and patients in case of any technical issues; and • telemedicine health-care workforce is continuously trained and informed of safety and security protocols, including data protection and patient confidentiality.
	Accessibility and readability	**Are the electronic devices associated with the telemedicine service easily accessible, adaptable, and self-configurable?**	The end-users (health-care providers and patients) have equal access, taking into account factors such as education, location, digital literacy, age, socioeconomics, culture and gender, differently-abled persons like people who are hearing- or vision-impaired, and other vulnerable groups.	**The telemedicine service-related electronic devices are easily accessible, adaptable, and self-configurable, evidenced as follows:** • the design of the telemedicine service is optimized for mobile phones as most people have access to a mobile phone, ensuring that users can access the service regardless of their location and device; • the design of the telemedicine service is accessible to all users, including those with hearing or vision impairments, low digital literacy, and limited socioeconomic means;

C4 contd

Domain	Subdomain	Question	Description	Goals
			Design considers the mobile-first principle (mobile phone-friendly), accessible design (plain text and easy-to-read fonts), and is adaptive and self-configurable. The service applies a user-centred approach and involves users in the design.	• the service uses plain text and easy-to-read fonts to ensure that users can understand and use the service without difficulty; • the service is adaptive and self-configurable to ensure that it can be easily used by all, regardless of their technical abilities or device specifications; • the service automatically adjusts to the user's device and internet connection to ensure that it works efficiently; • the design of the telemedicine service is user-centred, involving users in the design process to ensure that their needs are considered, ensuring that the service is intuitive and easy to use for all; • the design of the telemedicine service ensures that all end-users, including health-care providers and patients, have equal access to the service, considering factors such as education, location, digital literacy, age, socioeconomics, culture, gender, and vulnerable groups.
D4. Financial and economic domain	Financial management	**Is a routine cost vs budget analysis of the telemedicine service performed?**	Telemedicine operational expenses are tracked against the available budget and used to inform telemedicine planning and management. Cost-benefit analysis is undertaken to determine the efficiency, feasibility, and financial sustainability of the telemedicine service.	**A routine cost of the telemedicine service is being performed, evidenced as follows:** • a cost-benefit analysis of the telemedicine service is conducted, helping to determine the efficiency, feasibility, and financial sustainability of the telemedicine service, considering the cost of implementing and maintaining the service against the potential benefits, such as increased access to health care, reduced health-care costs, and improved health outcomes; • different revenue models are considered, which help to generate income for the telemedicine service (for example, charging patients or health-care providers for using the service or partnering with insurance companies to offer telemedicine services as part of their packages); • the operational efficiency of the telemedicine service is optimized by adopting best practices in this field, such as the use of secure communication channels, easy-to-use and reliable telemedicine platforms, and health-care professionals trained in telemedicine; • the cost of procuring and maintaining telemedicine equipment and technology is considered, and options for procuring affordable equipment and technology are explored, such as purchasing refurbished or pre-owned equipment, negotiating discounts with suppliers, or leasing equipment; and

C4 contd

Domain	Subdomain	Question	Description	Goals
				• telemedicine service operating expenses are tracked against the available budget and the data are used to inform telemedicine planning and management, ensuring that the telemedicine service stays within budget while providing high-quality care.
D3. Clinical domain	Clinical protocols and guidelines	**Have clinical protocols, referral forms, policies, and guidelines been developed to support the telemedicine service or programme?**	Clinical protocols to support the telemedicine service are operational, including clinical service mix, referral forms and pathways, diagnosis and treatment protocols, clinical decision-making processes, clinical appointment scheduling and workflows, clinical policies, and related guidelines. This includes market and patient analysis to identify which health issues and which patients can most benefit from telemedicine services.	**Clinical protocols, referral forms, policies, and guidelines have been developed to support the telemedicine service, evidenced as follows:** • relevant guidelines and protocols have been identified and adapted to support the telemedicine service or programme, including guidelines and protocols for diagnosis, treatment, referral, and patient management; • guidelines and protocols have been adapted to incorporate telemedicine-specific elements (for example, how to conduct assessments, make diagnoses, and develop treatment plans remotely); • referral forms and pathways have been developed to enable health-care providers to refer patients to the telemedicine service, which involves developing criteria for patient eligibility and outlining the referral process; • clinical decision-making processes have been developed to ensure that health-care providers make informed decisions when providing care via telemedicine, which involves developing criteria for when to use telemedicine and when to refer patients for in-person care; • clinical appointment scheduling and workflows have been developed to ensure that patients receive timely and appropriate care via telemedicine, which involves developing processes for scheduling appointments, conducting assessments, and providing follow-up care; • market and patient analyses have been conducted to identify which health issues and which patients can benefit the most from telemedicine services, which involves analysing patient demographics, health-care needs, and health-care access issues; and • clinical policies and related guidelines have been developed to support the telemedicine service or programme, including policies related to patient privacy and security, technology use, and liability.

C4 contd

Domain	Subdomain	Question	Description	Goals
D3. Clinical domain	Clinical risk assessment	**Is a clinical risk assessment process in place?**	A clinical risk assessment process is operational to support the safety and efficacy of telemedicine services, with attention to protecting the well-being of vulnerable populations (children and adults at risk). The process specifies which services are safe for the patients to use independently and which need expert medical support.	**A clinical risk assessment process is in place, evidenced as follows:** • potential risks associated with telemedicine services have been identified, including clinical risks such as misdiagnosis or inappropriate treatment, as well as technical risks such as data security breaches or technology failures; • risk assessment criteria have been developed for assessing the level of risk associated with different telemedicine services, including considerations such as the complexity of the service, patient population, and the type of health-care provider involved; • the level of risk associated with each telemedicine service has been assessed based on the established criteria, helping to determine which services are safe for patients to use independently and which require expert medical support; • risk mitigation strategies have been developed to reduce the likelihood and impact of identified risks, involving developing guidelines for clinical decision-making, training health-care providers in the use of telemedicine, and establishing data security protocols; • the level of risk associated with telemedicine services is monitored and evaluated on an ongoing basis, helping to identify emerging risks and ensure that risk mitigation strategies remain effective; and • the risk assessment process includes a focus on protecting the well-being of vulnerable populations, such as children and adults at risk, which involves developing additional safeguards or protocols to ensure their safety.

C5. Monitoring, evaluation, and optimization of the implementation of telemedicine

C5. Monitoring, evaluation, and optimization of the implementation of telemedicine

To understand how a telemedicine service is performing, it is critical to continuously monitor the implementation of the telemedicine service and evaluate the service at critical points in the telemedicine life cycle. The findings from the monitoring and evaluation feed into strategic planning to optimize and further strengthen the telemedicine service, which includes informing the sustainability and scalability of the service.

Domain	Subdomain	Question	Description	Goals
D7. Monitoring, evaluation and optimization	Monitoring and evaluation systems	**Are there plans to perform continuous evaluation of the implementation of telemedicine?**	Continuous monitoring is built into the telemedicine service deployment, and evaluation is undertaken at relevant implementation milestones. Monitoring includes routine regular review of telemedicine service information systems, progress against plans, expenditure against budget, feedback from the health workforce and patients, and regular review of other routine implementation data. Evaluation assesses the implementation process, effectiveness, efficiency, cost–effectiveness, and attribution.	**Continuous monitoring and evaluation of the implementation of the telemedicine service are in place, evidenced as follows:** • assessment mechanisms are integrated into telemedicine service design, development, and implementation phases; • the assessment mechanisms include clear performance indicators and targets that align with the goals and objectives of the telemedicine service; • a system for continuous monitoring of telemedicine services is in place and includes a routine review of information systems, monitoring of progress against plans, service operations, expenditure against budget, and a feedback system loop from the health workforce, patients, and other telemedicine service stakeholders (i.e., concerns, suggestions, comments on the performance of telemedicine service, addressing adverse events during a telemedicine service consultation); • data are collected using both qualitative and quantitative methods, such as surveys, interviews, and focus groups, to capture the perspectives of patients and health-care providers; • findings from routine monitoring are used to improve the quality of telemedicine services; • evaluation is undertaken (or planned) at appropriate milestones in the telemedicine service life cycle to assess the implementation process, effectiveness, efficiency, and cost–effectiveness, including evaluation of telemedicine services on patient waiting times, number of patient visits, and the referral pathway, frequency of multimodal communication between health-care providers and patients, and cost/benefits of telemedicine services for the health system and patients;

C5 contd

Domain	Subdomain	Question	Description	Goals
				• the evaluation plan includes regular reporting to leadership and stakeholders, including updates on the progress towards targets, any identified areas for improvement, and any changes or adaptations made to the telemedicine service based on the evaluation findings; and • a contingency plan should be prepared in case the monitoring assessment shows significant deviations in the implementation process.
D7. Monitoring, evaluation and optimization	Sustainability	**Is there a mechanism in place to assess whether the telemedicine service is sustainable?**	The telemedicine service has reached sustainability and is fully integrated into the health system as a routine service.	**The telemedicine service is found to be sustainable, and efforts are made to ensure that it remains integrated into the health system and is continuously improved, evidenced as follows:** • strategies are in place for tracking and developing the sustainability of the telemedicine service; • the telemedicine service is fully integrated into the health system as a routine service; • there is a mechanism in place to regularly monitor and evaluate the service's performance against established sustainability criteria, including financial viability, scalability, and ability to adapt to changing circumstances, stakeholder support, and alignment with the broader health system goals and strategies; • the evaluation also includes an assessment of the telemedicine service's impact on health outcomes, patient satisfaction, health-care provider satisfaction, and other relevant indicators, and if the telemedicine service is not sustainable, the evaluation findings inform efforts to identify and address the barriers to sustainability, involving revising the telemedicine service's goals and objectives, strengthening its financial and operational mechanisms, engaging with key stakeholders to build support, and addressing any gaps or deficiencies in the service's design or implementation; and • a contingency plan should be prepared in case monitoring assessment shows significant deviations in the implementation process.
	Health-care provider outcomes	**Is there a mechanism in place to assess health-care provider outcomes (health-care professionals' satisfaction and workload)?**	There is evidence that telemedicine services contribute to improved health-care provider service delivery (such as improved time management, quality of care, decision-making processes, optimized workloads etc.).	**There are mechanisms in place to assess health-care provider outcomes related to telemedicine services, evidenced as follows:** • a common set of evaluation indicators must be developed for the entire organization, which allows the performance of all services/units to be compared using the same criteria;

C5 contd

Domain	Subdomain	Question	Description	Goals
				• standardized surveys or questionnaires that measure health-care providers' satisfaction with telemedicine services and their perceived workload are used, which are administered periodically to gather feedback from health-care providers about the impact of telemedicine on their work; • data on health-care provider outcomes are analysed, such as changes in their workload, productivity, and quality of care before and after the implementation of telemedicine services, by comparing data from different time periods or by comparing outcomes between health-care providers who use telemedicine services and those who do not; • health-care provider outcomes related to telemedicine service assessment are conducted in a comprehensive and systematic way, which may require collaboration between different stakeholders, including health-care providers, administrators, and researchers; and • mechanisms for evaluating the performance of health-care providers are designed to protect the privacy and confidentiality of health-care providers and their patients.
D7. Monitoring, evaluation and optimization	Patient outcomes	**Is there a mechanism in place to assess patient outcomes (satisfaction and quality of life)?**	There is evidence that telemedicine services contribute to improvement for patients – i.e. patients with health-care access barriers (people in rural or remote areas, people who have been internally displaced) are now able to access services more conveniently and affordably.	**Mechanisms are in place to assess patient outcomes related to telemedicine services, evidenced as follows:** • a common set of evaluation indicators must be developed for the entire organization, which allows the performance of all services/units that provide care to patients to be compared using the same criteria; • standardized surveys or questionnaires that measure patient satisfaction with telemedicine services and their perceived quality of life are administered periodically to gather feedback from patients about their experience with telemedicine services; • data on patient outcomes are analysed, such as changes in health status, health-care utilization, and patient-reported outcomes, before and after the implementation of telemedicine services, which can be done by comparing data from different time periods or by comparing outcomes between patients who use telemedicine services and those who do not; • there are mechanisms for assessing patient outcomes related to telemedicine services designed to protect patient privacy and confidentiality, which may require the use of secure data collection and storage systems, as well as compliance with relevant regulations and guidelines; and

C5 contd

Domain	Subdomain	Question	Description	Goals
				• unique needs and perspectives of different patient populations are considered when designing mechanisms for assessing patient outcomes related to telemedicine services, so it may be necessary to adapt surveys or other assessment tools to ensure that they are relevant and accessible to all patients.
D7. Monitoring, evaluation and optimization	Scalability of telemedicine services	**Is there a mechanism in place to assess whether the telemedicine service is scalable?**	The telemedicine service is scalable to other health-care facilities, other types of services, or other types of telemedicine-related innovations	**The telemedicine service has reached (or is working towards) scalability, evidenced as follows:** • strategies are in place to assess the scalability of the telemedicine service and identify areas for improvement to facilitate further scaling, for example, by tracking the following metrics and indicators over time: number of health-care facilities where the service is implemented, number of patients served by the service, adoption rate among health-care providers and patients, cost savings, and efficiency gains achieved through the use of the service, patient outcomes and satisfaction rates; • the telemedicine service is standardized in terms of its technology, workflows, and protocols to ensure that it can be easily replicated in other health-care facilities, which helps to reduce the time and effort required to implement the service in new settings; • the telemedicine service is flexible enough to adapt to different health-care contexts and patient populations, which helps to ensure that the service can be scaled to meet the needs of diverse patient groups and health-care facilities; • the telemedicine service is cost–effective, both in terms of the initial investment required to implement the service and in terms of ongoing maintenance and support costs, which helps to ensure that the service can be scaled without incurring prohibitive expenses; • the telemedicine service is interoperable with other health-care technologies and systems to enable seamless integration with existing health-care infrastructure, which helps to ensure that the service can be scaled without disrupting existing health-care workflows; and • feedback from health-care providers and patients is considered to identify barriers to scaling the service and inform strategies to overcome these barriers.

Scores and recommendations
C1. Assessment of the current situation

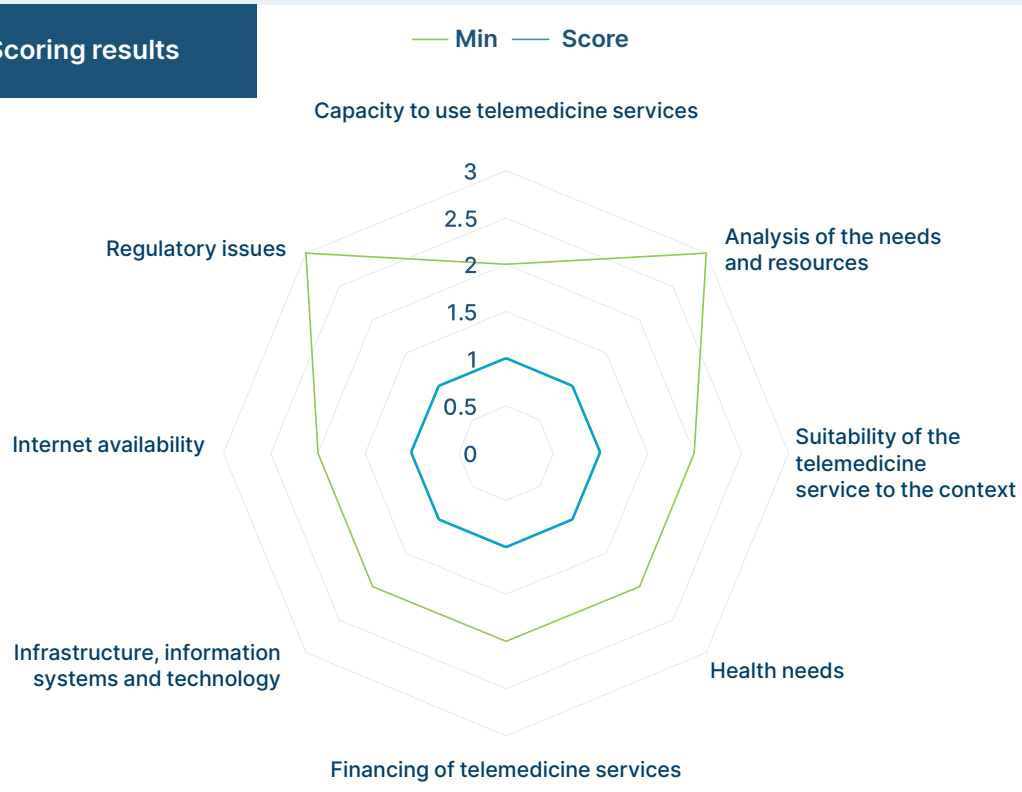
C1. Assessment of the current situation

Every health-care ecosystem is unique at national, regional, local, health-care facility and community level. Understanding the context in relation to telemedicine services is critical in determining the suitability of telemedicine services and how to support telemedicine design, development, deployment, scale-up and strengthening. Undertaking a situational analysis of your current context will help you to understand your current readiness for telemedicine services or level of telemedicine maturity.

Number items	Max score	Absent (1 point)	Emerging (2 points)	Mature (3 points)
8	24	8–17	18–21	22–24

To pass the CORE, you must obtain 18 points, of which 6 must come from the mandatory criteria.
Mandatory criteria: 2 (C1.D2.Q2 and C1.D6.Q8)

Scoring results



C1 contd

Legend	Recommendations to improve this core
C1.D1.Q1: Are health-care professionals capable of providing telemedicine services? *AN EMERGING maturity level is mandatory for this item.	Healthcare professionals should possess comprehensive digital skills, including proficiency in telemedicine software and tools, virtual communication, and the ability to maintain digital ethics while ensuring patient confidentiality, privacy, and security during telemedicine consultations.
C1.D2.Q2. Does the organization have a clear understanding of the needs and resources that the telemedicine service requires? *A MATURE maturity level is mandatory for this item.	The organization should conduct a comprehensive assessment to identify the needs of its patients, staff, and community, evaluate technology infrastructure, update protocols, assess financial feasibility, and ensure staff readiness for telemedicine adoption.
C1.D2.Q3. Is the telemedicine service adapted to the local context? *AN EMERGING maturity level is mandatory for this item.	Telemedicine implementation should consider community trust, equal access, cultural inclusivity, legal compliance, data security, local adaptability, affordability, sustainability, referral pathways, and integration with the broader health system.
C1.D3.Q4. Has the telemedicine services been clearly defined based on the health needs of the context? *AN EMERGING maturity level is mandatory for this item.	Telemedicine implementation involves assessing health-care needs, selecting appropriate modalities, defining service scope, developing clinical guidelines and providing comprehensive training to health-care providers.
C1.D4.Q5. Does the telemedicine service have adequate financial resources? *AN EMERGING maturity level is mandatory for this item.	Implementing telemedicine may involve securing funding from multiple sources, such as grants, private funding and insurance programmes. Cost-benefit analyses must be conducted and partnerships formed to share resources and identify funding opportunities.
C1.D5.Q6. Does the telemedicine service have the information, communication and technology necessary for providing the service? *AN EMERGING maturity level is mandatory for this item.	Appropriate technology and infrastructure should be selected based on service needs and contextual factors. Ensure easy-to-use, accessible, and reliable hardware and software platforms and prioritize interoperability with other e-health infrastructures. Scalable and sustainable technology should be chosen for long-term viability or consideration should be given to ease of upgradeability and financial sustainability.
C1.D5.Q7. Is internet connectivity adequate to meet the needs of the telemedicine service? *AN EMERGING maturity level is mandatory for this item.	Assess and address internet availability for the telemedicine service, considering factors like broadband, coverage, and connectivity. Infrastructure should be upgraded, partnerships established, and monitoring implemented to ensure reliable internet connectivity.
C1.D6.Q8. Is an adequate legal and regulatory framework in place for telemedicine services? *A MATURE maturity level is mandatory for this item.	Comprehensive telemedicine regulations should be established to monitor compliance, license providers, protect patient rights and ensure data privacy. Technology standards should be set, funding arrangements addressed and quality assurance measures implemented to ensure safe and reliable telemedicine services.

The level of maturity obtained in this CORE 1 is:

8

The minimum requirements for Core 1 have not yet been fulfilled, more work to do before progressing to Cores 2-5

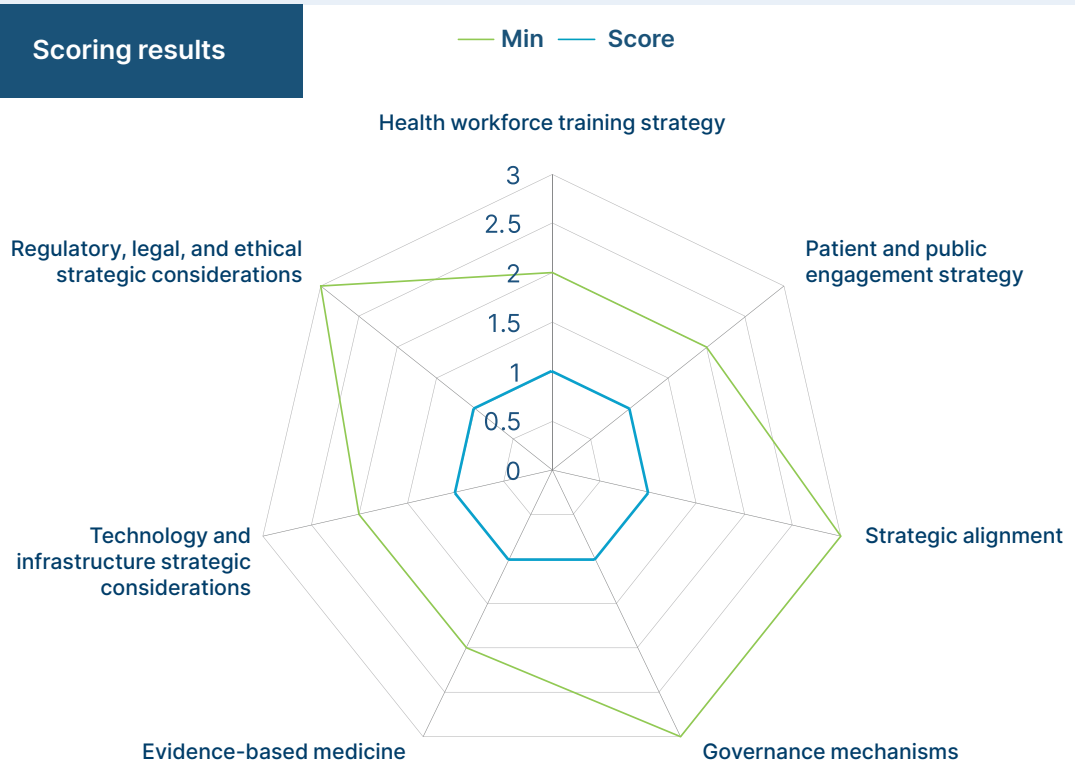
C2. Development of a telemedicine strategy

A telemedicine strategy will help the health-care organization to understand the current telemedicine context and align the overall organizational strategy with the telemedicine strategy as well as align the organization towards a common vision for telemedicine services. This will support resource mobilization, health-care service design, workforce development, action planning, and monitoring and evaluation.

Number items	Max score	Absent (1 point)	Emerging (2 points)	Mature (3 points)
7	21	7–16	17–19	20–21

To pass the CORE, you must obtain 17 points, of which 9 must come from the mandatory criteria.
Mandatory criteria: 3 (C2.D2.Q3, C2.D2.Q4 and C2.D6.Q7)

Scoring results



C2 contd

Legend	Recommendations to improve this core
C2.D1.Q1. Is there a strategy to support telemedicine skills development of the health workforce? *AN EMERGING maturity level is mandatory for this item.	Develop a telemedicine strategy with training on virtual communication, digital literacy, clinical consultations, security, and ethics. Conduct a needs assessment, provide various training methods, and establish quality assurance mechanisms. Offer ongoing support and collaboration to align training with health-care system needs.
C2.D1.Q2. Is there a strategy to support patient and public engagement in the telemedicine service? *AN EMERGING maturity level is mandatory for this item.	Identify patient groups and develop tailored engagement strategies. Build trust, address concerns, and ensure patient-centred telemedicine services. Overcome access and literacy barriers through training, outreach, and collaborations. Promote telemedicine benefits through multiple channels.
C2.D2.Q3. Is the telemedicine strategy aligned with the health system strategy? *A MATURE maturity level is mandatory for this item.	Align telemedicine service strategy with organizational health-care strategy. Analyse advantages and disadvantages against other care delivery modes. Involve stakeholders in strategy development. Ensure alignment with health system priorities and identify opportunities and challenges. Set clear goals and objectives to improve patient outcomes, access, and cost reduction. Prioritize telemedicine services based on impact and feasibility.
C2.D2.Q4. Does the telemedicine strategy include governance mechanisms? *A MATURE maturity level is mandatory for this item.	Establish management structures for telemedicine implementation. Implement monitoring and evaluation systems for effectiveness. Continuously improve telemedicine services to meet evolving needs.
C2.D3.Q5. Is the telemedicine strategy informed by the best available telemedicine clinical evidence? *AN EMERGING maturity level is mandatory for this item.	Conduct literature review for evidence-based telemedicine practices. Identify gaps and consult clinical specialists. Develop clinical pathways for telemedicine. Ensure continuity of care and accurate medical records. Implement case management processes and monitor quality of care.
C2.D5.Q6. Does the strategy adequately consider information, communication and technology needs of the telemedicine service? *AN EMERGING maturity level is mandatory for this item.	Assess communication needs and information requirements for telemedicine. Evaluate technology requirements, including interoperability with electronic health records. Address security and privacy concerns. Establish technical support mechanisms. Plan for scalability and sustainability of telemedicine technology.
C2.D6.Q7. Does the strategy incorporate regulatory, legal and ethical requirements of telemedicine? *A MATURE maturity level is mandatory for this item.	Identify and comply with regulatory requirements for telemedicine, including licensing and data protection laws. Develop ethical guidelines and ensure adherence to confidentiality and privacy standards. Monitor and report compliance, updating policies and procedures as needed. Provide training on regulatory, legal, and ethical requirements for all telemedicine personnel.

The level of maturity obtained in this CORE 2 is:

7

The minimum requirements have not yet been fulfilled for this Core

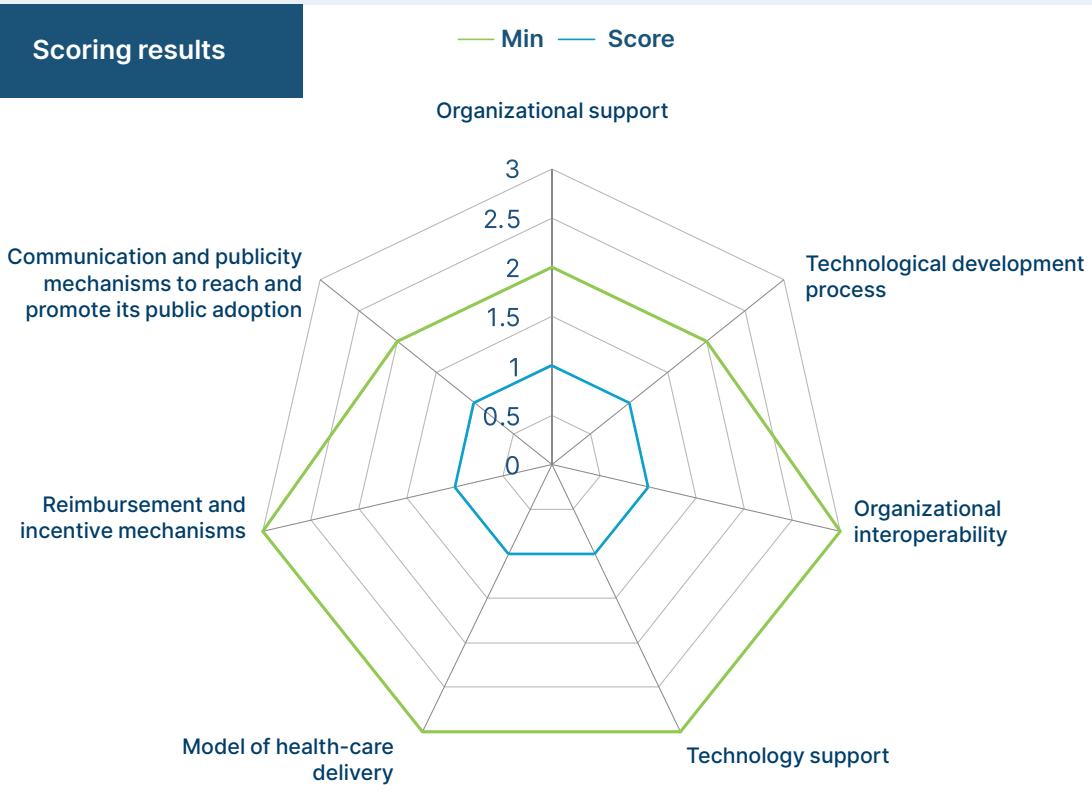
C3. Development of organizational changes

Telemedicine services are a new way of delivering health care, which is why they have an impact across the health system. The success of telemedicine implementation relies on managing the essential changes in the health-care workforce, organizational systems, as well as the consumer behaviour changes required to realize this new modality of health-care delivery.

Number items	Max score	Absent (1 point)	Emerging (2 points)	Mature (3 points)
7	21	7–16	17–19	20–21

To pass the CORE, you must obtain 18 points, of which 12 must come from the mandatory criteria.
Mandatory criteria: 4 (C3.D5.Q3, C3.D5.Q4, C3.D3.Q5 and C3.D4.Q6)

Scoring results



C3 contd

Legend	Recommendations to improve this core
C3.D2.Q1. Is there a supportive organizational environment for telemedicine implementation? *AN EMERGING maturity level is mandatory for this item.	Active involvement of the organization in telemedicine implementation, including usability assessments, system selection, and dedicated implementation team. There should also be clear, identifiable and proactive leadership with defined roles and resources to support organizational change. Effective communication and training systems to keep staff informed and engaged. Incentives and recognition for staff involvement. Implement evidence-based change management strategies to address concerns and create a supportive environment for telemedicine.
C3.D5.Q2. Are there mechanisms to upgrade technology according to the needs of the telemedicine service? *AN EMERGING maturity level is mandatory for this item.	A dedicated team should conduct regular technology assessments to manage upgrades and ensure high-quality care. Stakeholders could be encouraged to provide feedback and identify areas for improvement. Technology roadmaps should be developed to plan for future upgrades. Collaborations could be established with technology providers to keep abreast of industry developments.
C3.D5.Q3. Is organizational interoperability addressed in the telemedicine service implementation? *A MATURE maturity level is mandatory for this item.	Clearly define business objectives and processes for telemedicine services, ensuring alignment and information sharing among stakeholders. Implement standardized processes, protocols, and common data elements. Establish a governance structure to oversee implementation and promote effective collaboration. Develop policies, procedures, and defined roles/ responsibilities for stakeholders.
C3.D5.Q4. Are IT and technical support services available for the telemedicine service? *A MATURE maturity level is mandatory for this item.	A specialized technical team should be established to handle all telemedicine-related technology support, including hardware and software development, implementation, maintenance and security. Provide ongoing virtual and in-person technical support, equipment maintenance, and training to ensure effective and safe use of telemedicine technology. Offer a helpdesk to resolve issues and support end-users.
C3.D3.Q5. Are the health-care delivery modalities adjusted to align with the telemedicine services? *A MATURE maturity level is mandatory for this item.	Adjust health professionals' workflows to integrate telemedicine services, including changes in scheduling, record review, and prescription issuance. Rearrange workspaces to accommodate virtual consultations. Coordinate clinical care across levels. Consider creating new positions, like telemedicine coordinators or telecare technicians, to manage equipment, provide technical support, and support infrastructure. Redefine roles and responsibilities of health personnel, updating job descriptions, training requirements, and performance indicators.
C3.D4.Q6. Are there reimbursement and incentive mechanisms in place in the regulatory environment? *A MATURE maturity level is mandatory for this item.	A reimbursement mechanism should be implemented to allow payment for telemedicine services. Likewise, clear guidelines should be established on how reimbursement mechanisms and incentives should be determined, implemented and evaluated over time, ensuring their effectiveness.

C3 contd

Legend	Recommendations to improve this core
C3.D6.Q7. Are there communication mechanisms to inform and promote patients about the telemedicine service? *AN EMERGING maturity level is mandatory for this item.	Develop a comprehensive marketing plan to promote telemedicine services, targeting specific audiences and using a variety of communication channels. Establish partnerships with community organizations, such as community health centres and patient support groups, to reach underserved populations and ensure effective communication of the message. Staff should be trained in effective communication, seek patient feedback and ensure that they have clear and accurate information so that they can use telemedicine services with confidence.

The level of maturity obtained in this CORE 3 is:

7

The minimum requirements have not yet been fulfilled for this Core

C4. Development of telemedicine services

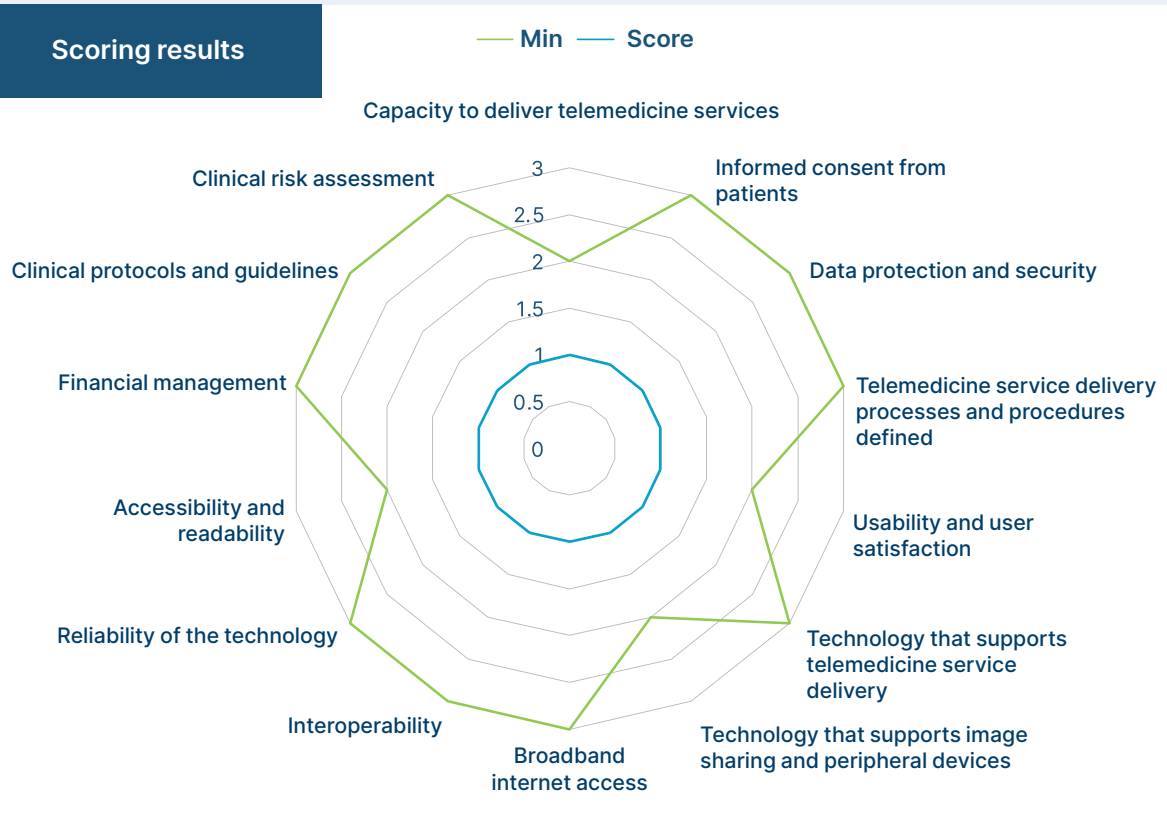
Developing a telemedicine service is complex and requires a design that fits with the needs of the local context, including technological considerations, procedures and guidelines to support the service, continuous development of the workforce, and alignment and coordination across the health system.

Number items	Max score	Absent (1 point)	Emerging (2 points)	Mature (3 points)
14	42	14–37	38–40	41–42

To pass the CORE, you must obtain 38 points, of which 30 must come from the mandatory criteria.

Mandatory criteria: 10 (C4.D9.Q2, C4.D9.Q3, C4.D9.Q4, C4.D5.Q6, C4.D5.Q8, C4.D5.Q9, C4.D5.Q10, C4.D4.Q12, C4.D3.Q13 and C4.D3.Q14)

Scoring results



C4 contd

Legend	Recommendations to improve this core
C4.D1.Q1. Is the health-care workforce capable of delivering quality telemedicine services? *An EMERGING maturity level is mandatory for this item.	Health-care professionals should be trained, follow protocols and guidelines, communicate effectively, ensure data privacy, coordinate with other stakeholders, receive technical support, be kept up to date and recognized for their workload in telemedicine services.
C4.D6.Q2. Is informed consent of the patient integrated into the telemedicine services? *A MATURE maturity level is mandatory for this item.	Procedures should be established to obtain informed consent from patients for telemedicine services, using plain language, documenting consent and data authorization in the patient's record and health-care providers should be trained on obtaining informed consent and communicating about telemedicine.
C4.D6.Q3. Are data protection and security measures integrated into the telemedicine service? *A MATURE maturity level is mandatory for this item.	The telemedicine service should ensure data protection through protocols, assigned responsibilities, breach response plans, secure technology, provider training and regular reviews to comply with regulations and maintain data security.
C4.D5.Q4. Are telemedicine standard operating procedures in place? *A MATURE maturity level is mandatory for this item.	Telemedicine services should be guided by clinical protocols, referral pathways, reporting systems, and regularly updated standard operating procedures to ensure quality service delivery, monitor performance, and adapt to changes in clinical guidelines and feedback from health-care providers and patients.
C4.D5.Q5. How intuitive is the solution? *AN EMERGING maturity level is mandatory for this item.	Telemedicine solutions should prioritize user needs and preferences, involve end-users in the development process, offer easy navigation and clear instructions, use familiar technologies, provide technical support, and monitor user satisfaction for continuous improvement.
C4.D5.Q6. Does the centre have a device at the point of use with audio and video capabilities and telemedicine platform for delivering telemedicine services? *A MATURE maturity level is mandatory for this item.	Ensure devices with the necessary specifications for telemedicine service, including high-quality webcam and microphone/headset. Utilize telemedicine platform for audio-video transmission and features for health-care providers, patients and administrators. Maintain adequate audio-video quality and functioning streaming devices. Enable videoconferencing with secure recording capability.
C4.D5.Q7. Is there technology to support image sharing and peripheral devices for remote diagnosis? *AN EMERGING maturity level is mandatory for this item.	Advanced medical devices, including high-definition video cameras, dermatoscopes, intra-oral cameras, digital stethoscopes, video otoscopes, endoscopes, and ultrasound machines, enable detailed visualization and remote diagnosis in various specialties such as dermatology, dentistry, auscultation, otolaryngology, gastroenterology, and ultrasound imaging.
C4.D5.Q8. Is there adequate broadband network access to support the telemedicine service? *A MATURE maturity level is mandatory for this item.	For quality video and data transmission in telemedicine, a fast and stable network connection with sufficient bandwidth should be guaranteed. The hardware and storage technology used should be up to date, and measures such as the use of VPN or access from different providers should be implemented to improve security and maintain a stable connection.

C4 contd

Legend	Recommendations to improve this core
C4.D5.Q9. Are telemedicine service data interoperable with other health system databases? *A MATURE maturity level is mandatory for this item.	Data standards, standardized terminologies, data exchange protocols, data governance policies, and standardized data capture tools should be established to promote interoperability, consistency, quality, and privacy in telemedicine data management and exchange.
C4.D5.Q10. Is the telemedicine technology reliable? *A MATURE maturity level is mandatory for this item.	Telemedicine technology should be maintained, updated and backed up regularly, with robust cybersecurity measures in place. Adequate technical support should be available, and the health-care workforce should be continuously trained on safety and security protocols, including data protection and patient confidentiality.
C4.D5.Q11. Are the electronic devices related to the telemedicine service easily accessible, adaptable, and self-configurable? *AN EMERGING maturity level is mandatory for this item.	The telemedicine service should be optimized for mobile phones, be accessible to all users regardless of disability or socioeconomic status, use plain text and easy-to-read fonts, adapt to different devices and internet connections, and prioritize user-centred design with equal access for all, taking into account various factors such as education, location, digital literacy and vulnerable populations.
C4.D4.Q12. Is a routine cost vs budget analysis of the telemedicine service performed? *A MATURE maturity level is mandatory for this item.	A cost-benefit analysis should guide the implementation and sustainability of the telemedicine service, considering efficiency, financial viability, and potential benefits. Revenue models should be explored, operational efficiency should be optimized, equipment costs should be managed, and expenses should be tracked to ensure budget adherence and high-quality care.
C4.D3.Q13. Have clinical protocols, referral forms, policies, and guidelines been developed to support the telemedicine service or programme? *A MATURE maturity level is mandatory for this item.	Relevant guidelines, protocols, referral forms, and clinical decision-making processes should be adapted and developed to support the telemedicine service, incorporating telemedicine-specific elements. Clinical appointment scheduling, market analysis, and patient analysis should also be conducted to ensure timely and appropriate care. Clinical policies should be established to address patient privacy, security, technology use, and liability.
C4.D3.Q14. Is a clinical risk assessment process in place? *A MATURE maturity level is mandatory for this item.	Potential risks associated with telemedicine services should be identified, assessed, and mitigated through risk assessment criteria, guidelines, and training. Ongoing monitoring and evaluation should ensure the effectiveness of risk mitigation strategies. Attention should be given to protecting vulnerable populations.

The level of maturity obtained in this CORE 4 is:

14

The minimum requirements have not yet been fulfilled for this Core

Scores and recommendations

C5. Monitoring, evaluation, and optimization of the implementation of telemedicine

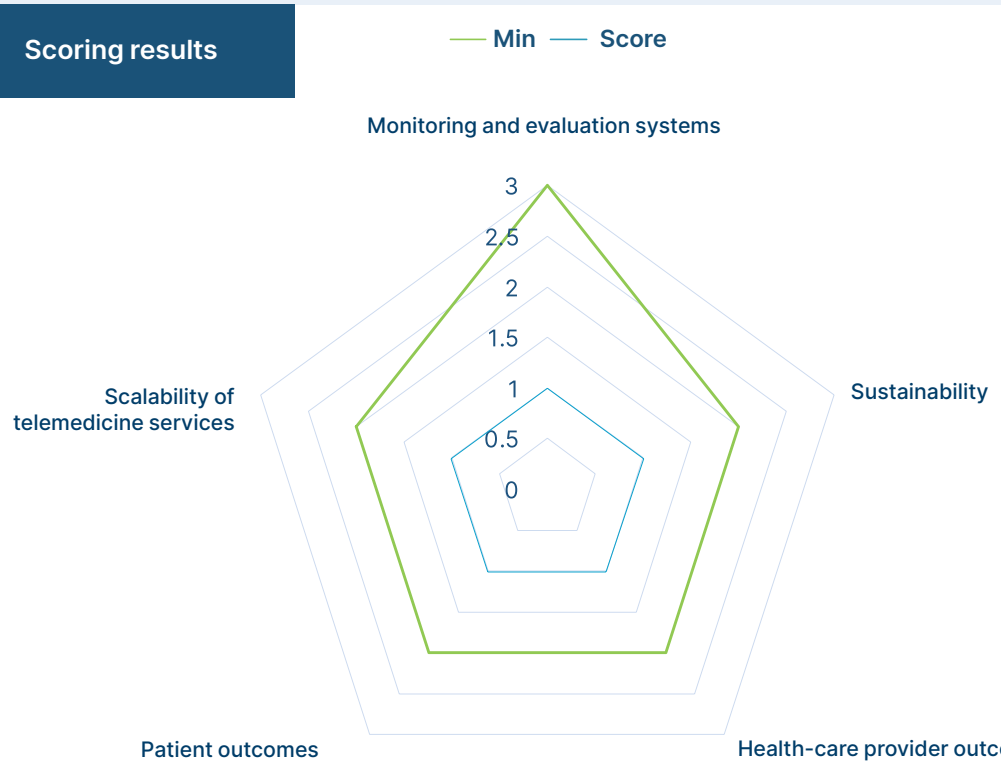
C5. Monitoring, evaluation, and optimization of the implementation of telemedicine

To understand how the telemedicine service is performing, it is critical to continuously monitor the implementation of the telemedicine service and evaluate the service at critical points in the telemedicine life cycle. The findings from the monitoring and evaluation feed into strategic planning to optimize and further strengthen the telemedicine service, which includes informing the sustainability and scalability of the service.

Number items	Max score	Absent (1 point)	Emerging (2 points)	Mature (3 points)
5	15	5–10	11–13	14–15

To pass the CORE, you must obtain 11 points, of which 3 must come from the mandatory criteria.
Mandatory criteria: 1 (C5.D10.Q1)

Scoring results



C5 contd

Legend	Recommendations to improve this core
C5.D7.Q1. Are there plans to perform continuous evaluation of the implementation of telemedicine? *A MATURE maturity level is mandatory for this item.	Integrate assessment mechanisms throughout the design, development, and implementation of the telemedicine service, set clear performance indicators and targets aligned with service goals, and implement continuous monitoring for the telemedicine service. Use data from patients and health-care providers to improve quality. Conduct evaluations at appropriate milestones, assessing implementation, effectiveness, efficiency, and cost-effectiveness and report progress to stakeholders. Prepare a contingency plan for significant deviations.
C5.D7.Q2. Is there a mechanism in place to assess whether the telemedicine service is sustainable? *AN EMERGING maturity level is mandatory for this item.	Establish strategies for telemedicine service sustainability. Integrate it fully into the health system as a routine offering. Monitor and evaluate performance against sustainability criteria, including financial viability, scalability, stakeholder support, and alignment with health system goals. Assess the impact on outcomes and satisfaction. Address barriers to sustainability. Prepare a contingency plan for deviations.
C5.D7.Q3. Is there a mechanism in place to assess health-care provider outcomes (health-care professionals' satisfaction and workload)? *AN EMERGING maturity level is mandatory for this item.	Develop common evaluation indicator for organization-wide comparison. Use standardized surveys to measure health-care provider satisfaction and workload. Analyse data on provider outcomes pre- and post-telemedicine, such as workload, productivity, and quality of care. Conduct comprehensive assessments on health-care provider outcomes, involving collaboration between stakeholders. Ensure privacy and confidentiality in evaluating provider performance.
C5.D7.Q4. Is there a mechanism in place to assess patient outcomes (satisfaction and quality of life)? *AN EMERGING maturity level is mandatory for this item.	Develop common evaluation indicators for organization-wide comparison in patient care. Use standardized surveys to measure patient satisfaction and quality of life with telemedicine. Analyse data on patient outcomes pre- and post-telemedicine, such as health status and health-care utilization. Ensure privacy and confidentiality in assessing patient outcomes. Consider diverse patient populations when designing assessment tools.
C5.D7.Q5. Is there a mechanism in place to assess whether the telemedicine service is scalable? *AN EMERGING maturity level is mandatory for this item.	Implement strategies to assess scalability and identify areas for improvement in the telemedicine service. Standardize technology, workflows, and protocols for replication in other health-care facilities. Adapt to diverse contexts and patient populations. Maintain costeffectiveness and interoperability. Seek feedback from health-care providers and patients to address barriers to scaling.

The level of maturity obtained in this CORE 5 is:

5

The minimum requirements have not yet been fulfilled for this Core

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World Health Organization
Regional Office for Europe

UN City, Marmorvej 51,
DK-2100 Copenhagen Ø, Denmark
Tel.: +45 45 33 70 00 Fax: +45 45 33 70 01
Email: eurocontact@who.int
Website: www.who.int/europe