WORLD BANK GROUP
Health, Nutrition & Population

Support to develop a health system strategy for priority disease areas in Latvia

Hospital Infrastructure, Equipment and Human Resource Mapping

WORLD BANK | 2016

Hospital Master Planning Goals

- Set planning targets to adjust needs in hospital infrastructure, equipment and staff against 'evidence-based' targets.
- Compare existing availability of hospital capacity with need and invest or disinvest accordingly.
- Identify enabling factors in the health system that need to change to facilitate the improvements in hospital capacity utilization → lead to improvements in performance.
- Introduce a phased implementation strategy allowing for further strengthening of the network and impact of demographic changes.

Outline

1. Master planning
2. Investment needs
3. Equipment planning
4. Human resources
5. Roadmap to implementation

Key Principles for Master Plan Development

- Timely access to hospital services for all;
- Safe, quality hospital services delivered according to international standards of care;
- Equitable distribution of resources between primary care and hospital services;
- Development of a sustainable financing framework that adjusts the services delivered to the resources available; and
- Creation of hospital centres of excellence delivering the highest level of care to the entire population

Moving from Bed/physician Centric to People Centred Model

Geographic Access
-Travel Time

Population Needs
-Demographic/Morbidity & Mortality

Volume Standards
-Evidence based

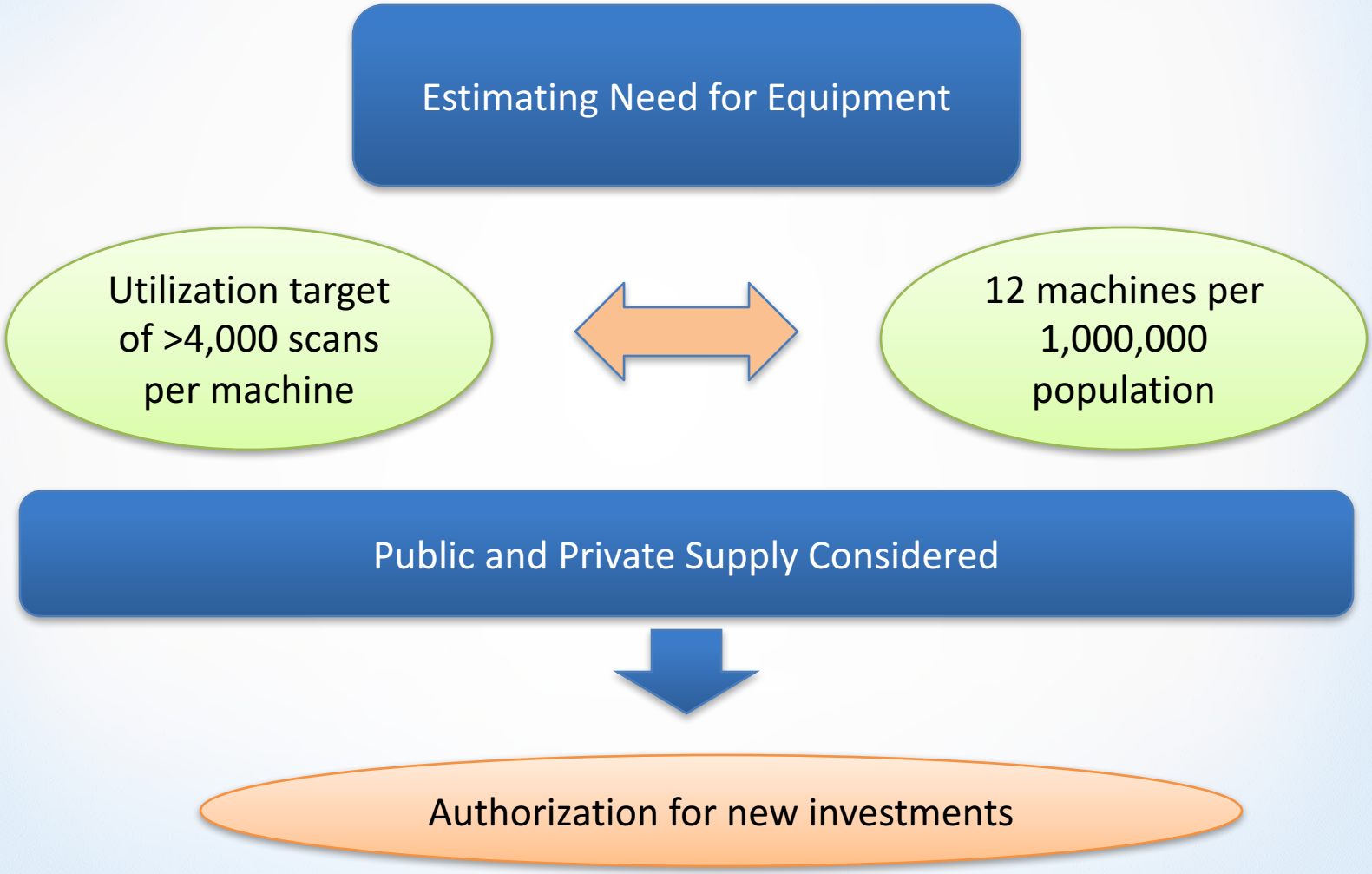
Effective Care
-New Technology
-Latvia & Int'l standards
Efficiency

Master Plan

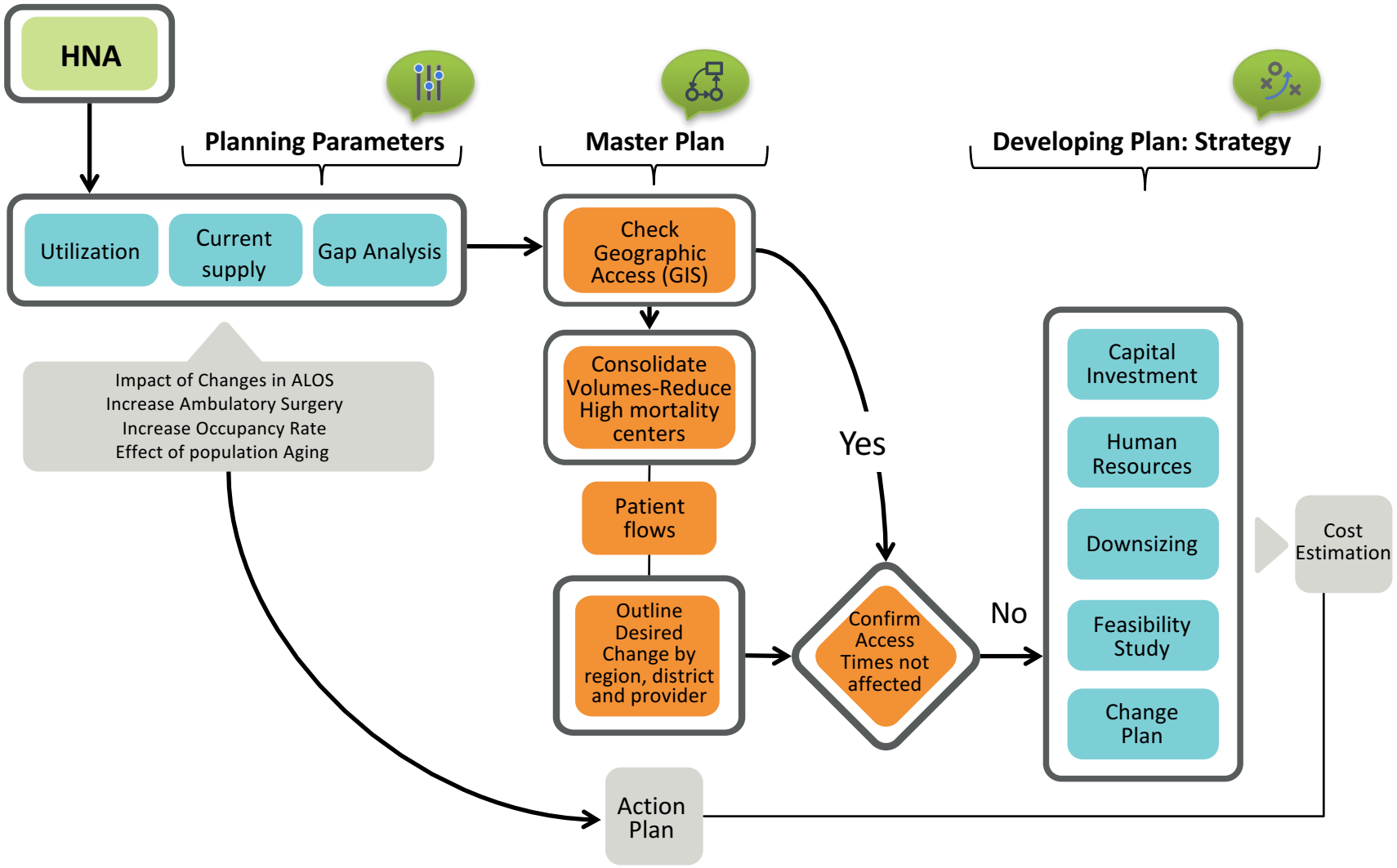
Future Infrastructure

Equipment & Technology Requirements, Delivery Strategy & Human Resources

The Mechanics of Estimating Supply



Integrated Approach of the Health Sector Reconfiguration Assignment



Sanigest Inpatient Volume Projection Methodology

Inpatient volumes are projected based on market size estimates (based on use rates and population) and by applying market share growth assumptions.

Project IP Discharge Volume: Market & Hospital

Base year Inpatient Volume (2014) ÷ Base Year Population (age/sex-stratified) ÷ 100,000 = Baseline Utilization Rate

Project IP Discharge Volume: Market & Hospital

Baseline Utilization Rate **X** Focused Utilization Rate Adjustments **X** Projected Population - 5 yrs - 10 yrs **=** Projected Inpatient Market Volume **X** Hospital Market Share **=** Projected Hospital Inpatient Volume

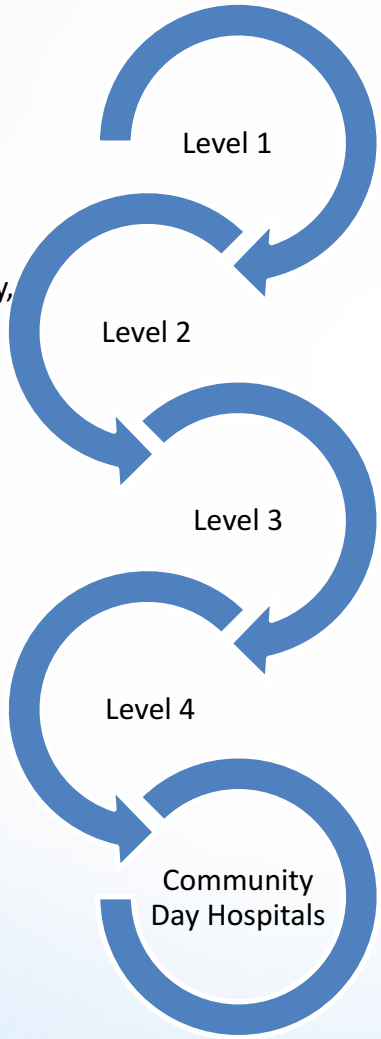
Incorporate changes in utilization due to ambulatory surgery, shift to less acute sites de-institutionalization LTC

Sensibility Analyses/Strategy Scenarios: Ability to model multiple future outcomes for planning purposes

Key Assumption & Variables

- Population/demographics
- Use rates – Science and Technology
- Medical staff mix changes
- Hospital market share (by service line)
- In/out migration (by services line)
- ALOS: Science and Technology / Performance Improvement

Defining levels of care



••Provide general surgery, paediatrics, OBGYN, and internal medicine

••Emergency services for adult and paediatric patients

••Clinical laboratory and radiology services

••Acute psychiatric inpatient services, physiotherapy, and intensive care

••Level 1 services + specialties such:cardiology, gastroenterology, infectious diseases, urology, nephrology (dialysis), neurology, neonatology, and a radiology

••First and second levels plus a unit for burn patients, endocrinology, surgical dermatology, pulmonology, ENT, cardiovascular surgery, maxillofacial surgery, paediatric surgery, chest surgery, reconstructive plastic surgery, neurosurgery, gastroenterology, pathology, radiation therapy, and angiography.

••Specialized institutions such as paediatrics, maternity, trauma hospitals, and university hospitals.

••This would be a facility for low complexity cases, which may or may not be a day hospital, where patients receive specific treatments that do not require hospitalization on an outpatient basis

Modelling considerations for OTHER SERVICES

Cardiovascular

- Demand is expected to increase 20%
- Master Plan recommends that five catherization labs are set up with two in Riga and three in regional hospitals
- Assumptions maintain that a minimum of 500 angioplasty procedures
- By optimising the inpatient cardiology care, the bed occupancy rate should be 80-85%.

Oncology

- Oncology patients has increased by roughly 40 percent
- Chemotherapy and radiotherapy can be delivered without extended hospitalization
- Day care areas should be created for an increasing volume of chemotherapy patients
- Proposed planning guidelines advocate that not less than 30 beds must be in the oncological departments with a target bed occupancy rate of 85%.

Traumatology and Orthopaedics

- Demand will increase due to the lack of trauma prevention
- In the period of the next 10 years, it is possible to decrease the average length of stay in a hospital up to 7-8 days
- The size of the traumatology and orthopaedic department in hospitals providing secondary and tertiary care could be 40-50 beds
- For the next 5-10 years the bed occupancy rate recommended is 85-90%

Modelling considerations for OTHER SERVICES

Surgery

- Is one of the main sources of potential savings in bed days
- The present master plan targets an increase in volume for surgery and a decrease in the length of stay
- Assumptions for the future state analysis are based on 85 percent occupancy, an increase to 40 percent of all surgeries on a day basis, and ward sizes between 30 and 50 beds depending on the facility level.

Neurology

- Is expected to require further strengthening
- Number of the beds will decrease to 515 per 100,000 population
- Number of the practicing neurologists would decrease to a standard of 11,000 people per neurologist
- The average length of stay for a neurological patient in the future could decrease to 11 days, with 30 beds the minimal size of the neurological department.

General Medicine

- Analysis of ambulatory care sensitive conditions (ACSC) shows that an estimated 14 percent of all hospitalizations are avoidable with the improvement of primary care and stricter admission criteria
- Hospitalization rate for general medicine cases should decrease by 10 percent over the next five years
- Average length of stay is set at 5 days and the occupancy rate target for general medicine is 85 percent.

Master plan recommendation for specialized services

Highly Specialized Care (increase Centralization)

Make Services Accessible (decentralization)

Master Plan Recommendation
• Consolidate cardio-thoracic surgery into 2 sites, Pauls Stradins and East Riga Clinical • Consolidate into larger facilities those hospitals with fewer than 500 births • Increase consolidation of long term psychiatric beds • Increase consolidation of trauma and orthopaedic beds
• Place Angiography units in Liepaja Regional Hospital, Daugavpils Regional Hospital, Eastern Clinical University Hospital of Riga and Jekabpils Regional Hospital • LINAC in Liepaja Regional Hospital, Daugavpils Regional Hospital, Eastern Clinical University Hospital of Riga, Jekabpils Regional Hospital and Jelgava City Hospital. • Expand access to hemodialysis services • Expanded access to day care beds and long term beds through the conversion of smaller hospitals into non-acute facilities. • Increasing community based mental health and substance abuse brings these services into smaller population units.

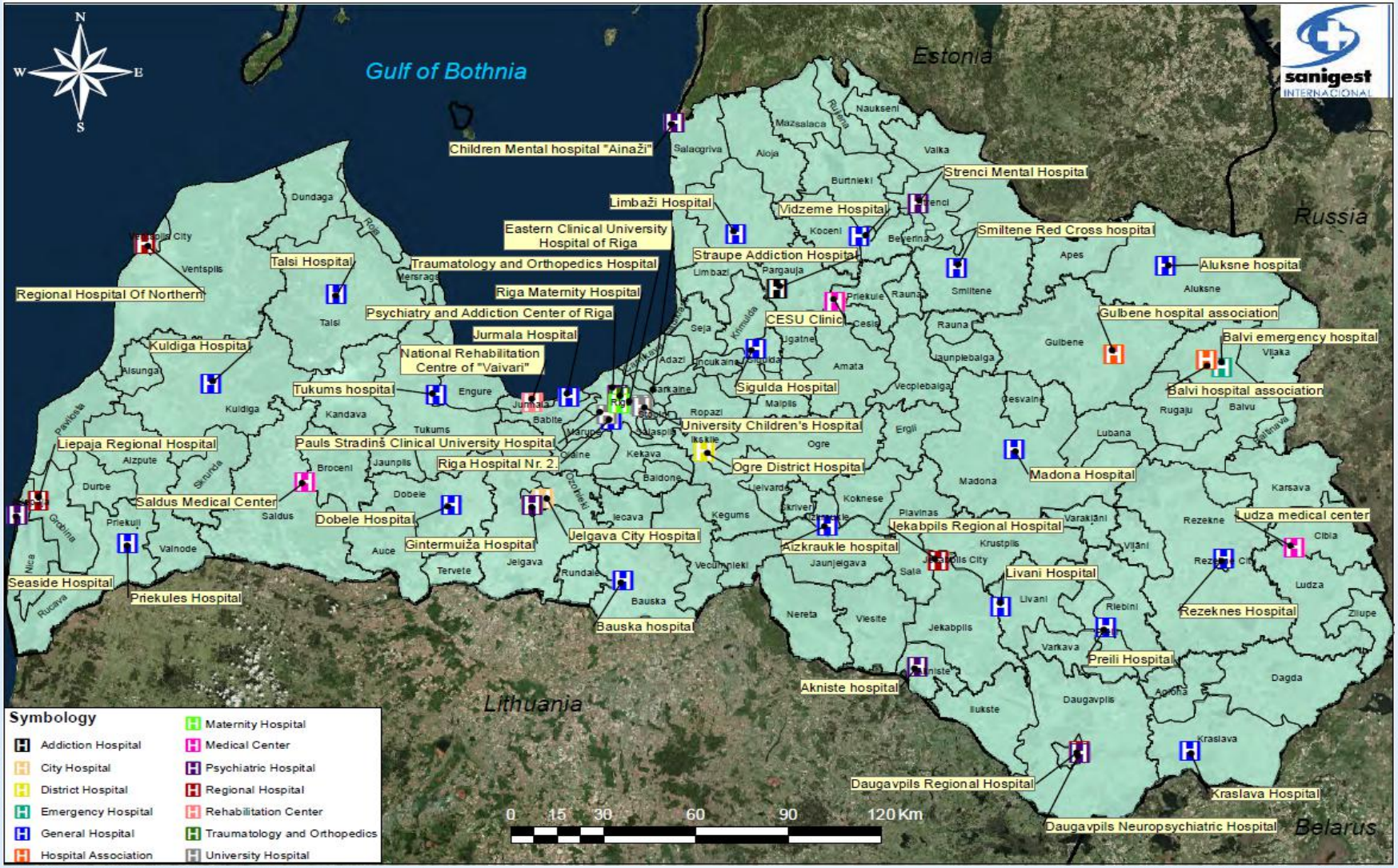
Key Motivating Conditions

Due to this misallocation of resources, many patients need to travel long distances to access larger and better equipped centers outside their own regions.

Establish standards based on assumptions of productivity and quality for medical providers: volume + quality

Economy of scale in facilities and more appropriate distribution of services: many of the facilities with fewer than 50 beds

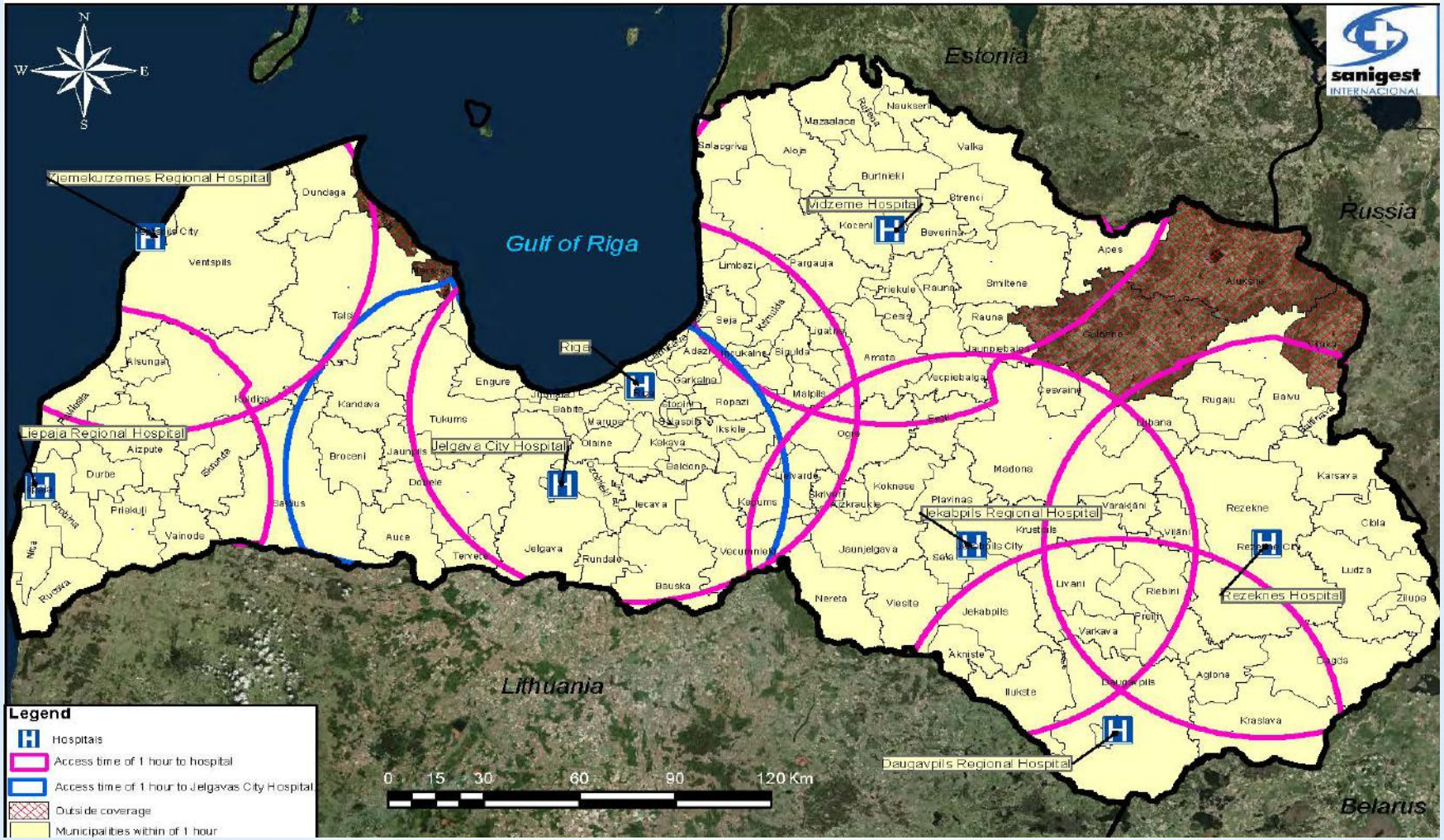
Current distribution of contracted facilities



Setting access time standards by profile

Level of Care	Access Standard
Community Day Hospital	< 30 minutes
Level 1 Hospital (Locality or Municipality)	< 30 minutes
Level 2 Hospital (Regional- Municipality)	less than 1 hour
Level 3 Hospital (Regional)	90 minutes
Level 4 Hospital (National Centre of Excellence)	less than 3 hours

Mapping Access Times to Improve Equity



Future facility network configuration

- Driven to support the National Development Plan

Scenario 1

- Optimal allocation based on best practice planning guidelines

Scenario 2

Scenario 1: Hospitals by level

Level 4

-University Children's Hospital

-Riga Maternity Hospital

-Traumatology and Orthopaedics Hospital

-Riga East Clinical University Hospital

-Pauls Stradiņš Clinical University Hospital

Level 3

-Daugavpils Regional Hospital

-Liepaja Regional Hospital

-Jēkabpils Regional Central Hospital

-Rēzeknes Hospital

-Vidzeme Hospital (Valmiera and Valka)

Level 2

-Madona Hospital

-Balvi and Gulbene Hospital Association

-Jelgavas City Hospital

-Hospital Jurmala

-Ziemeļkurzemes Regional Hospital/ Ventsipils - Northern Regional Hospital (Tilsa)

Level 1

-Cēsu Clinic

-Ogre District Hospital

-Dobele Hospital

-Riga 2nd Hospital

-Tukums Hospital

-Aizkraukle Hospital

-Alūksne Hospital

-Bauska hospital

-Krāslava Hospital

-Kuldīga Hospital

-Līvāni Hospital

-Ludza Medical Center

-Preiļi Hospital

-Saldus Medical Center

-Sigulda Hospital

-Smiltene Red Cross Hospital

-Limbaži Hospital

-Prielukes Hospital

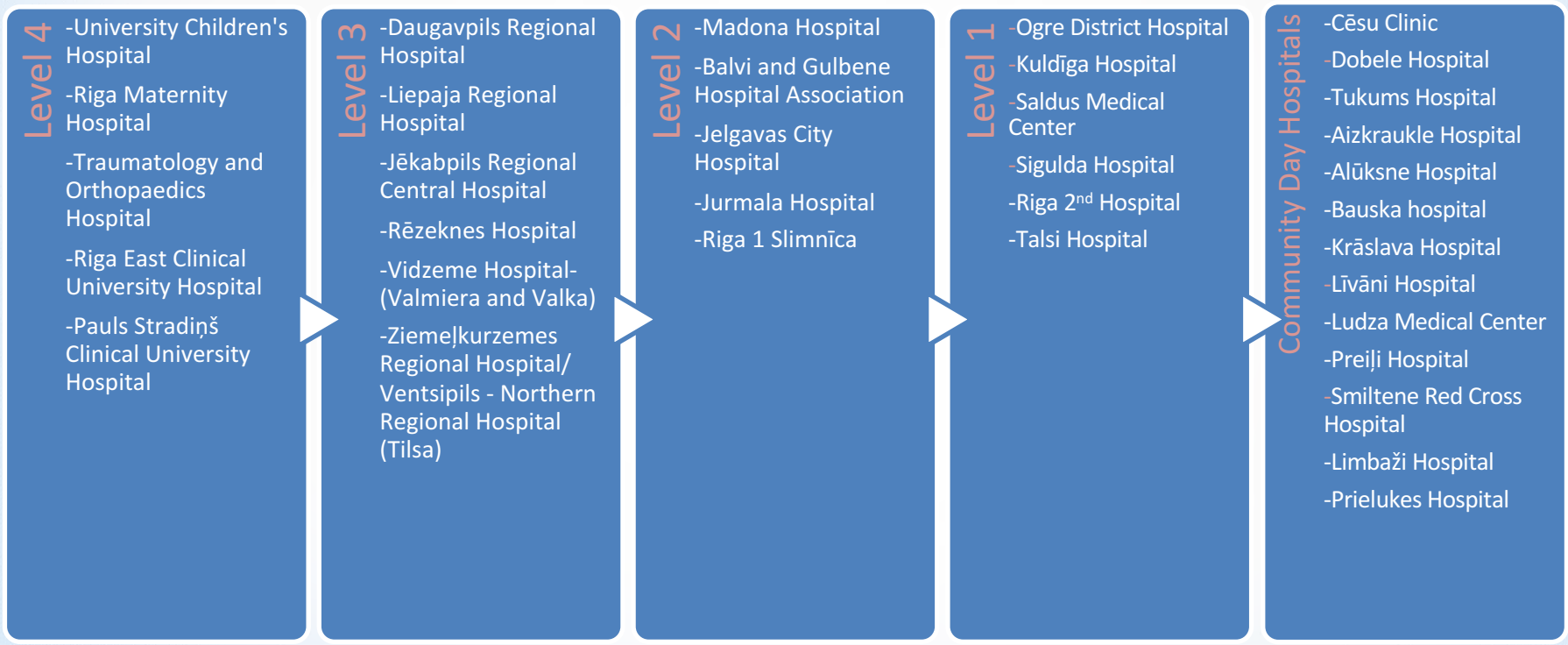
Bed needs under scenario 1 (2025)

Additional **822** beds in the network that are not strictly necessary.

Health Functions	Current Beds	Bed need	Surplus/Deficit
	2014 (Contracted)	2025	2025
Medical Specialties	2,258	2,411	-153
Paediatric	853	1,080	-227
Obstetrics and Gynaecology	514	440	74
Surgical Specialties	2,523	1,815	708
Pathology and Radiology	499		
Mental health and Disabilities		79	-79
Long Term care	3,406	2,650	756
Total	10,053	8,475	1,578
Acute Care Only	6,647	5,825	822

Scenario 2: Hospitals by level

Additional strengthening of the Center of Excellence concept and and development Community Day Hospital as base component network

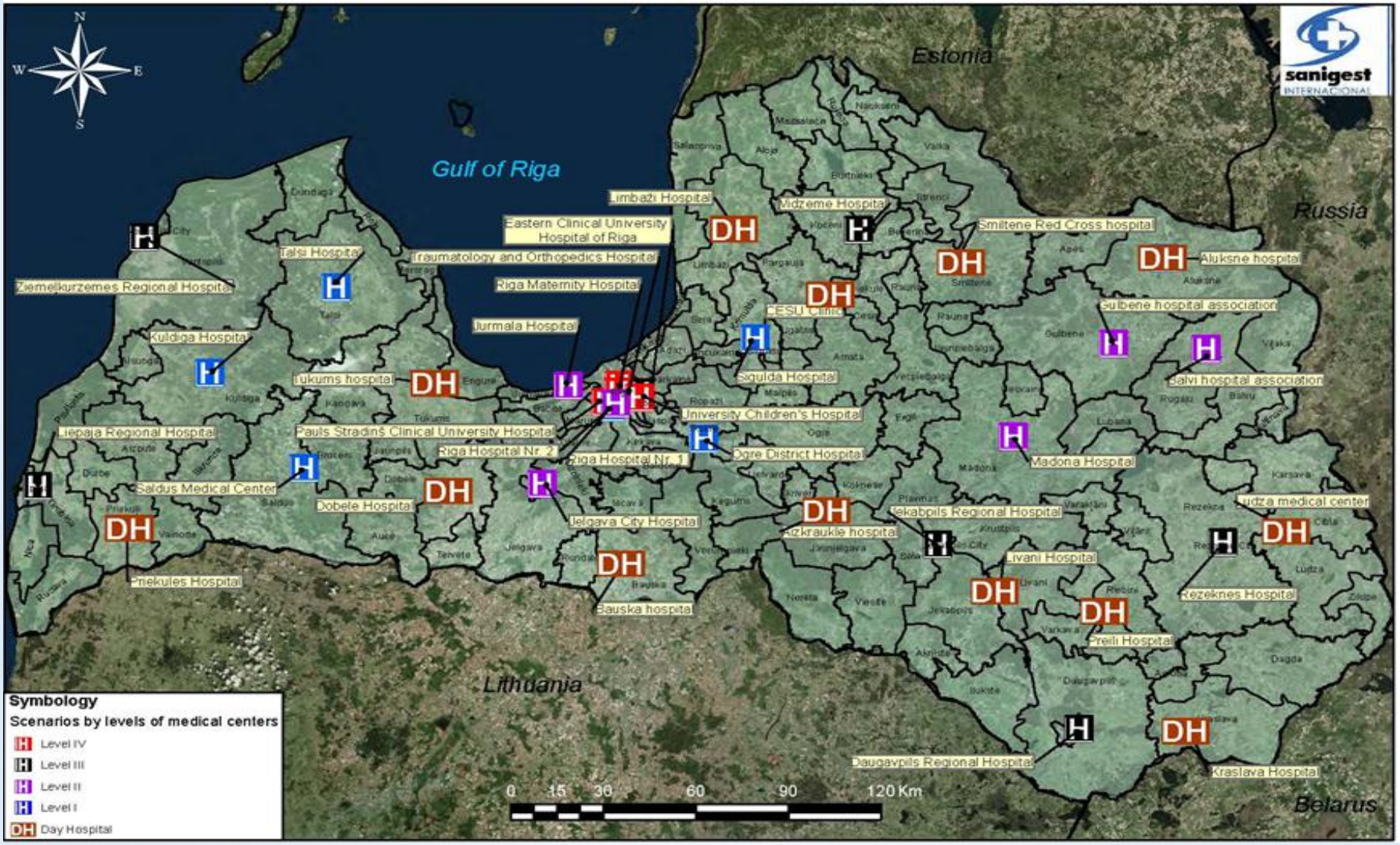


Bed needs under scenario 2 (2025)

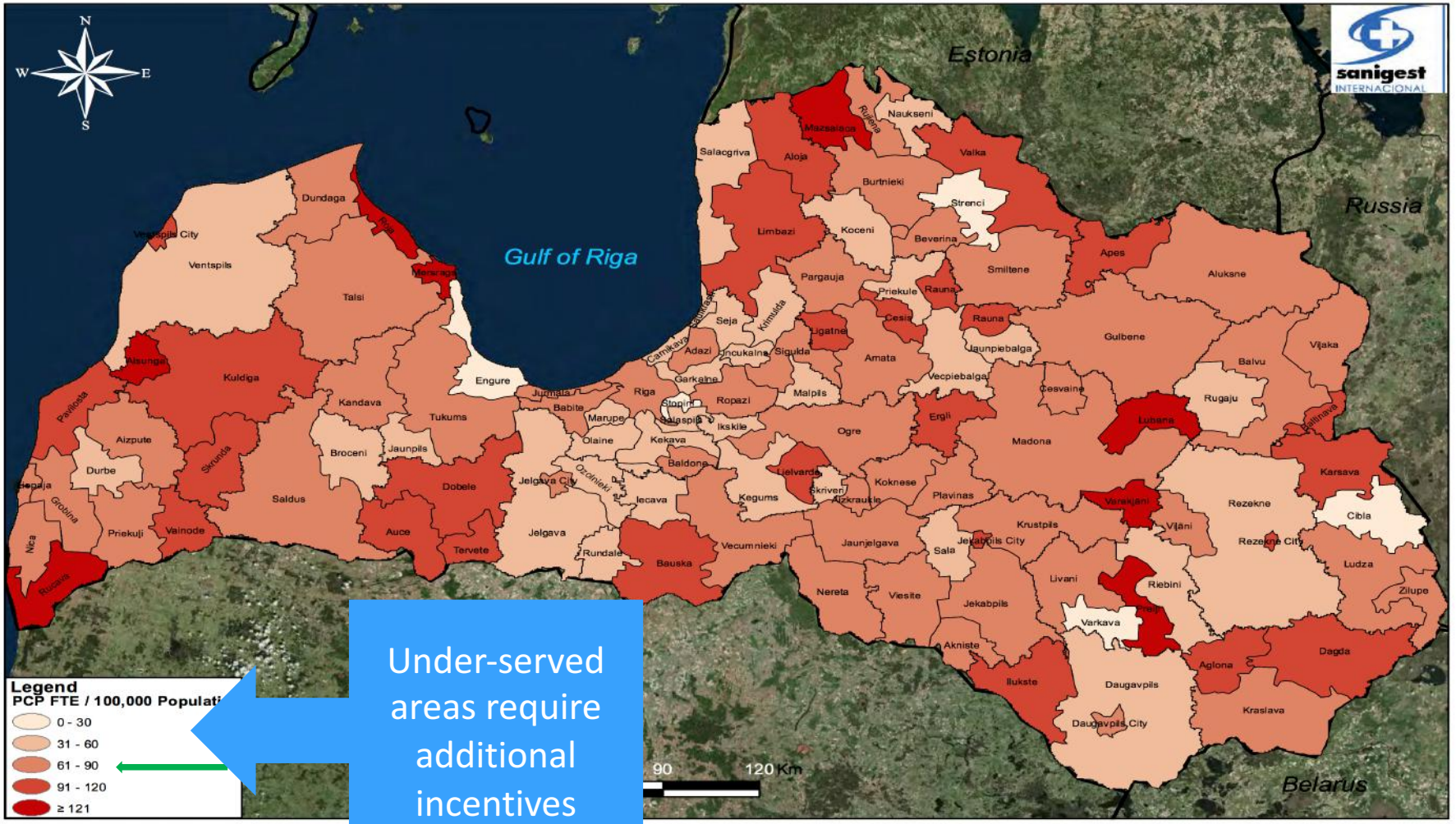
Specialties	Current Beds	Bed need	Surplus/Deficit
	2014 (Contracted)	2025	2025
Medical Specialties	2,258	2,169	89
Paediatric	853	848	5
Obstetrics and Gynaecology	514	473	41
Surgical Specialties	2,523	1,561	9562
Pathology and Radiology	499		
Mental health and Disabilities		79	-79
Long Term care	3,406	2,650	756
Total	10,053	7,780	2,273
Acute Care Only	6,647	5,130	1,517

Target: 5,000 acute beds and 3,000 long term beds for 2025

Facility distribution under scenario 2



Primary Care Network Needs Strengthening



Defining the PHC Structure

Outpatient Specialist Care

Ambulatory Surgery Centers

Urban PHC Centers

Group GP Practices

Individual GP Led Teams

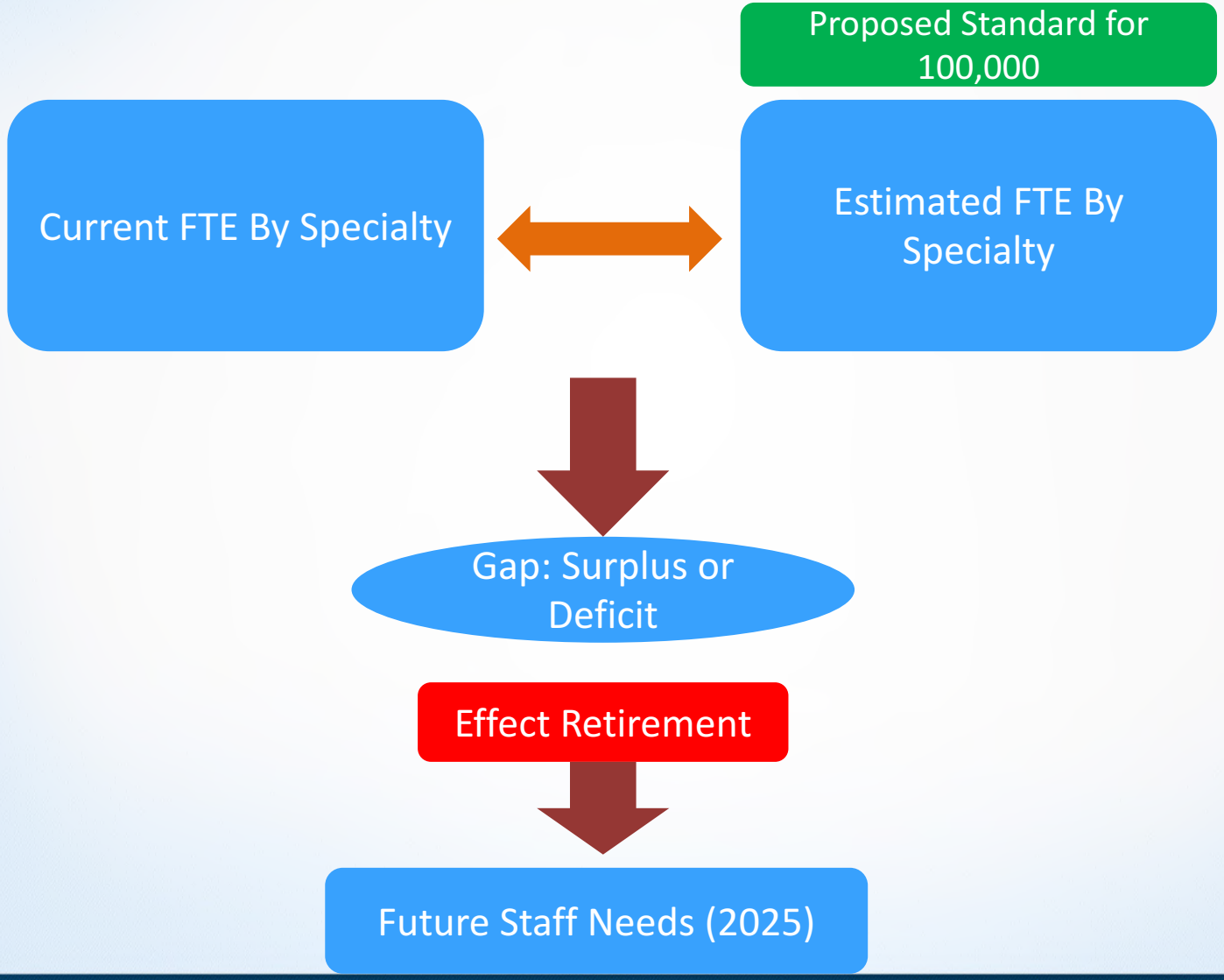
Mobile and Outreach Services

Primary Care Network Organization

Hospital Care


Human resources

Human Resource Mapping



From Need to Supply…

Calculations	Surgery
Population base	100,000
Surgeries per year	5,000
Work days per year	230
Surgeries per day (low)	1
Surgeries per day (high)	2
Surgeries per year (low)	230
Surgeries per year (high)	460
Surgeons (current)	69
Surgeons required (low)	21.74
Surgeons required (high)	10.87

HR Planning:

- Assumes standard productivity
- Seeks equitable distribution
- Accounts for aging workforce
- Allows for adjustment in incentives
- Adjust future inflow medical education

+ Other activity

Standard = 30 surgeons per 100k

Human Resource Mapping

application of standards yields a national level surplus for medical specialties, with some exceptions in areas like Accident & Emergency, Nuclear Medicine, and Occupational Medicine.

Medical Staff per specialty	FTE	Proposed FTE	Proposed FTE	Proposed Deficit-Surplus	
	Current	2020	2025	2020	2025
Medical Specialties	**4025.0**	**2973.7**	**2866.1**	**1051.3**	**1158.9**
Accident and Emergency	138.1	190.9	184.0	-52.7	-45.8
Critical Care (including Anaesthesia)	449.7	292.0	281.5	157.7	168.2
Cardiology	244.7	84.0	80.9	160.7	163.8
Dermatology	197.8	36.3	35.0	161.5	162.8
Endocrinology/ Diabetes Mellitus	83.7	28.6	27.6	55.0	56.1
Gastroenterology	95.5	49.6	47.8	45.8	47.6
General Medicine (GP)	1539.0	1145.2	1103.8	393.8	435.3
Geriatric Medicine		22.9	22.1	-22.9	-22.1
Infectious Diseases	54.8	57.3	55.2	-2.4	-0.3
Internist	486.4	477.2	459.9	9.2	26.5
Medical Oncology	82.2	38.2	36.8	44.1	45.4
Neurology	322.3	133.6	128.8	188.7	193.5
Nuclear Medicine		19.1	18.4	-19.1	-18.4
Occupational Medicine	148.5	248.1	239.1	-99.7	-90.7
Pneumonology	115.5	114.5	110.4	1.0	5.1
Renal Medicine	44.0	21.0	20.2	23.0	23.8
Rheumatology	22.8	15.3	14.7	7.5	8.0

Productivity Matters…

Physician Classification	Number Visits	Visits per specialist	Per Day
Family Doctor	4,516,033	3,265	14.20
OBGYN	557,078	1,232	5.36
Ophtalmologist	371,456	1,587	6.90
Surgeon	249,867	796	3.46
Psychiatrist	218,007	793	3.45
Trauma/Ortho	210,782	1,158	5.04
Otolaryngologist	201,536	1,260	5.48
Pediatrician	252,880	803	3.49
Neurologist	211,652	814	3.54
Endocrinologist	153,333	1,870	8.13
Dermatologist	134,566	852	3.70
Cardiologist	176,563	761	3.31
Pediatric Surgeon	80,126	1,571	6.83
Rehabilitation	3,655	203	0.88
Oncologist	64,461	750	3.26
Nephrologist	35,767	852	3.70
Cardio thoracic /heart surgeon	886	63	0.28
Neurosurgeon	9,849	201	0.87
pediatric cardiologist	9,081	1,009	4.39
urologist	6,272	98	0.43

PERCENTAGE OF SPECIALIST OVER RETIREMENT AGE

The needs for each specialty were previously identified based on project service levels and population projections and these values are now compared to the estimated workforce after retirement using the analysis of the share of each specialty that are facing retirement in 2025

	2016 FTE	Mean Age 2016	% ≥62 in 2020	% ≥65 in 2025
Obstetrics & Gynaecology	572.0	53.1	35.4%	44.9%
Medical Oncology	79.7	55.9	36.0%	56.6%
Cardiology	237.2	51.6	30.9%	41.9%
Cardiothoracic Surgery	13.7	51.0	20.1%	32.0%
Mental Health:				
Child/Adolescent Psych	19.8	52.5	42.1%	49.4%
Forensic Psychiatry	13.6	61.5	59.5%	68.7%
General Psychiatry	283.3	54.8	44.3%	53.0%
Psychotherapy	45.7	50.9	12.0%	23.0%

CURRENT STAFF LEVEL and NEED: ESTIMATED 2025

Re-estimation of 2025 availability AFTER RETIREMENT shows the potential challenge to addressing the aging workforce. Future production should fill this gap.

Minus Retirees

	2016 FTE	2025 Need	2025 Estimated	2025 Gap
Obstetrics & Gynaecology	572.0	367.9	315.2	(53)
Medical Oncology	79.7	36.8	34.6	(2)
Cardiology	237.2	80.9	137.7	57
Cardiothoracic Surgery	13.7	18.4	9.3	(9)
Mental Health:		0.0		-
Child/Adolescent Psych	19.8	32.8	10.0	(23)
Forensic Psychiatry	13.6	28.9	4.3	(25)
General Psychiatry	283.3	210.1	133.1	(77)
Psychotherapy	45.7	40.5	35.2	(5)

+ Future Production

+ Net

CURRENT STAFF LEVEL and NEED: ESTIMATED 2025

With retirement at the regional level for 2025…

Specialist Category	Riga	Periga	Vidzeme	Kurzeme	Zemgale	Latgale
Obstetrics & Gynae	15	(25)	(6)	(8)	(15)	(13)
Medical Oncology	10	(4)	(1)	(2)	(2)	(1)
Cardiology	62	(5)	(3)	(1)	1	2
Cardiothoracic Surg	1	(3)	(1)	(2)	(2)	(2)
Mental Health:						
Child/Adol Psych	(11)	(3)	(2)	(3)	(2)	(2)
Forensic Psychiatry	(13)	(5)	(2)	(3)	(1)	(0)
General Psychiatry	(26)	(26)	(7)	(10)	(1)	(7)
Psychotherapy	8	(6)	(2)	(1)	(1)	(4)

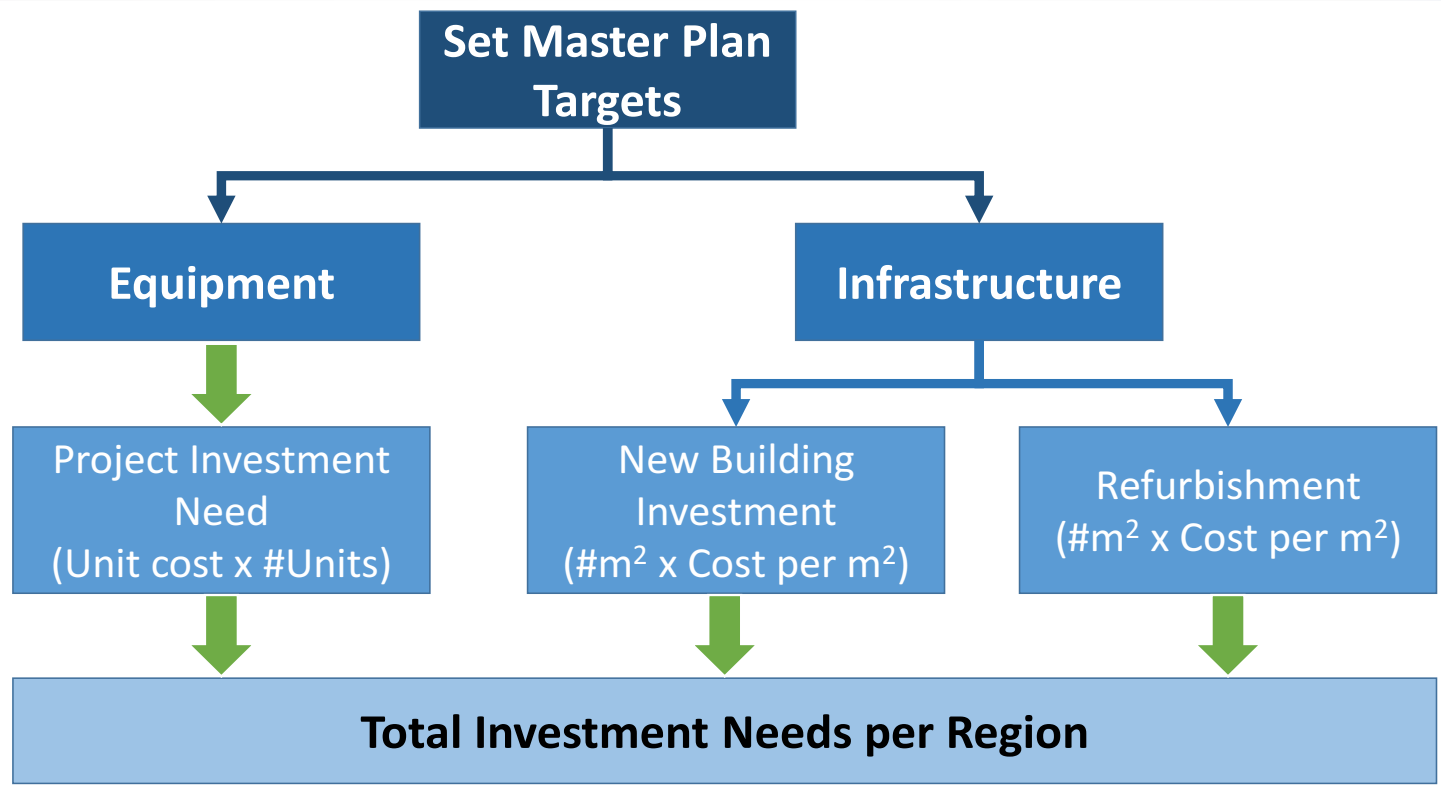
Optimal inpatient nurse staffing

Hospital Unit	Nurse to Occupied Bed Ratios	Total nurses needed	Riga	Kurzeme	Latgale	Zemgale	Vidzeme	Pieriga
Emergency Departments	1 to 4	422	151	51	67	52	64	37
General Medical Surgical floor	1 to 4	1,068	660	119	140	80	31	39
ICU/CCU	1 to 2	85	54	11	2	8	5	6
Labour and delivery	1 to 2	196	64	24	38	26	19	24
Neonatal ICU (RN's Only)	1 to 2	29	11	2	8	4	3	-
Pediatrics	1 to 4	473	177	37	70	41	38	111
Specialty Care (Dialysis & Oncology)	1 to 4	393	216	40	69	24	23	21
Telemetry Unit	1 to 4	288	33	32	40	43	19	121
Behavioural Health and Psych Units	1 to 6	1,378	334	96	254	454	216	25
Long-term care	1 to 8	641	189	21	42	23	43	323
TOTAL		4,973						

Investment needs

Calculating Hospital Investment Needs

1. Estimate the changes required: Master Plan Target vs. Current Level for infrastructure and Equipment by region/facility
2. Estimate total investment needs in m2 or units equipment
3. Monetize the investment by using unit cost estimates



Total investment needs

Investment Category	Total Cost (in € million) (scenario 1)	Total Cost (in € million) (scenario 2)
Hospital Refurbishment	€ 211	€ 174
FF&E	€ 53	€ 44
MME Equipment	€ 30	€ 30
2nd Priority Equipment	€ 34	€ 34
Other Medical Equipment	€ 9	€ 9
Total	**€ 336**	**€ 290**

Infrastructure costs

Investment Category	Scenario 1 (million €)	Scenario 2 (million €)
NDC and RDC Refurbishing	€ 211	€ 174
Day Hospital Refurbishing		€ 23
Furnishing	€ 53	€ 49
New building cost	€ 61	€ 53
Total Infrastructure Cost	**€ 325**	**€ 299**

Equipment costs

High priority	Secondary priority	Other equipment
• Angiography (digital) • CT Scanners • Gamma Camera • Haemodialysis Units • Linear Accelerators • Lithotripter • Mammography Units, and • MRI Machines • PET Scanner	• Angiography (Ophthalmology) • Echograph (general purpose) • Echograph (Mammography) • Surgical Laser • Plasma Sterilizer • X-Ray Hemodynamic Unit • X-Ray Unit • Mobile X-Ray Unit, Image Intense	• Anesthesia • Arthroscopy • Laboratory • Defibrilator • Dental Unit • Echograph • EKG • EEG • Endoscope • Incubators • Laparoscopy eq • Tonometer • Ventilator • Fluoroscopy

First priority equipment gap

Region	Hospital	Angiography (digital)	Gamma Camera	Haemodialysis Units	LINAC	Lithotripter	Mammography Unit	MRI
Kurzeme	Liepaja Regional Hospital	2	2		1	2		
	Regional Hospital Of Northern					1		
Latgale	Daugavpils Regional Hospital	2	2		1	2		
	Rezeknes Hospital					1		
Riga	Eastern Clinical University Hospital of Riga	2	2		2	2	2	
	Pauls Stradinš Clinical University Hospital					2	1	
	University Children Hospital							
Vidzeme	Madona Hospital							
	Vidzeme Hospital					2		1
Zemgale	Dobele Hospital			2				
	Jekabpils City Hospital	1	2	5	2	1		1
	Jelgava City Hospital			4		1		1
	TOTAL	**7**	**8**	**11**	**5**	**14**	**3**	**3**

Equipment costs

Region	Major Medical Equipment (MME)	2nd Priority	Other Equipment	Total Equipment Cost
Kurzeme	€ 6	€ 8	€ 2	€ 15
Latgale	€ 6	€ 8	€ 2	€ 15
Riga	€ 7	€ 12	€ 1	€ 20
Vidzeme	€ 2	€ 3	€ 1	€ 6
Zemgale	€ 9	€ 4	€ 3	€ 16
Total	**€ 30**	**€ 34**	**€ 9**	**€ 72**

2016 constant €

Peer Review Feedback and Changes

Stakeholders who provided comments on the report

- Alūksne Hospital
- CDPC
- European Commission
- Latvian Association of Family Doctors
- Latvian Hospital Association
- Ministry of Finance
- Ministry of Health
- Ministry of Welfare
- National Health Service
- Pauls Stradiņš Clinical University Hospital
- Riga Hospital No. 1 and Riga Maternity Hospital
- Riga Hospital No.2
- Riga Stradiņš University and Latvian Health Economy Association
- State Emergency Medical Service
- Vaivari Rehabilitation Center
- Ziemeļkurzeme Regional Hospital

Categories that received the most comments

- Scope of facilities covered by the report
- Population and demand projections
- The level of care offered by Riga 2nd Hospital
- Estimation of human resource needs
- Correspondence with CPDC and NHS data
- Equipment availability
- PHC network distribution
- Relation of mental healthcare with PHC

Most important changes in response to stakeholder review

- Change of Riga 2nd Hospital from LTC facility to Level I Hospital in order to require fewer umber of new beds at other Level 4 facilities.
- Change of Northern Regional Hospital from a Level II to a Level III Hospitals to increase geographical access to Level III hospitals.
- Riga 1st Hospital was included in the analysis as a Level II.
- Additional information on the current and proposed EMS network and resource needs was added to the chapter on EMS.
- The data on equipment was reviewed for several hospitals, which resulted in slightly modified equipment costs.

Most important changes in response to stakeholder review

- The text clarifies further why Riga is not considered for the first phase of development of Urban PHC Centers and Ambulatory Surgical Centers due to its higher relative development compared to the other regions.

- Additional explanation on the strengthening of PCP work with mental health care, where specialized psychiatric care for complex cases is recommended in polyclinics and through GP referral.

- Mortality rate for Riga 2nd Hospital was modified and the corresponding ranking.

- Overall corrections due to typos, numbering, references, etc.

- A different methodology was utilized for estimations of human resources, producing an estimation of FTE across the regions by specialty (which assumed the maximum FTE that any one provider could represent is 1.5, with their primary specialty and location valued at 1.0 FTE and other allocated evenly across the remaining 0.5 FTE)

Roadmap to implementation

Need for a supportive policy environment

- Link to key reform agendas:
  - ✓ Continue to improve capacity of PHC and create incentives for expanding access
  - ✓ Clinical guidelines and clinical pathways development linked to
    - evidence
    - provider payment mechanism
    - benefits package
  - ✓ Provider payment reform
  - ✓ Introduce Strategic Purchasing in key areas

- Other complementary reforms
  - ✓ Strategy for reallocating and retaining health care personnel in the regions
  - ✓ Improve patient transport and patient communication mechanisms e.g. telehealth
  - ✓ Training both providers and patients on the network reconfiguration.
  - ✓ Changes in the benefits package reflected by evidence-based guidelines and pathways.

Road map to implementation

1. **Setting detailed plans**
   - Obtain data at facility-level on
     - ✓ workforce, its skill mix, and working hours and
     - ✓ Detailed investment need @ facilities.
2. **Phase implementation approach – University/Regional + PHC and then local hospitals**
3. **Consulting stakeholders**
   - Two very influential groups deserve additional attention:
     - ✓ Clinical leaders in the main disease groups
     - ✓ Local politicians representing the municipalities to be affected by proposed hospital downgrades.

Thank you

Comments and Questions:

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