Cardiovascular telemedicine: Improving Cardiovascular Care with Telemedicine

GOVERNMENT OF MONGOLIA
MINISTRY OF HEALTH
LUXEMBOURG AID & DEVELOPMENT
TSCH
LUX DEV Luxembourg Development Cooperation Agency

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Healthcare Challenges in Mongolia in early 2000s

1

Limited availability

Geographical distances and limited healthcare infrastructure.

2

Lack of human resources

Mongolia faced a shortage of trained cardiologists, making it challenging to provide timely and comprehensive care to all patients.

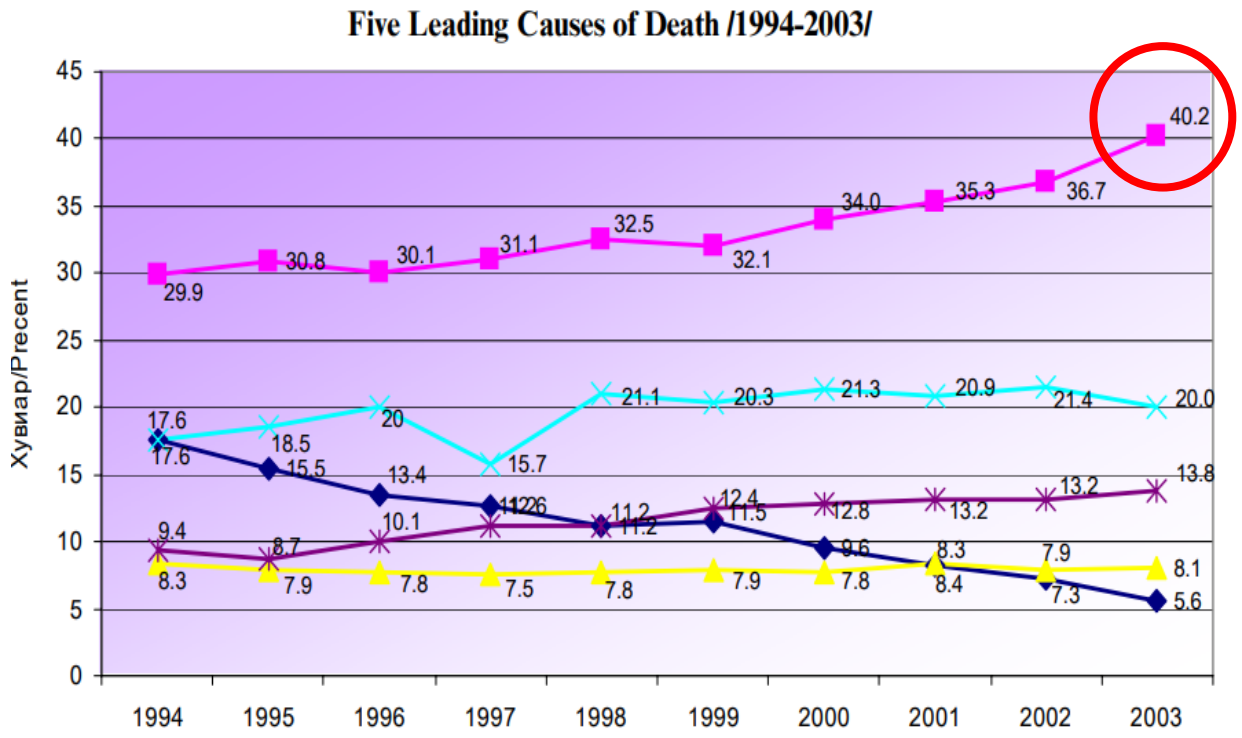
3

Financial stress and solvency

The high costs of travel and healthcare services created financial barriers for many Mongolian patients seeking cardiovascular care.

Healthcare Challenges in Mongolia in early 2000s

Cardiovascular disease burden



- CVD mortality accounts for 40% of total death in Mongolia in 2003.

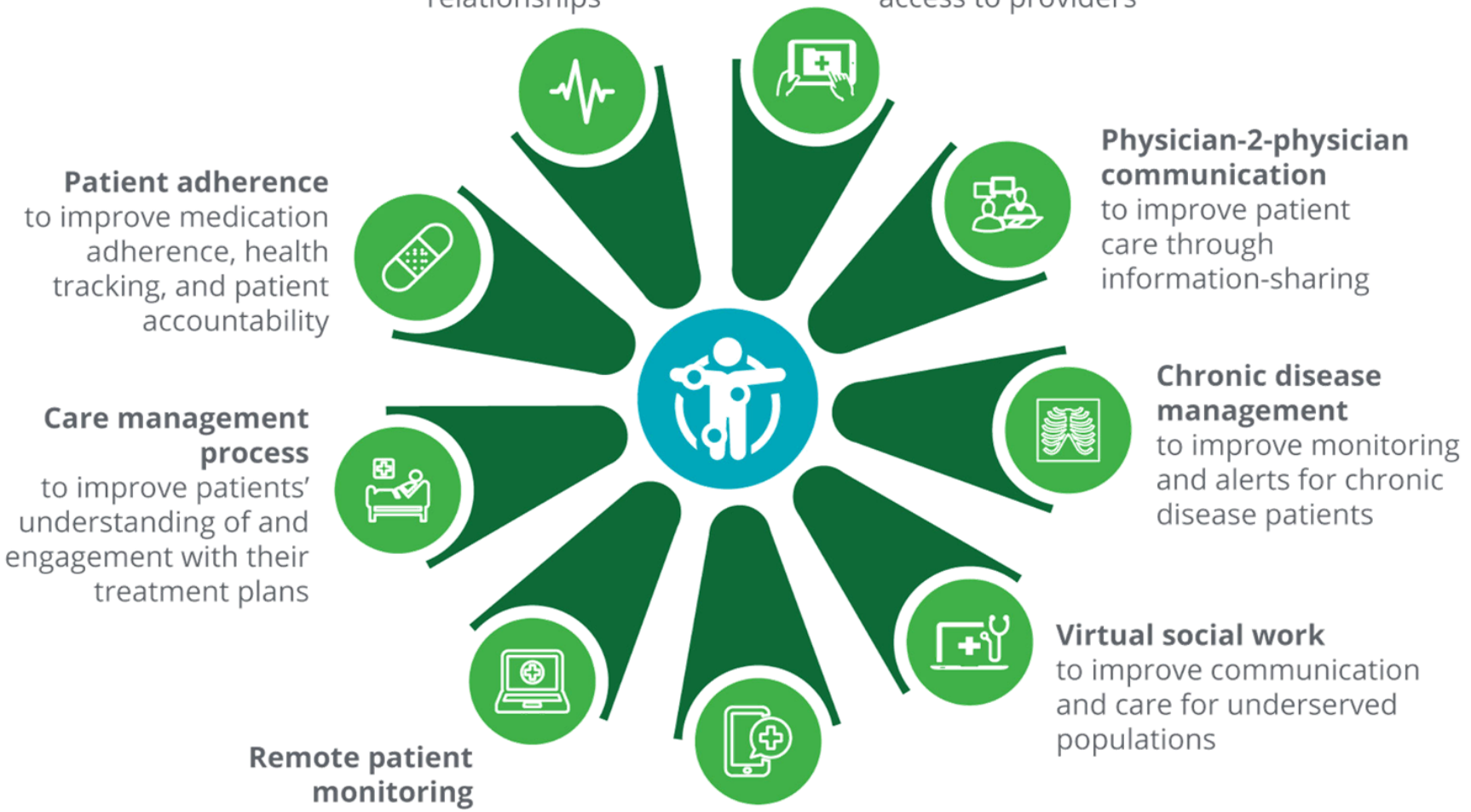
National health statistics

Challenges for province doctors

- Significant lack of cardiovascular postgraduate training
- Limited opportunity to obtain advances in medical science and new or updated clinical knowledge and experience
- Isolated from the expertise and collaboration essential for effective cardiovascular care.

"In addressing challenges, our approach focuses on delivering quality, specialized medical advice, and care services to a broader audience swiftly and efficiently through TELEMEDICINE."

Roles and Potentialities in Healthcare Telemedicine



Store and forward type of telemedicine :
Chosen strategy for improving cardiovascular care

ECONSULTS

LIVE (SYNCHRONOUS)

A two-way audiovisual link between a patient and a care provider.

PATIENT TO PROVIDER

PROVIDER TO PROVIDER

STORE-AND-FORWARD (ASYNCHRONOUS)

The transmission of a recorded health history to a health practitioner, usually a specialist.

eConsults provide access to specialty care by connecting PCPs with specialists via secure messaging platform and HER.

PROVIDER TO PROVIDER

REMOTE PATIENT MONITORING (RPM)

The use of connected electronic tools to record personal health and medical data in one location for review by a provider in another location, usually at a different time.

PATIENT TO PROVIDER

MOBILE HEALTH (MHEALTH)

Healthcare and public health information provided through mobile devices. The information may include general educational, targeted texts, and information about disease outbreaks.

HEALTHCARE NETWORK TO PATIENT

GOVERNMENT OF MONGOLIA

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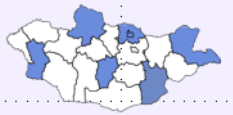
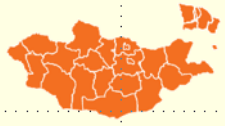
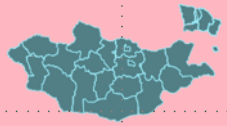
Luxembourg Government supported project in Mongolia: Cardiovascular field

2001-2007 MOH/002	2007-2012 MOH/003	2012-2017 MOH/005	2017-2022 MOH/006	2022 - 2027 MOH/007
Pilot project: "Cardiovascular Diagnostic Centre"	"Cardiovascular Diagnostic Centre" Phase II	"Cardiovascular Centre, MCH and e-Health Expansion"	"Consolidating Cardiovascular Services and National Cardiac Centre in Mongolia"	"Cardiology, Cardio-surgery and Telemedicine in Mongolia"
				
• Telecommunication using simple emails	• Telemedicine: specific SW with teleconsultation and e-Medical record	• Telemedicine • Further development of SW, adding features • Support on e-Health strategy development	• Further development of Telemedicine SW • Patient follow-up system • Vertical expansion to primary health care • Horizontal expansion, duplication	• Further development of Telemedicine SW • Patient platform • Doctor-to-client online consultation and consultation • CVD risk
• Clinical training	• Tele education: Distance learning through specific web	• Health statistics training • CVD management in all 21 provinces and 9 districts	• Clinical training • Webinar • Digital conference	• Clinical training • Webinar • Digital conference
• CVD diagnostics and treatment • Echocardiography	• CVD management	• Interventional cardiology: expansion: volume and type of procedures	• Cardiology case management improvement	• CVD management
• Basic equipment: 6 provinces and SCH	• Clinical training	• Cardiac surgery advancement: Equipment, condition, safety environment	• Cardiac surgery advancement: Equipment, safety environment	• Expansion of Cardiac Interventions: Number and Types
	• Interventional cardiology component	• Clinical training	• NCC institutionalizing • Extension for NCC building	• Advances in cardiac surgery:
	• Equipment: 8 provinces and SCH	• Maternal and Child Health project		• CVD prevention
				• NCC institutionalizing • Extension for NCC building

Cardiovascular telemedicine “MnCardio” program development

2003 — VISIOMIP

- Telecommunication using simple email: Interchange information, advice
- Simple Interchange file via a special forum

2009 — MNCARDIO: DEDICATED CARDIOVASCULAR SW INITIATED

- MnCardio: Dedicated SW for teleconsultation
- Simple E-medical record
- Connection with the MoH database
- Teleconsultation request notified by SMS
- Link with mobile provider

2015 — MNCARDIO: INTEGRATED MEW MODULES

- MnCardio SW extension:
  - ✓ Inpatient module,
  - ✓ Management of hospital admission
  - ✓ Inpatient drug prescription
  - ✓ PCI recording
  - ✓ Procedure recording,
  - ✓ Integrating medical calculator
  - ✓ EuroSCORE
- Responsive Layout for Mobile Screens

2019 — UPDATE IN FULL SOURCE, VERTICAL EXTENSION OF SW

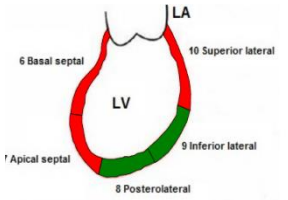
- Renewal of MnCardio:
  - ✓ Heart teams follow up section
- Vertical expansion to the primary level hospitals

2024 — SW DUPLICATION, NATIONAL REGISTRATION

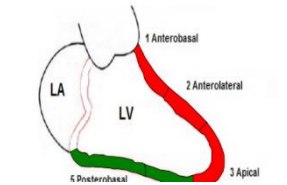
- Duplication SW: Horizontal expansion to the different subjects:
  - ✓ MnStroke
  - ✓ COVID 19 telemedicine
- Adding National registry section
- Patient online consultation section

Introducing the current MnCardio SW: Key features

Patient's registration page:
- Passport information
- History of previous visit
- Past medical history



Procedure recording page:
- Echocardiography measurement
- User friendly recording of findings
- Upload picture/video



ECG recording page:
- Attached ECG file and conclusion

Laboratory test result

Take under monitoring:
- Incorporate the patient into the own followed-up patients' list

Add to:
- Move to heart teams, according to the diagnosis
- Valvular team
- Vascular team
- Congenital disease team
- Arrhythmology team
- Heart failure team

To hospitalize:
- Hospitalization waiting list

Calculator:
- ATRIA bleeding score
- CHA2DS-VASc
- Geneva Score for Pulmonary Embolism
- National Institutes of Health Stroke Scale etc

National registry
- Heart failure
- Congenital heart disease
- Vascular disease
- Valvular heart disease
- Arhythmology

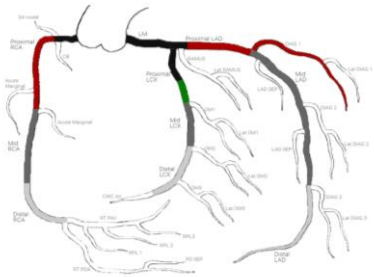
VISIT | EXO | ECG | INR | TICKET | TAKE UNDER MONITORING | SURGERY REPORT | ADD TO ... | TO HOSPITALIZE | КАГ | VALCULATOR | NATIONAL REGISTRY | Referral | CVD RISK

New visit recording page:
- Type of examination: preventive, active follow up, the home visit on call
- Purpose of consultation: new-onset/chronic disease
- Major Complaint
- Body measurements, vital signs
- Diagnosis according to ICD 10
- Major findings,
- Prescribed treatments, procedures, referrals,
- Attached files

Ticket:
- Seek second/third medical opinion from other cardiologists'

Cardiovascular Surgery report:
- Page 1: Hospitalization, Past medical history
- Page 2: Pre-surgery risk factors,
- Page 3: Hemodynamic, catherization
- Page 4: CV surgery, previous PCI report
- Page 5: Valvular surgery, valves echocardiography evaluation
- Page 6: Planned surgery, procedure types
- Page 7: Blood perfusion and types of myocardial protection type
- Page 8: Post-surgery complication

PCI:
- Planning procedures
- Doctors to be perform PCI
- Mark coronary arteries findings and treatments easily illustrative manner: site, degree of occlusion, narrowing, type of implanted stents etc

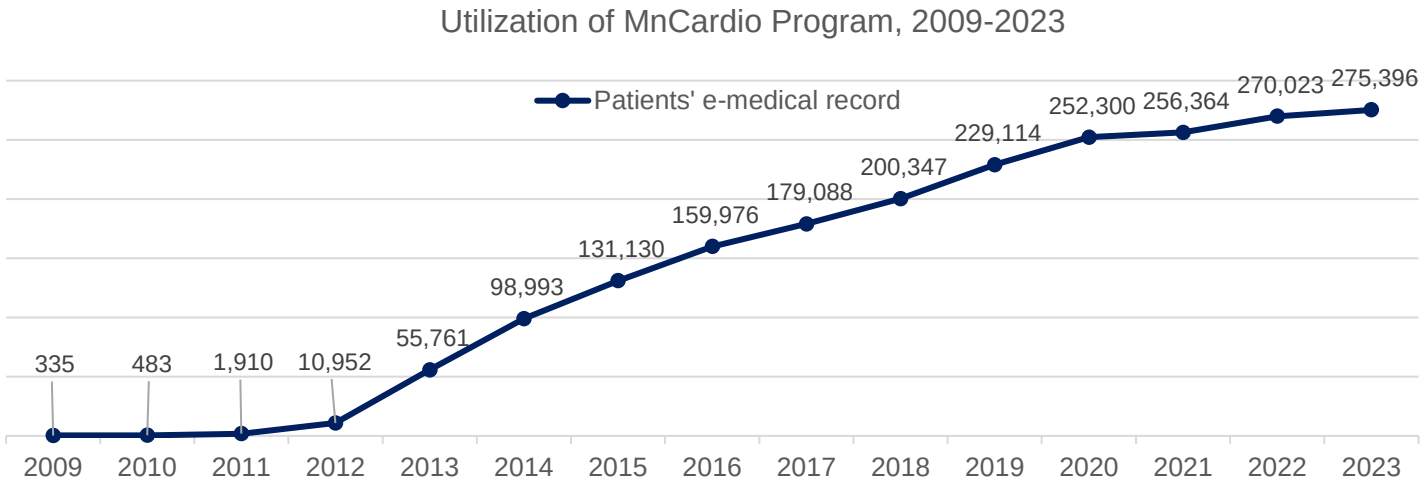


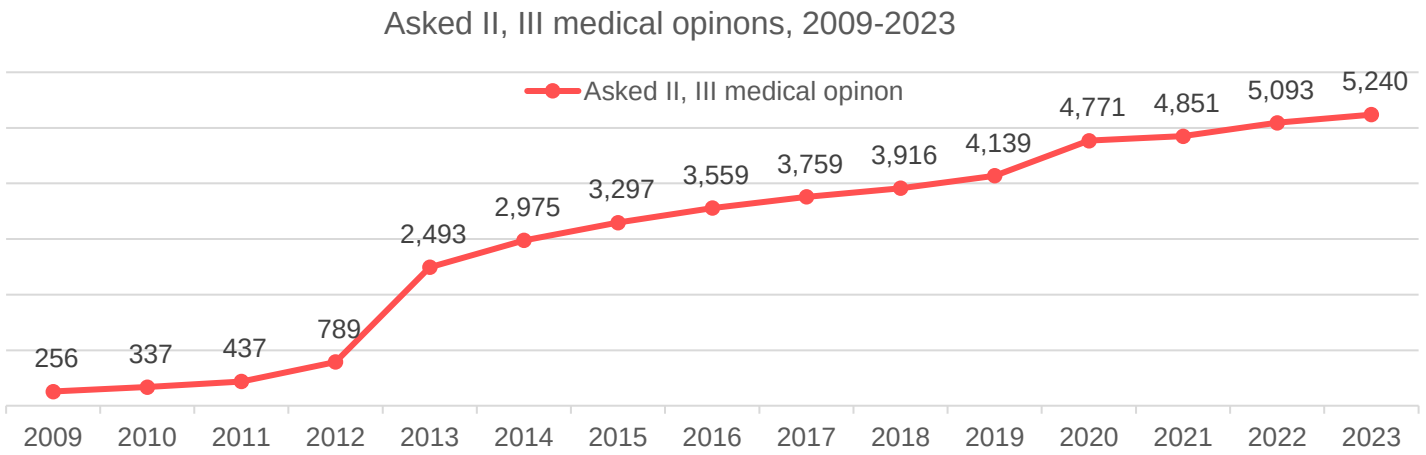
Patient referral
- Purpose of the patient referral

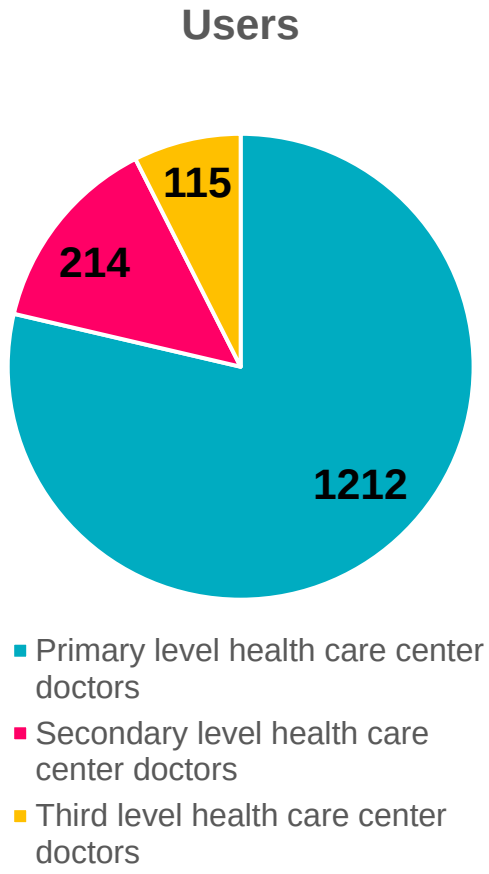
CVD risk estimation
- CVD risk estimation

Sustainability and Utilization of MnCardio, 2009-2023

- Over 275,000 patients' EMRs archived in the program







1541

USERS

5,240

TELECONSULTATION: asked for a medical opinion

9,989

TELECONSULTATION: advice on clinical decision making

275,396

REGISTERED PATIENTS

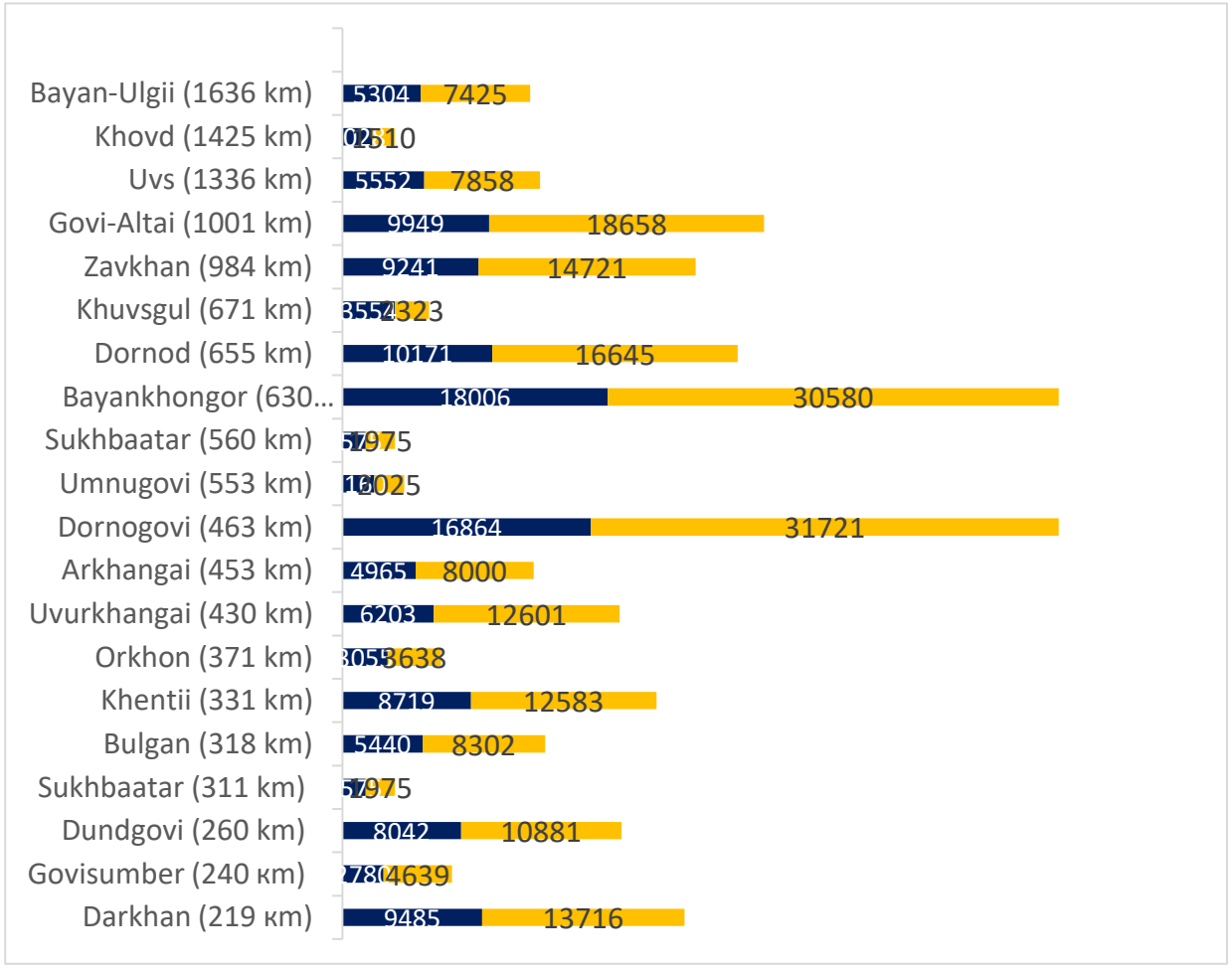
438,408

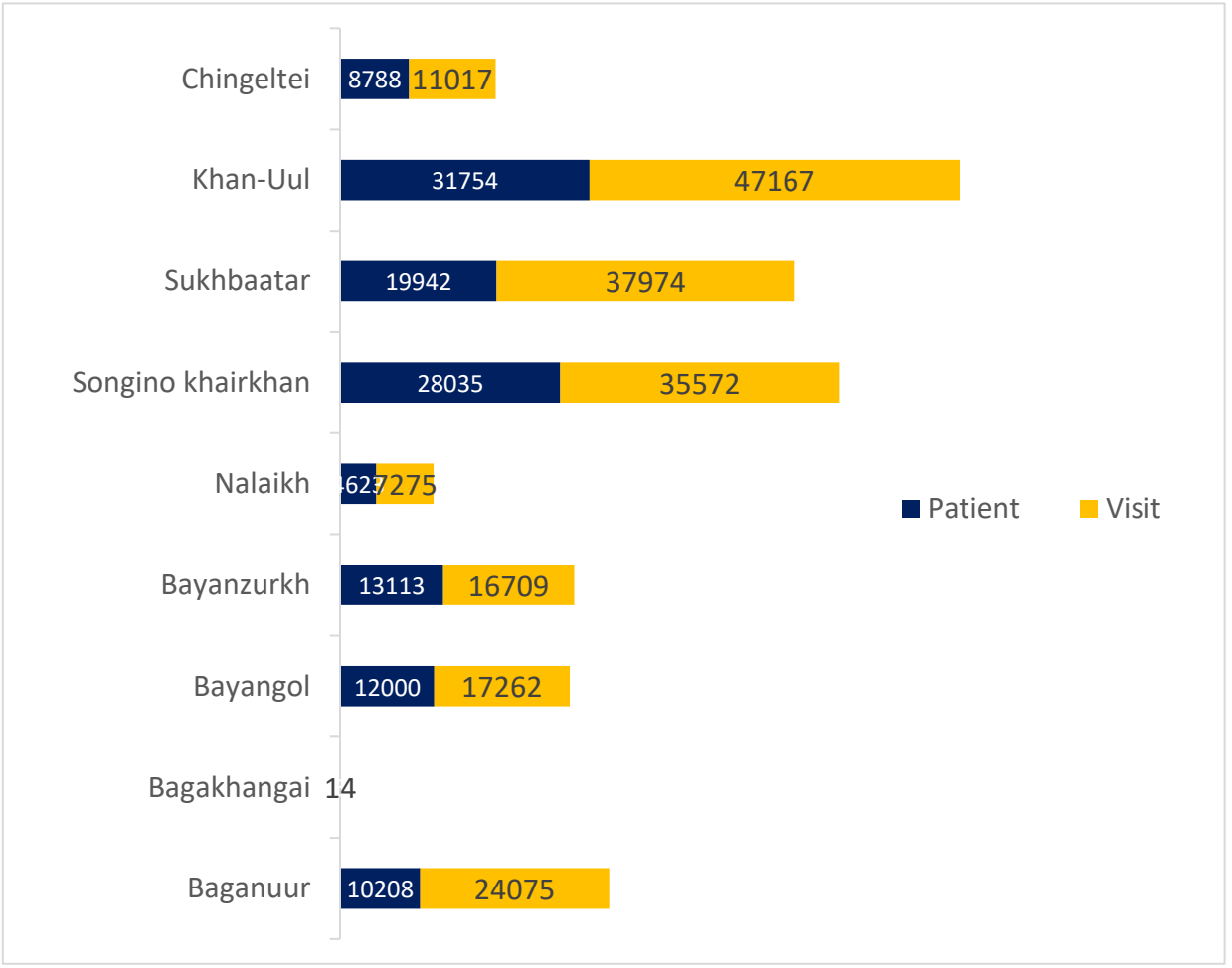
E-MEDICAL RECORDS

Utilization of MnCardio: at the provinces and districts from 2009 to 2023
Patient registration and E-medical records of all provinces and districts

21 Province: 144,199 patient registration, 226,817 e-medical records

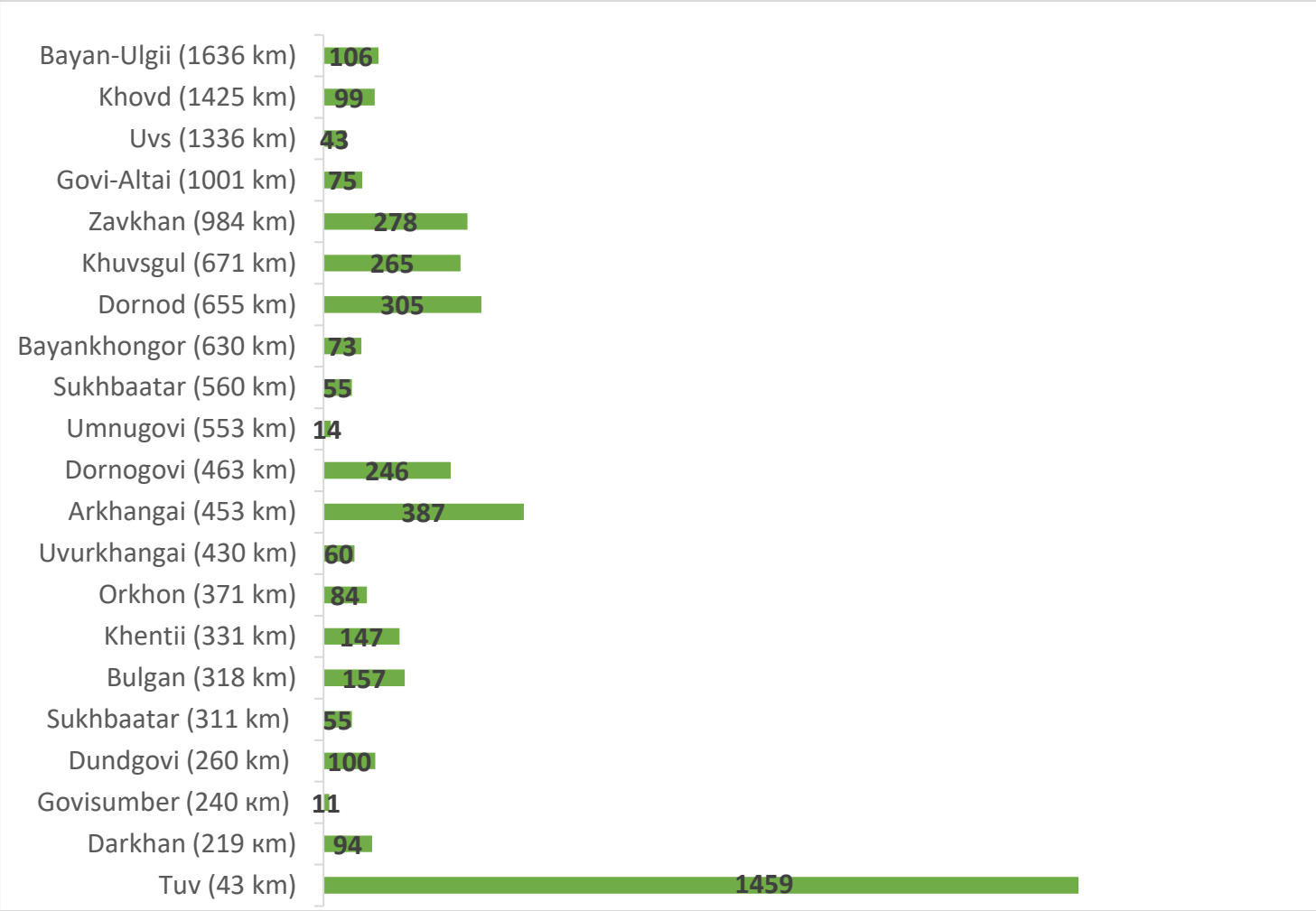
9 District: 128,468 patient registration, 197,065 e-medical records



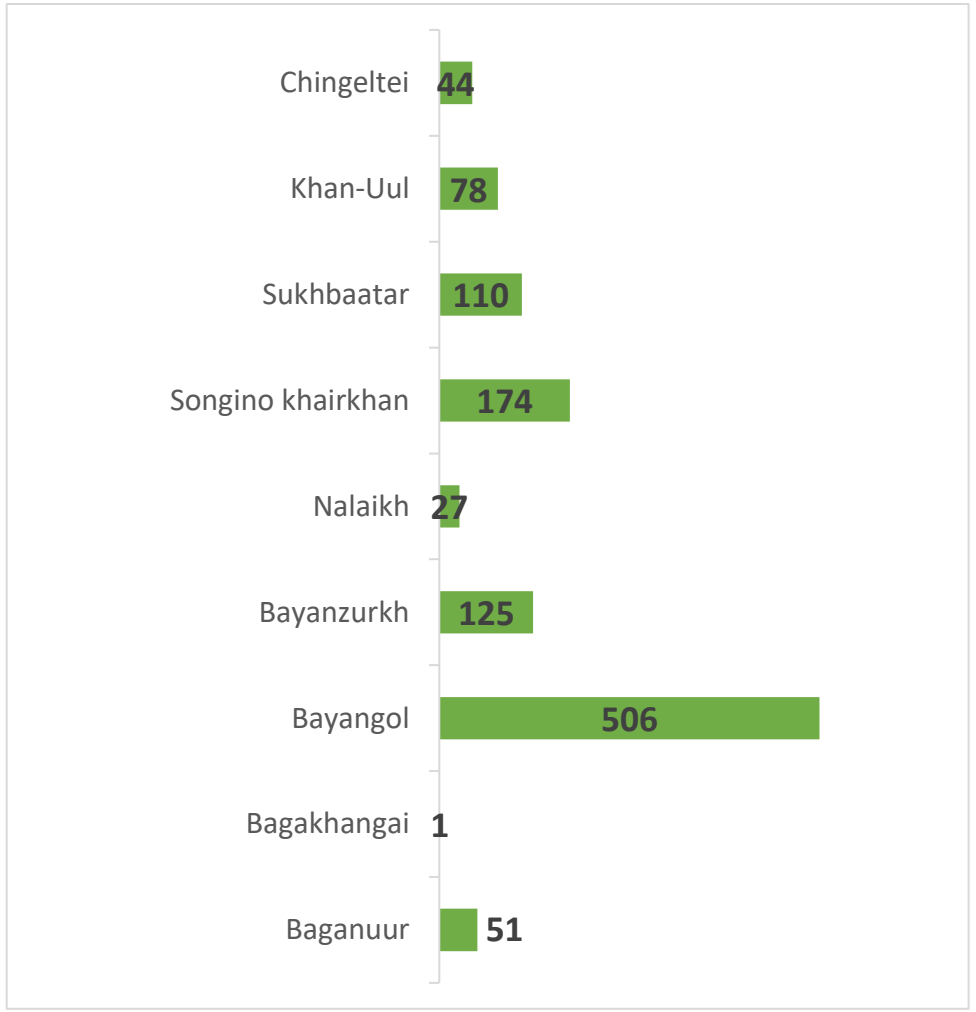


Utilization of MnCardio: at the provinces and districts from 2009 to 2023
Asked second and third medical opinions from all provinces and districts

21 Province – 5 240 second, third medical opinion

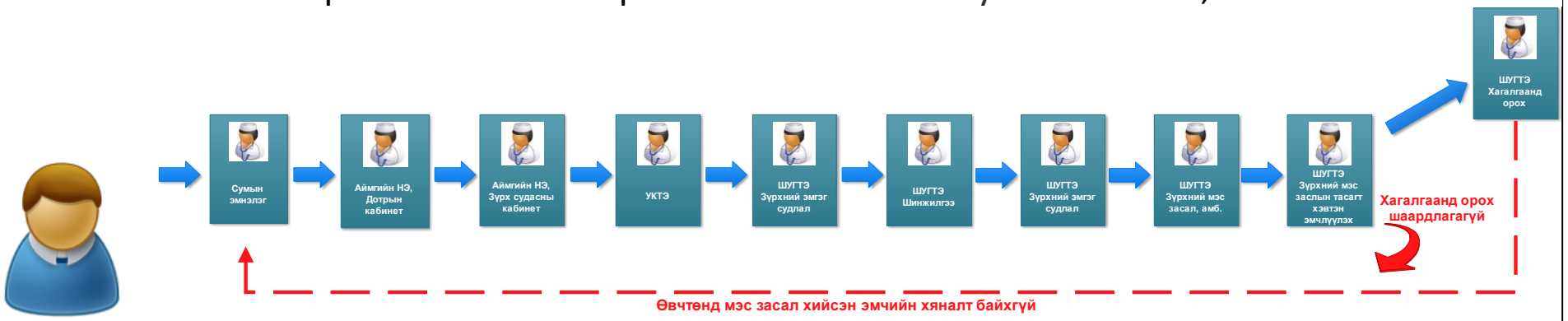


9 Disctrict – 1 116 second, third medical opinion

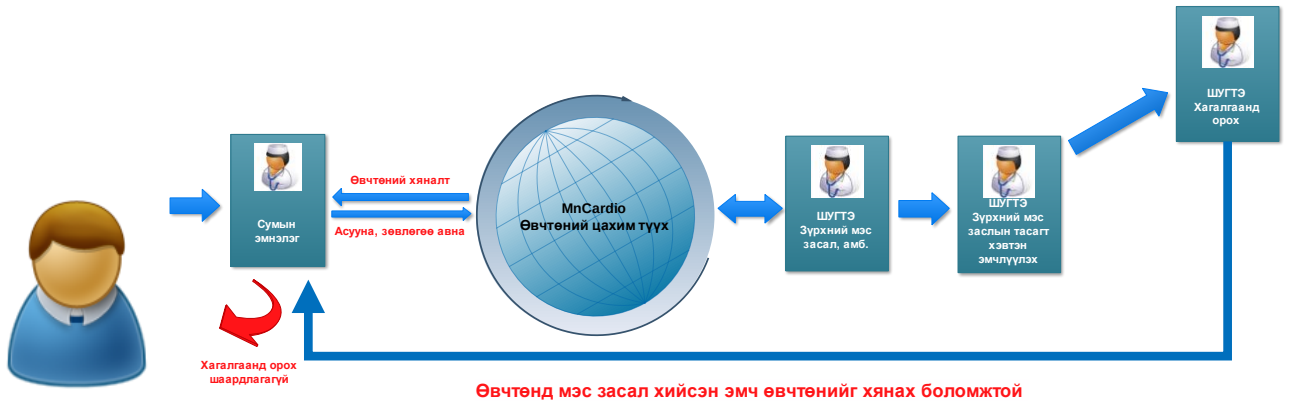


Optimal Patient Referral from secondary to tertiary level hospital: telemedicine shortcuts traditional steps and time-saving approach for timely advanced health care

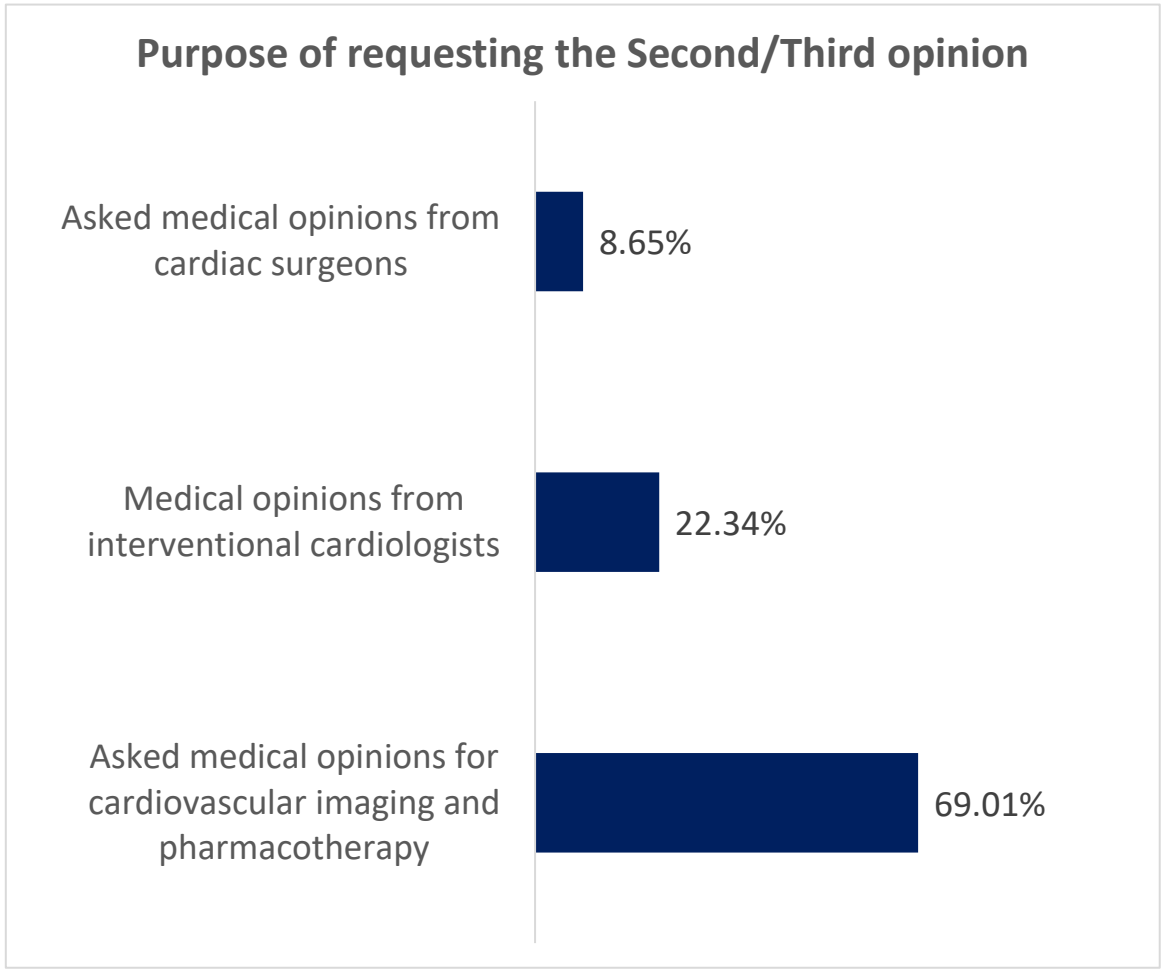
The traditional steps and burden for patients to visit tertiary care centers, National CV center

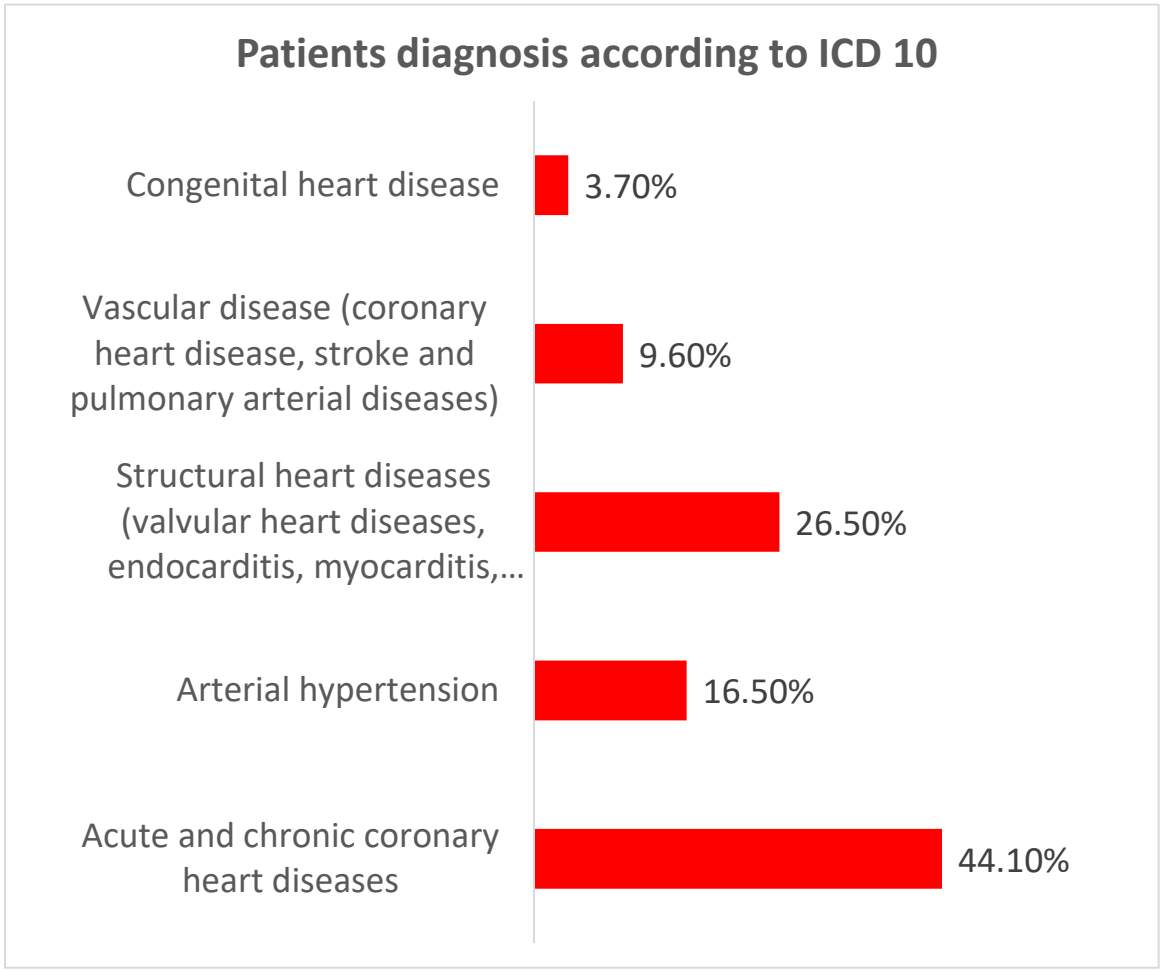


Telemedicine shortcut the steps and reduce the burden to access specialized center



Second and third medical opinions asked through the MnCardio SW



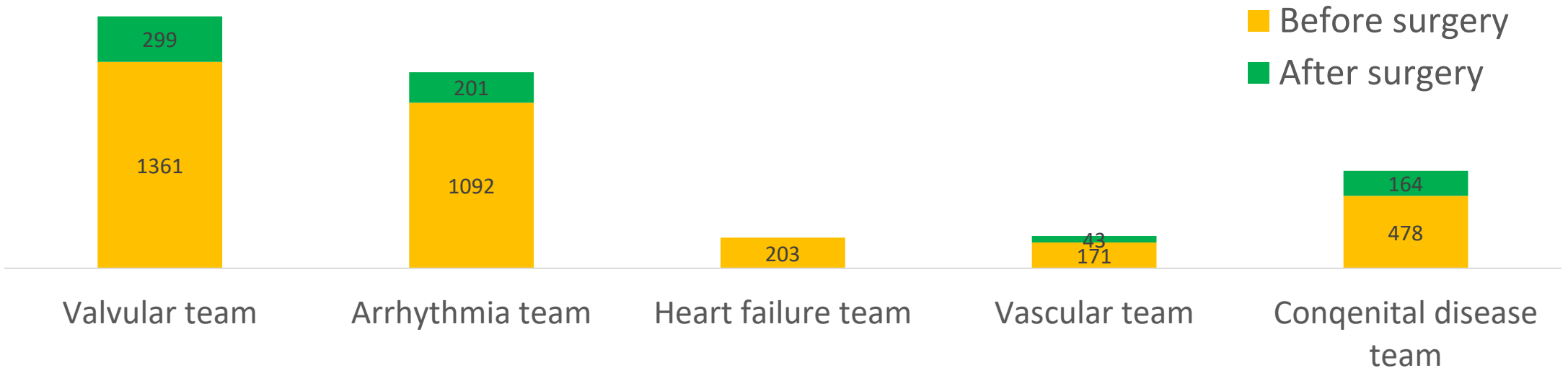


The Role of MnCardio in Follow-up Management

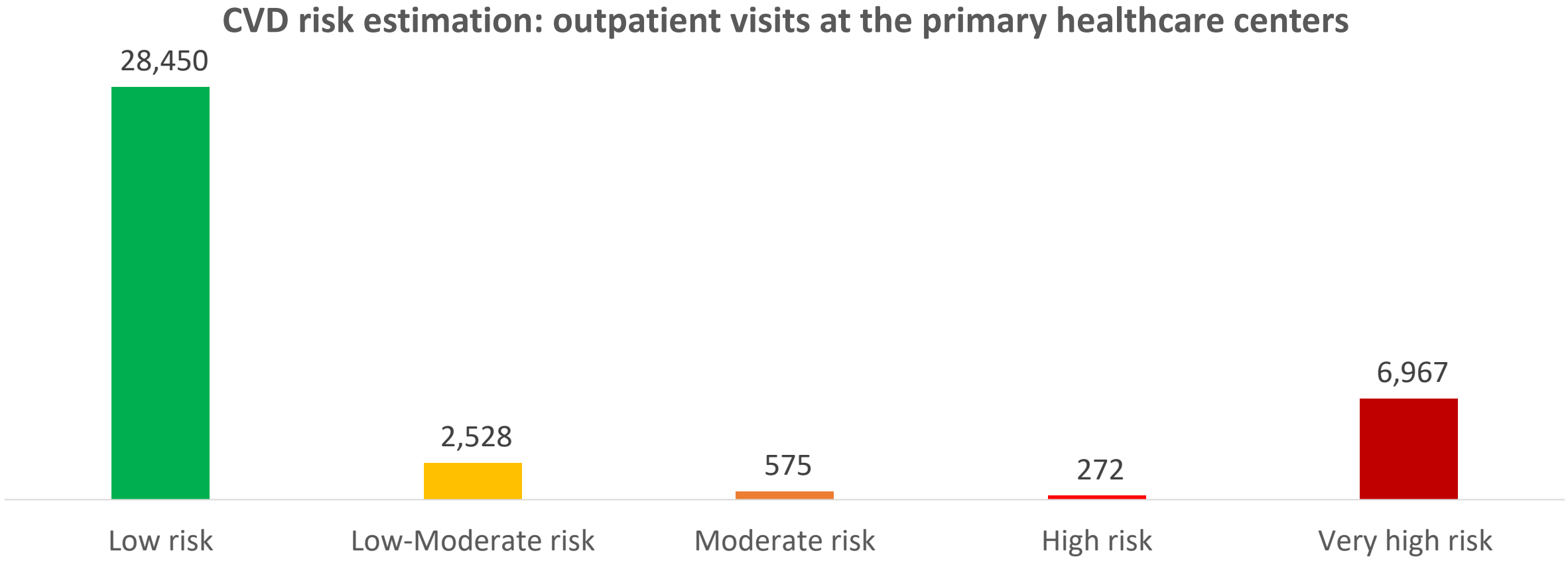
Total of over 4,200 patients followed-up by:

- the dedicated cardiac teams at National cardiovascular center and
- province and district doctors

Number of patients followed-up by clinical teams through MnCardio SW, MnCardio 2017-2023



The Role of MnCardio in follow-up based on CVD risk



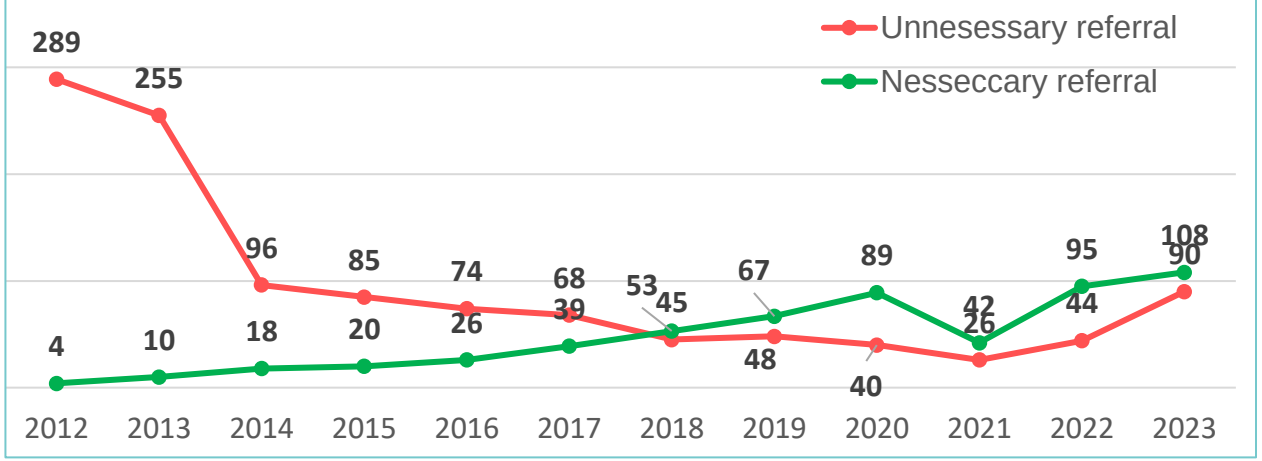
A total of 38,792 people's CVD risk estimated and archived in the SW.

From rural perspective: Zavkhan province's example

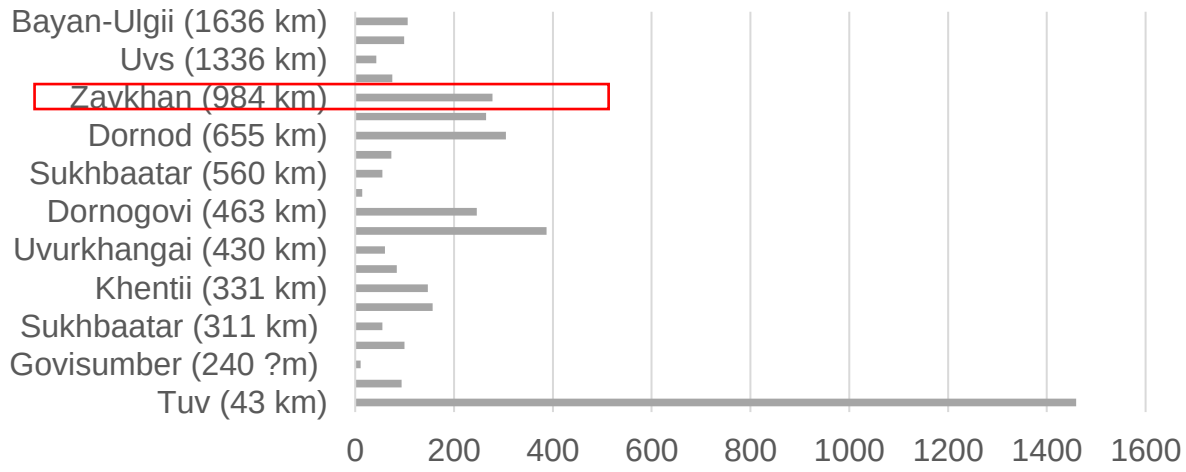
- Zavkhan located in the west of the country, 1115 km from UB
- Consists of 24 soum, 114 family group practices
- Over 72,000 population
- The province hospital has 2 cardiologists
- Flights are only scheduled 2 times a week.
- Involved in the project since 2012

Advances in telemedicine introduction at the province level: Example of Zavkhan province

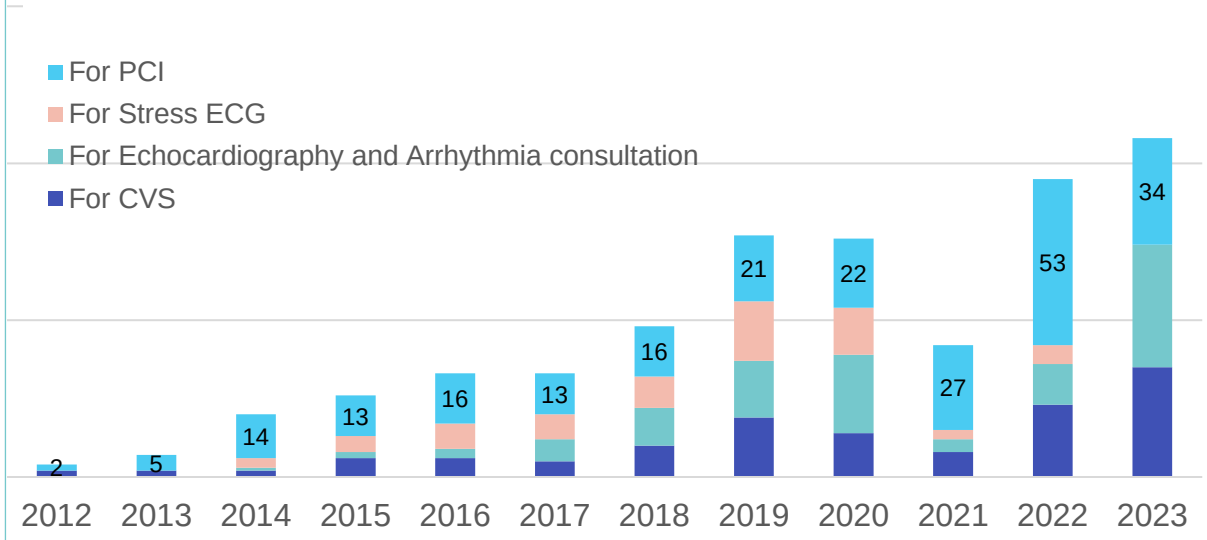
Number of referrals from Zavkhan to UB, since 2012



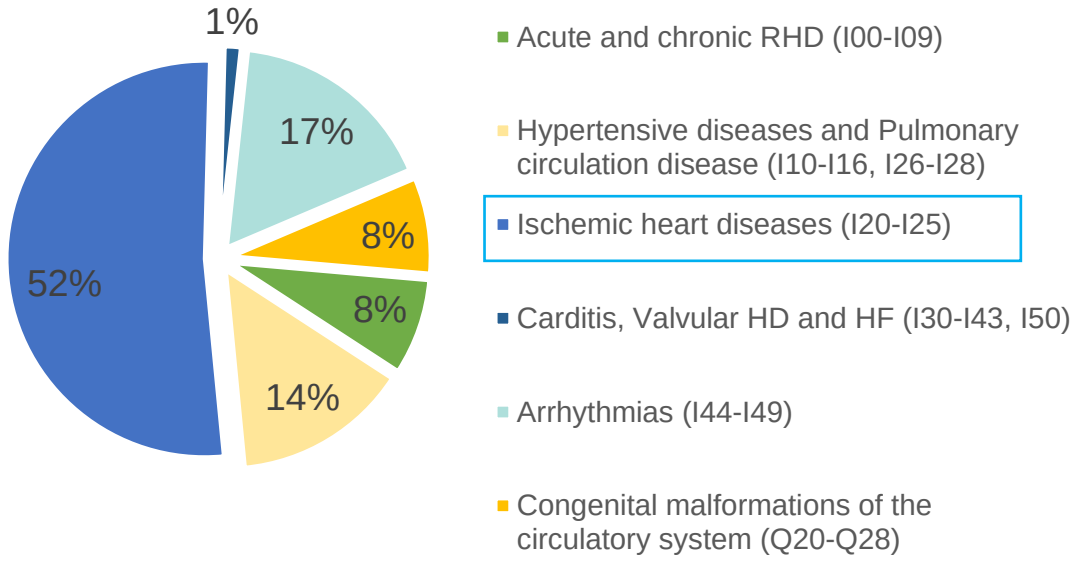
Asked medical opinions



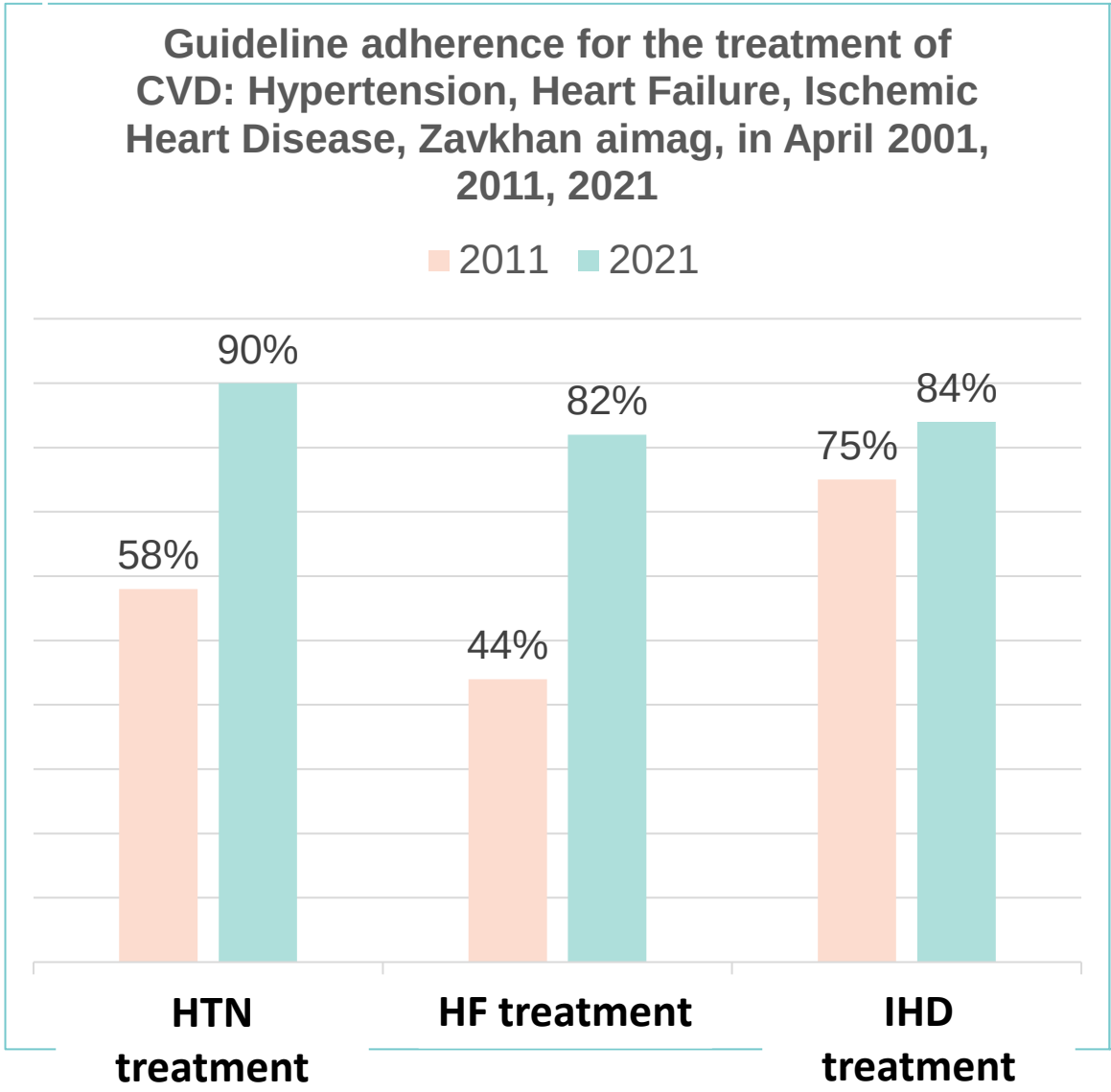
The number of referrals for CV imaging, surgery and consultation

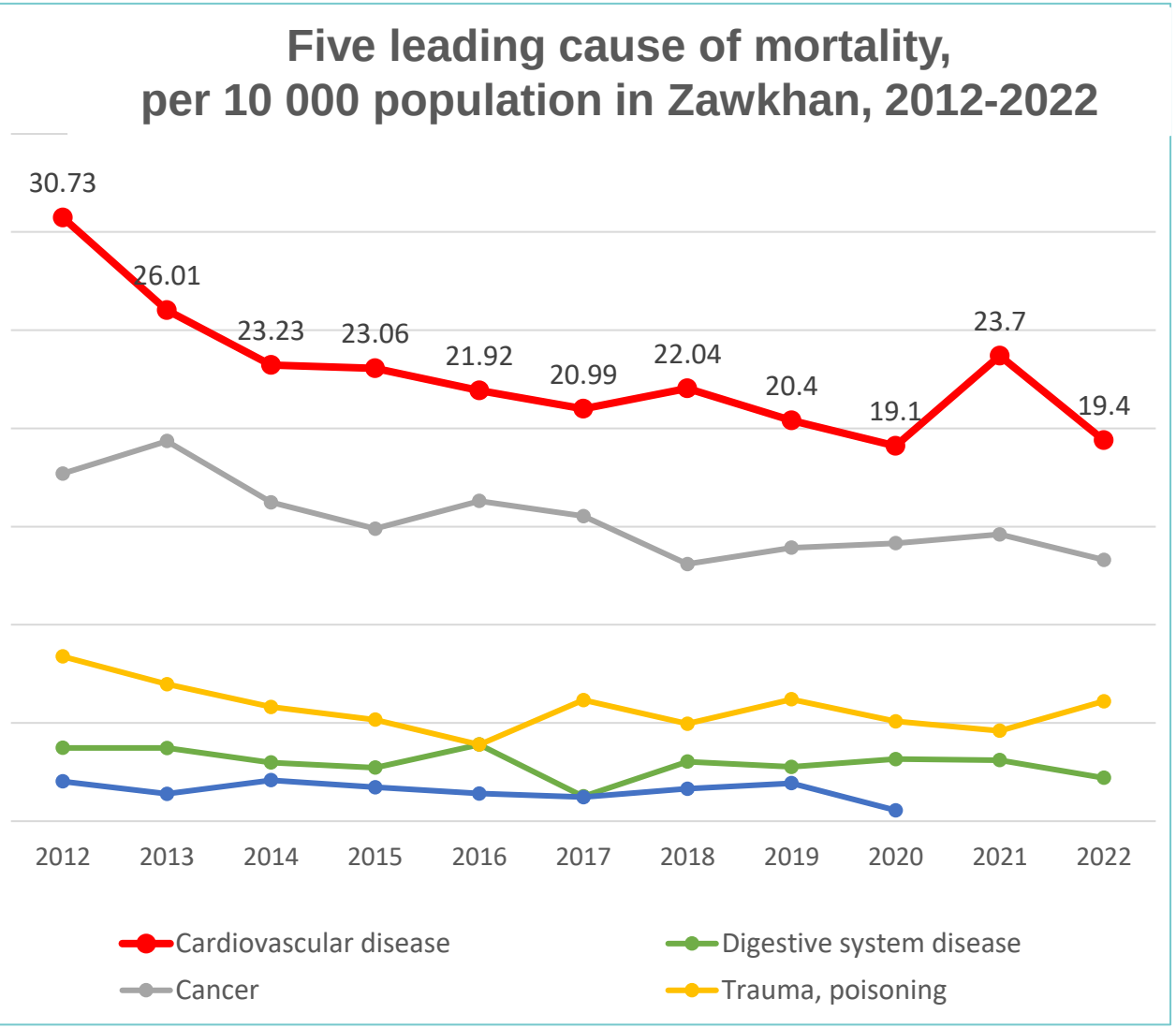


Zavkhan province's Purpose of requesting the Second/Third opinion



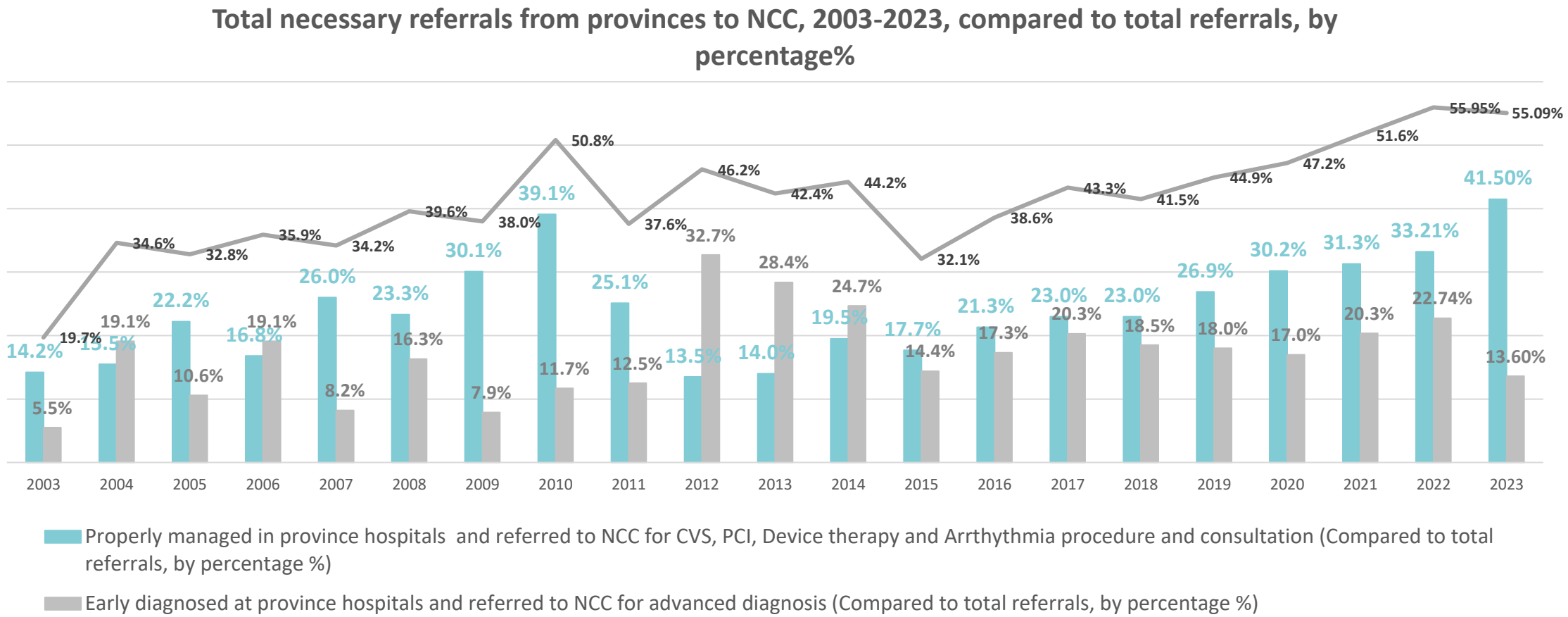
Advances in telemedicine introduction at the province level: Clinical guideline adherence on medical treatment and CVD mortality reduction in Zavkhan





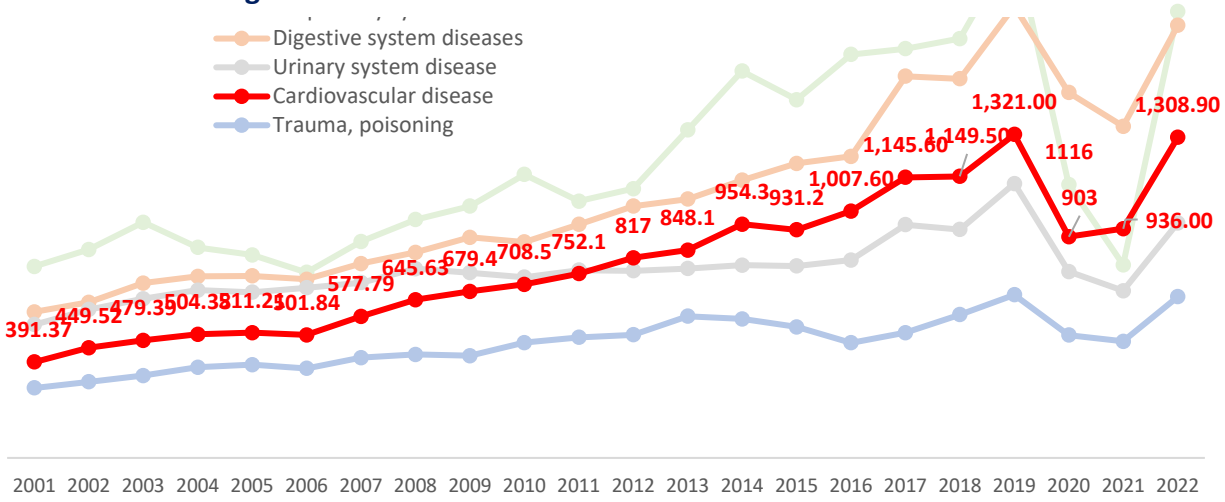
Telemedicine resulting positive change in case management in all provinces

- Telemedicine strategies improved management of CVD in the rural areas and the patients early diagnosed and referred to the Cardiovascular center for advanced diagnosis and interventional treatment is increasing over period

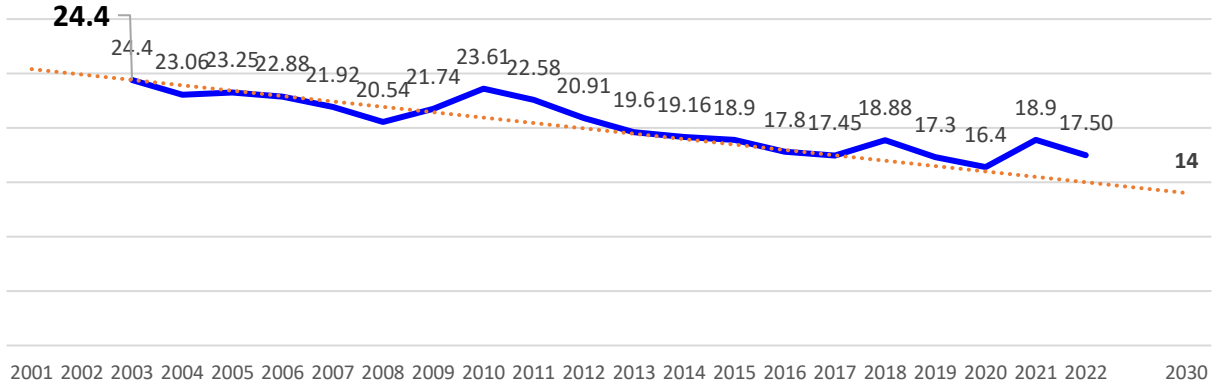


Cardiovascular morbidity and mortality, since 2001 in Mongolia

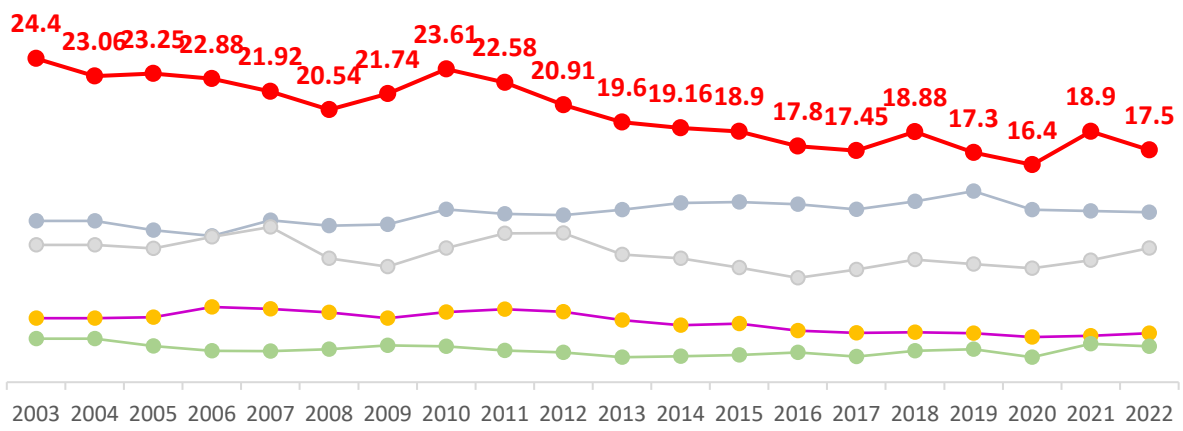
Five leading cause of morbidity, per 10,000 population, 2001-2022, Mongolia



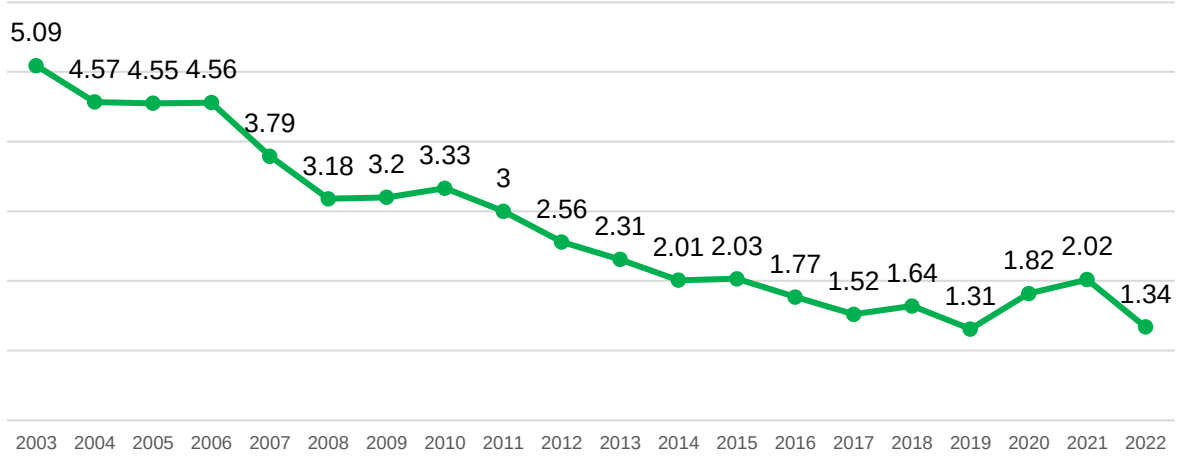
Cardiovascular mortality, per 10,000 population, 2001-2022, Mongolia



Five leading cause of morbidity, per 10,000 population, 2003-2022, Mongolia



Mortality percentage among patients with Cardiovascular disease, 2003-2022, Mongolia



Conclusion: positive elements

- **Store and forward type of telemedicine**: user-friendly, cost-efficient method for chronic disease management and secondary prevention, especially in contexts akin to Mongolia.
- **Reduce load of CV care**: enhances accessibility and affordability. Moreover, it streamlines patient experience and fosters patient-centered care by minimizing travel needs and expenses.
- **Alternatives to shortcut patient experience and patient centered care:** facilitating timely consultations between provincial healthcare providers and tertiary-level cardiologists, thereby enhancing care quality.
- **Supports clinical decision making in timely situations:** Telemedicine enabled Mongolian healthcare providers in provinces to consult with and receive guidance from tertiary level hospital cardiologists, enhancing the quality of care delivered.
- **Bridge for team building in cardiology sector:** it serves as a bridge for team building in cardiology, integrating seamlessly into daily routines and continuously adapting to meet evolving needs."

Conclusion: challenges

- **Telemedicine's Reach:** While telemedicine excels in managing electronic medical records (EMRs), establishing data archives, and monitoring chronic disease patients, it cannot address every gap in healthcare services comprehensively.
- **Personal Commitment:** The utilization of telemedicine, particularly doctor-to-doctor support, hinges on individual perspectives and workload considerations.
- **Teleconsultation Fees:** Legislation governing teleconsultation fees need transition to practical implementation, ensuring efficacy and delineating responsibilities effectively.
- **Data Security:** Maintaining the security of health data is paramount and requires ongoing vigilance and development in both user practices and system infrastructure.
- **Regulatory Framework:** Robust regulation is essential to support healthcare providers and internet service providers in delivering teleconsultation services effectively.
- **Limited Accessibility:** Despite its potential, telemedicine's reach remains constrained, particularly among vulnerable populations such as low-income and remote patients, highlighting the need for continued efforts to expand access and usability.

THANK YOU FOR YOUR KIND ATTENTION

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