



# The State of Integration of Care in Estonia

## Delivering Care in the Appropriate Setting

World Bank Group





# Research Questions

Integration  
of care

What is the most appropriate care setting for the delivery of services?

How to ensure the coordination and continuity of care across care settings?



# Research Questions

Integration  
of care

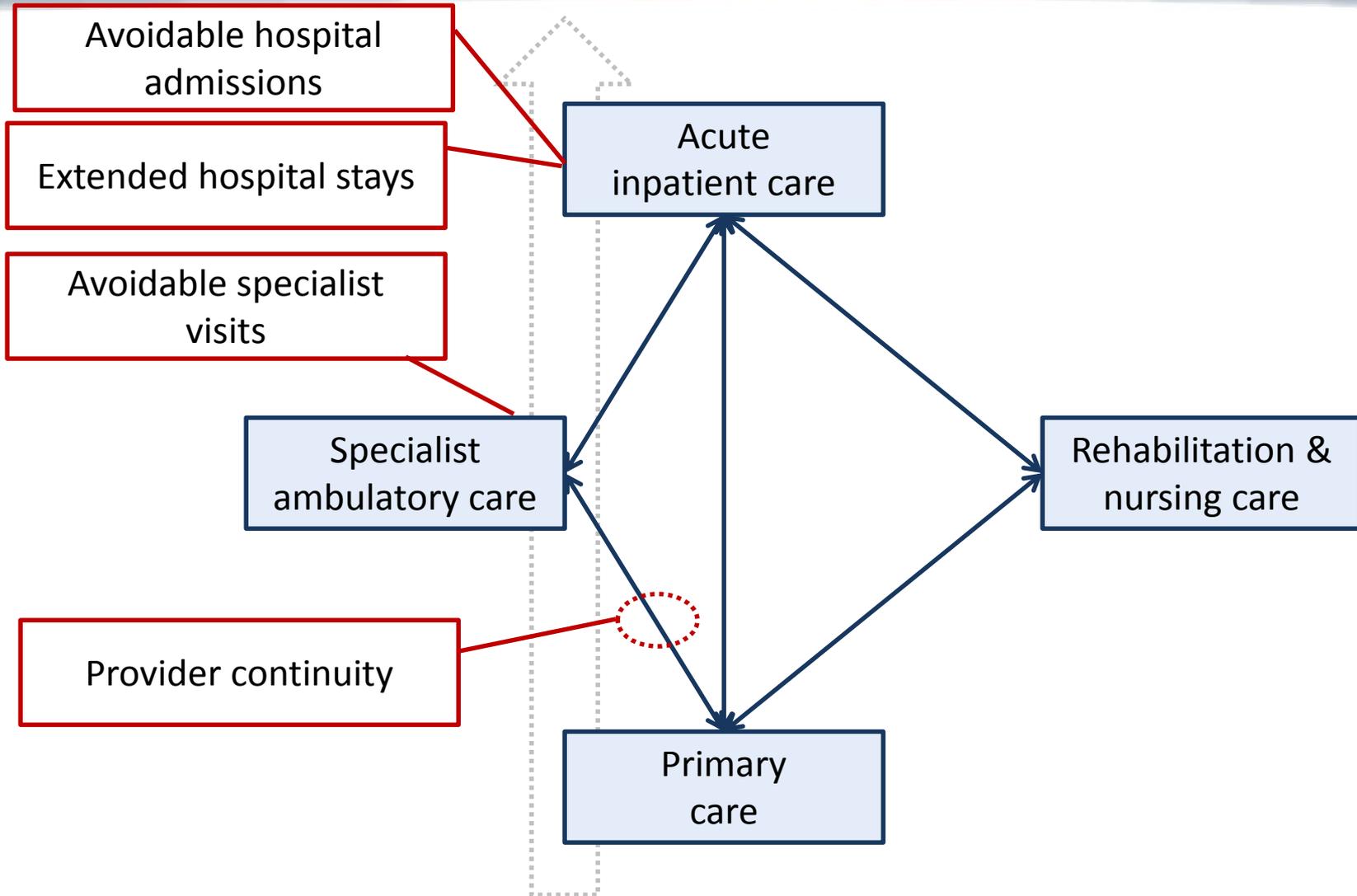
What is the most appropriate care setting for the delivery of services?

- Hospital / specialist care that is avoidable
- Hospital / specialist care that can be shifted into more appropriate care settings?
- Provider continuity

How to ensure the coordination and continuity of care across care settings?



# What is the most appropriate care setting for the delivery of services?





## Outline

### Key performance indicators

- **Avoidable hospital admissions**
- Extended hospital stays
- Avoidable ambulatory specialist visits
- Provider continuity



# Avoidable Hospital Admissions

**Approach:** OECD Avoidable Hospital Admissions protocols

**Principles:** Avoidable hospital admission rates are for certain ambulatory care-sensitive conditions (ICD 10). Admissions are not justified unless not directly related procedures are required (NOMESCO).

**Tracer conditions:**

- Asthma & Chronic Obstructive Pulmonary Disease
- Diabetes
- Congestive Heart Failure & Hypertension

**Construction of the indicator:**

- Avoidable hospital admissions (including age restrictions) as a share of all admissions for a certain disease group (e.g., avoidable asthma admissions as a share of respiratory disease admissions).
- Age- and sex-standardized per 100,000 population rates.
- Referrals are not counted. Patients dying during the hospital stay are not counted.



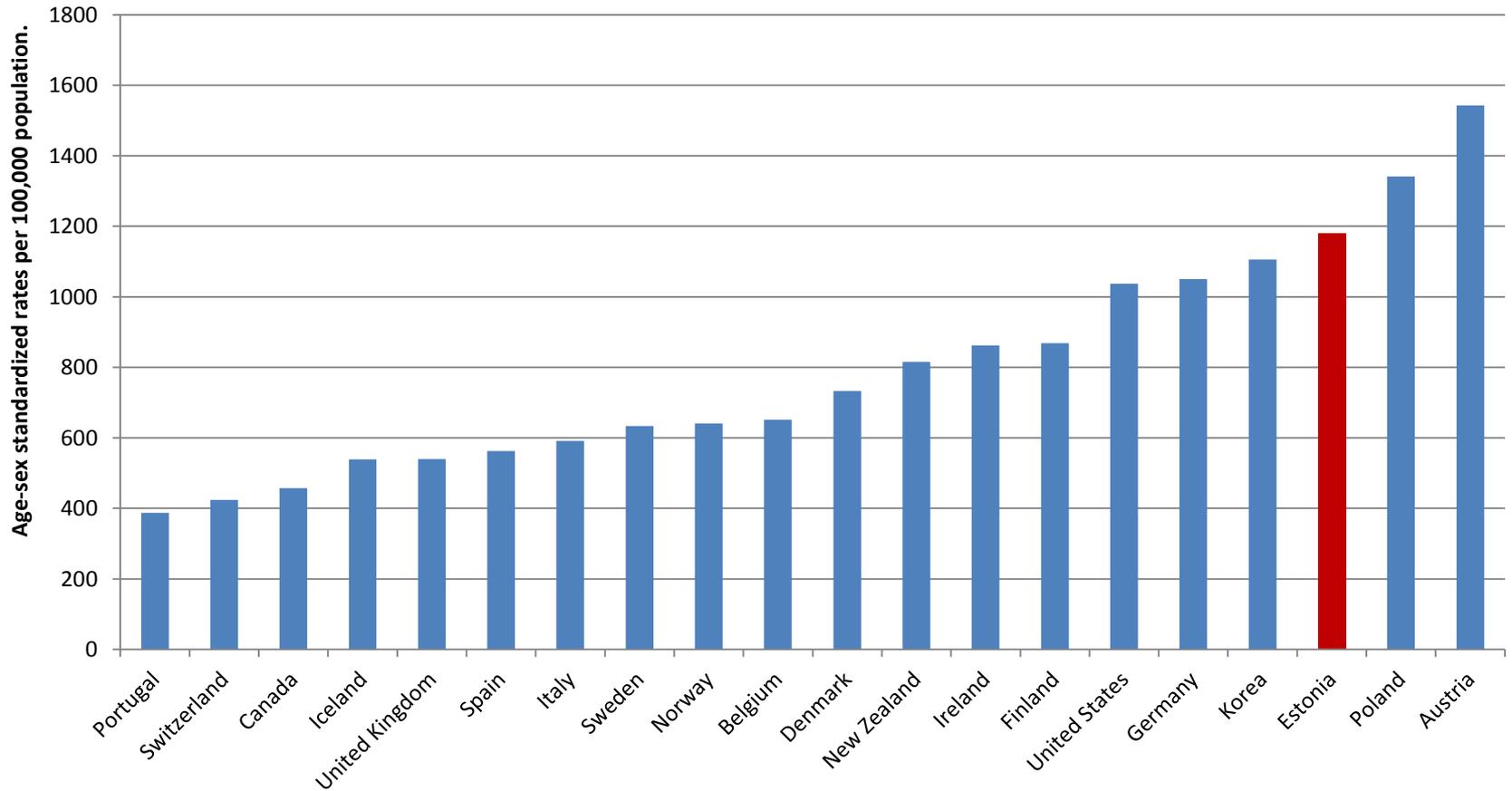
## Avoidable admissions as a share of hospital admissions (2013)

Disease group	Number of admissions	% of avoidable admissions
<b>Avoidable COPD &amp; asthma admissions as a share of:</b>		
Lower Chronic Respiratory Disease admissions	2,935	76.9%
Respiratory disease admissions	25,836	8.7%
<b>Avoidable Diabetes admissions as a share of:</b>		
Diabetes Mellitus admissions	3,013	83.0%
Endocrine, nutritional and metabolic disease admissions	5,356	46.7%
<b>Avoidable CHF &amp; Hypertension admissions as a share of:</b>		
Hypertension & other forms of heart disease admissions	10,431	84.3%
Circulatory disease admissions	39,338	22.35%



# Avoidable admissions as age-sex standardized population rates – Tracers in 2008

## Avoidable Hospital Admission Rates (2008)\*

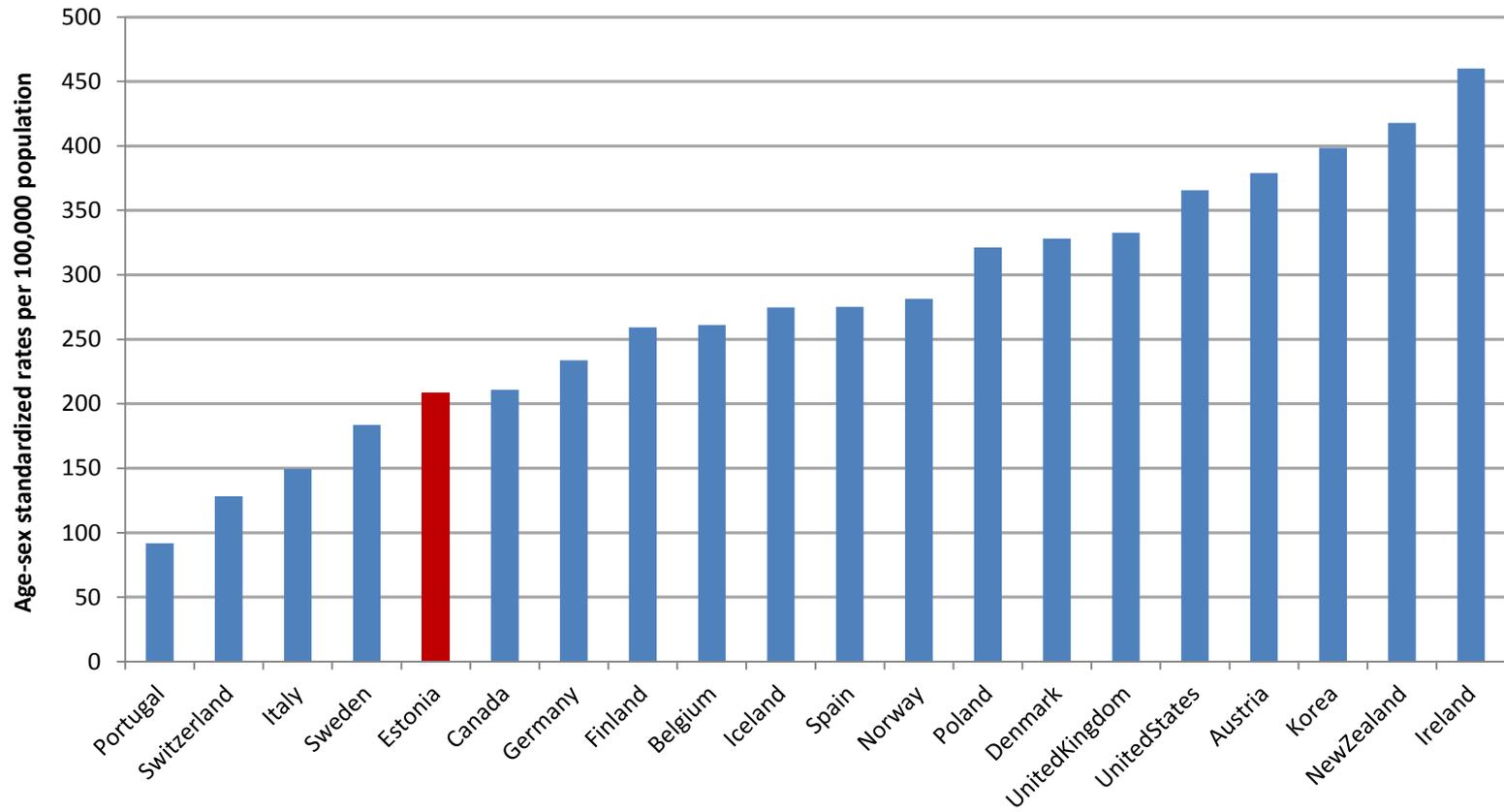


\*2008 or next available year.



From good...

## Respiratory Avoidable Hospital Admission Rates (2008)\*

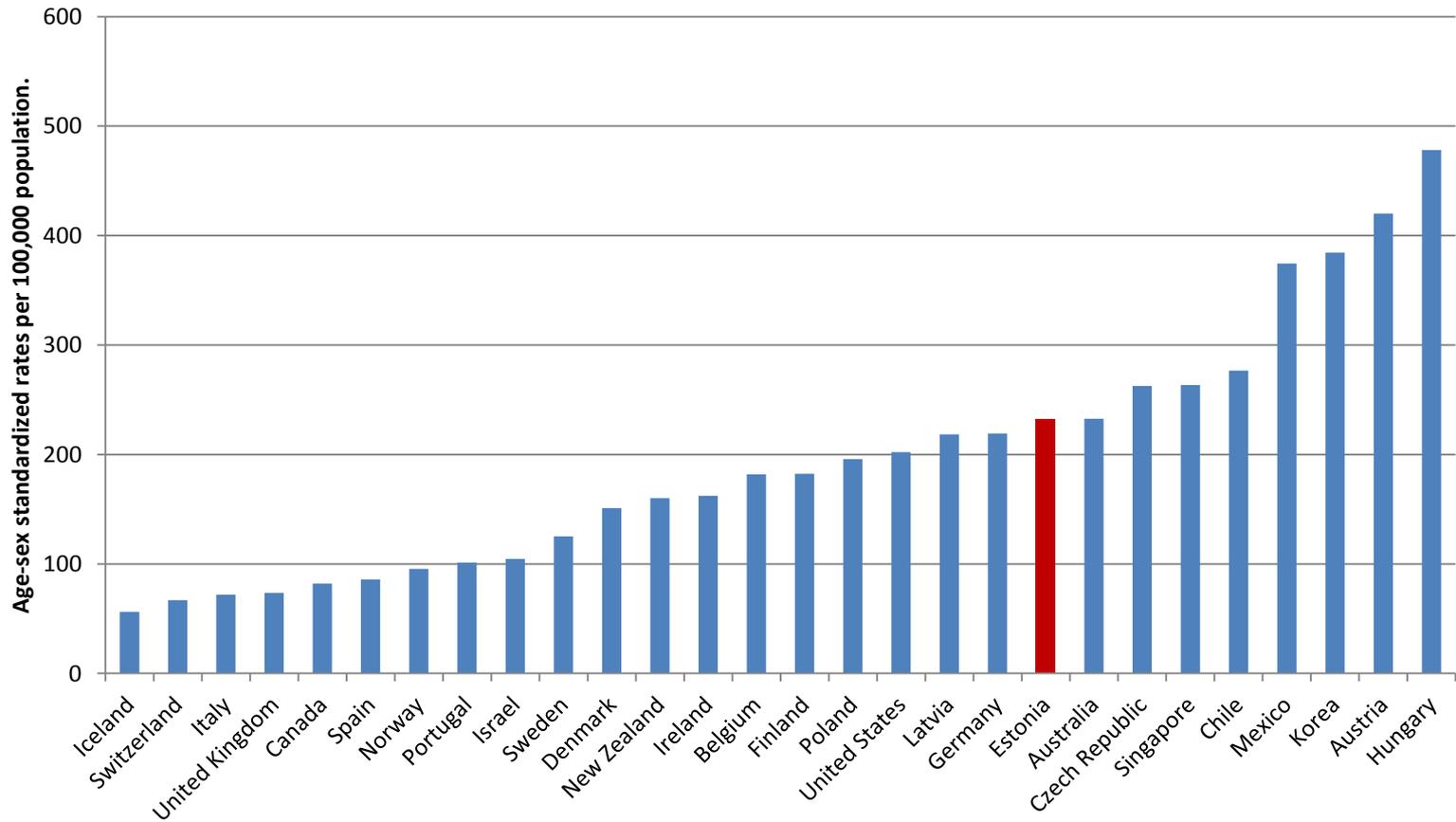


\*2008 or next available year.



...to average...

### Diabetes Avoidable Hospital Admission Rates (2008)\*

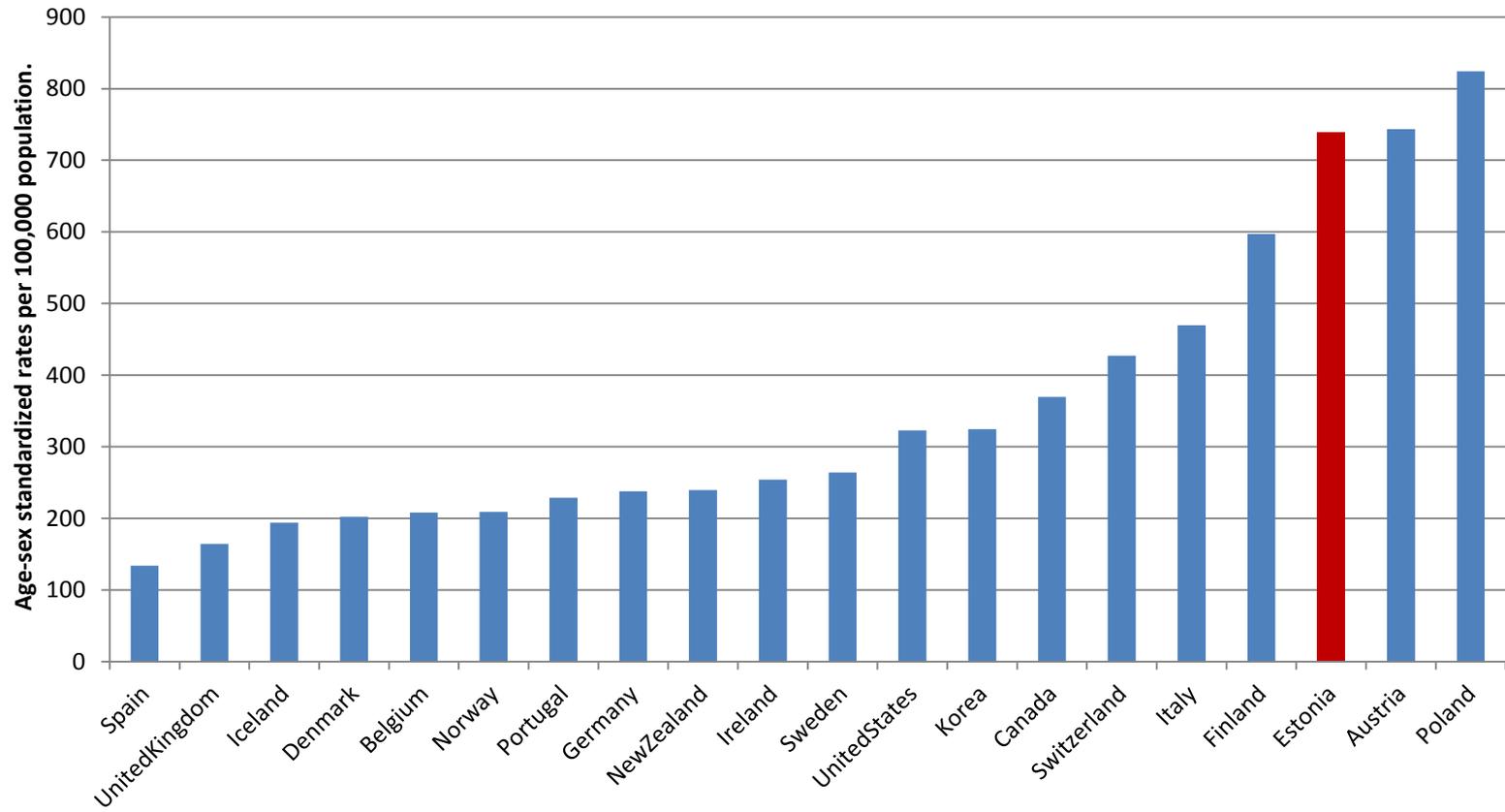


\*2008 or next available year.



... and low performance...

### CVD Avoidable Hospital Admission Rates (2008)\*



\*2008 or next available year.



...however with positive national trends.

### Avoidable Hospital Admission Rates

Tracer/ Year	Asthma	COPD	Diabetes	CHF	Hypertension
<b>2008</b>	78.0	133.0	232.0	403.0	343.0
<b>2013</b>	48.0	125.0	200.0	340.0	229.0



## Admissions across different hospital types

Provider type	Total admissions (2013): Respiratory, Endocrine, and Circulatory	% Avoidable
Regional	22,903	14.69%
Central	20,612	18.58%
General	18,144	22.33%
Non HNDP providers	10,138	14.01%
All providers	71,797	17.64%

Referrals and transfers to other facilities are excluded from this analysis.



## Outline

### Key performance indicators

- Avoidable hospital admissions
- **Extended hospital stays**
- Avoidable ambulatory specialist visits
- Provider continuity



# Extended hospital stays

**Approach:** UK NHS outcomes framework

**Principles:**

- Number of days until discharge to usual place of residence (includes rehab)
- Inappropriate procedure (open cholecystectomy)

**Tracer conditions:**

- Stroke
- Hip fracture
- Cholecystectomy

**Construction of the indicator:**

- Percentage of stays beyond maximum length of stay
- Percentage of inappropriate procedures



## Extended hospital stays

Tracer	Total cases (2008)	% of outliers	Total cases (2013)	% of outliers
Stroke (28 days)	4054	24.20%	4335	23.40%
Stroke (42 days)		12.28%		12.10%
Stroke (56 days)		5.56%		6.90%



## Extended hospital stays

Stroke	Total cases (2008)	% of outliers	Total cases (2013)	% of outliers
Regional	850	5.88%	1220	6.64%
Central	1400	6.00%	1539	7.86%
General	1287	4.97%	1018	6.48%
Non HNDP hosp.	517	5.22%	558	5.73%
All hospitals	4054	5.56%	4335	6.91%



## Extended hospital stays

Tracer	Total cases (2008)	% of outliers	Total cases (2013)	% of outliers
Hip fracture (28 days)	1374	29.33%	1529	32.60%



## Extended hospital stays

Hip fracture	Total cases (2008)	% of outliers	Total cases (2013)	% of outliers
Regional	594	26.26%	656	31.71%
Central	457	29.98%	511	32.09%
General	251	37.05%	267	39.33%
Non HNDP hosp.	72	23.61%	95	22.11%
All hospitals	1374	29.33%	1529	32.60%



## Extended hospital stays

Tracer	Total cases (2008)	% of open cholec.	Total cases (2013)	% of open cholec.
Cholecystectomy	2924	11.81%	2706	11.12%



## Extended hospital stays

Tracer	Total cases (2008)	% of open cholec.	Total cases (2013)	% of open cholec.
Cholecystectomy	2924	11.81%	2706	11.12%

Cholecystectomy	Laparoscopic cholec.	open cholec.
Average Length of Stay in Days	3.03	13.55



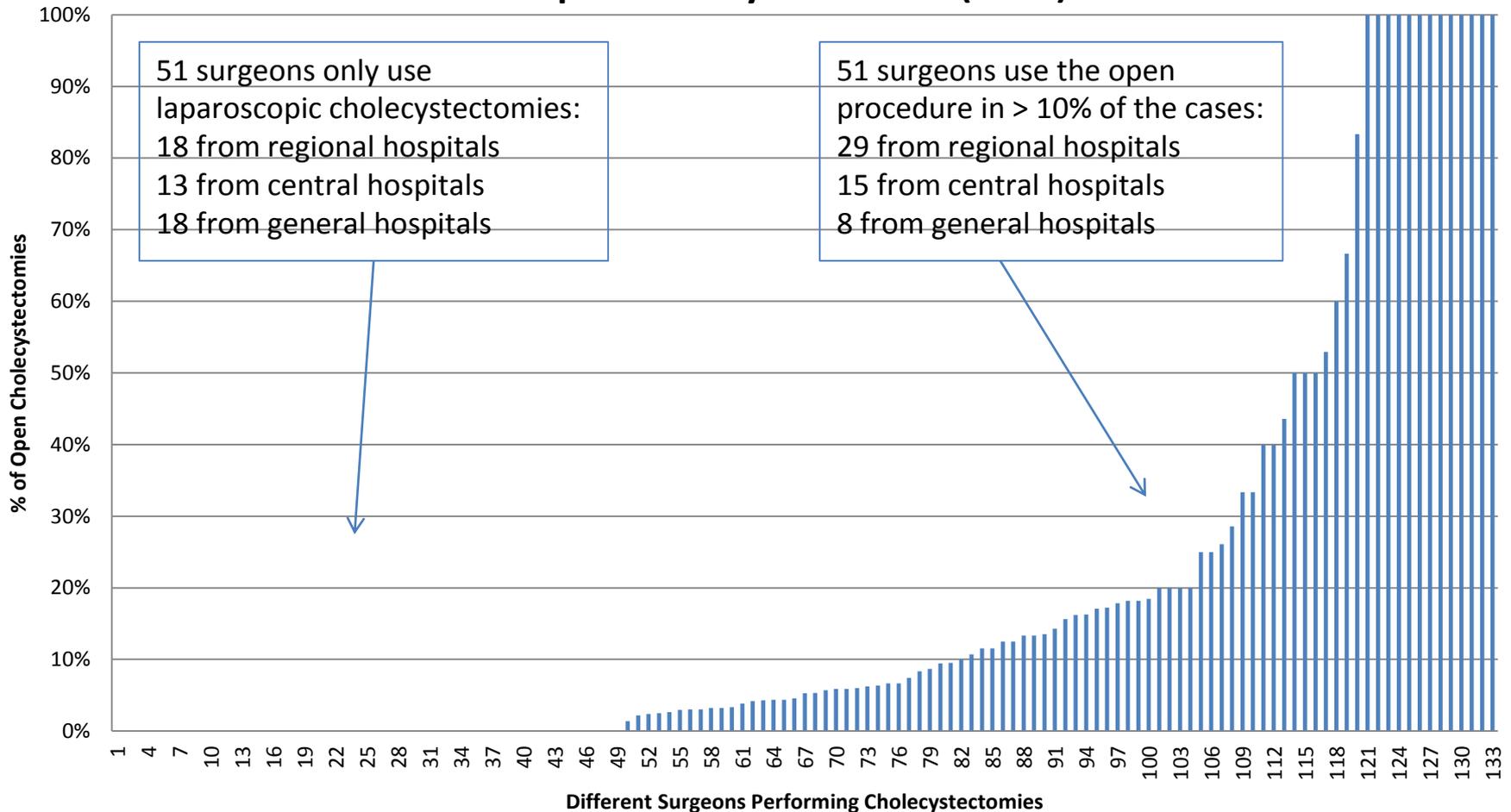
## Extended hospital stays

<b>Cholecystectomy</b>	<b>Total cases (2008)</b>	<b>% of open cholec.</b>	<b>Total cases (2013)</b>	<b>% of open cholec.</b>
Regional	1011	12.85%	862	19.49%
Central	1138	9.40%	1128	8.33%
General	775	9.30%	716	5.45%
Non HNBP providers	-	-	-	-
All providers	2924	11.81%	2706	11.12%



# Extended hospital stays

## % of open cholecystectomies (2013)





## Outline

### Key performance indicators

- Avoidable hospital admissions
- Extended hospital stays
- **Avoidable ambulatory specialist visits**
- Provider continuity



# Avoidable ambulatory specialist visits

## Approach

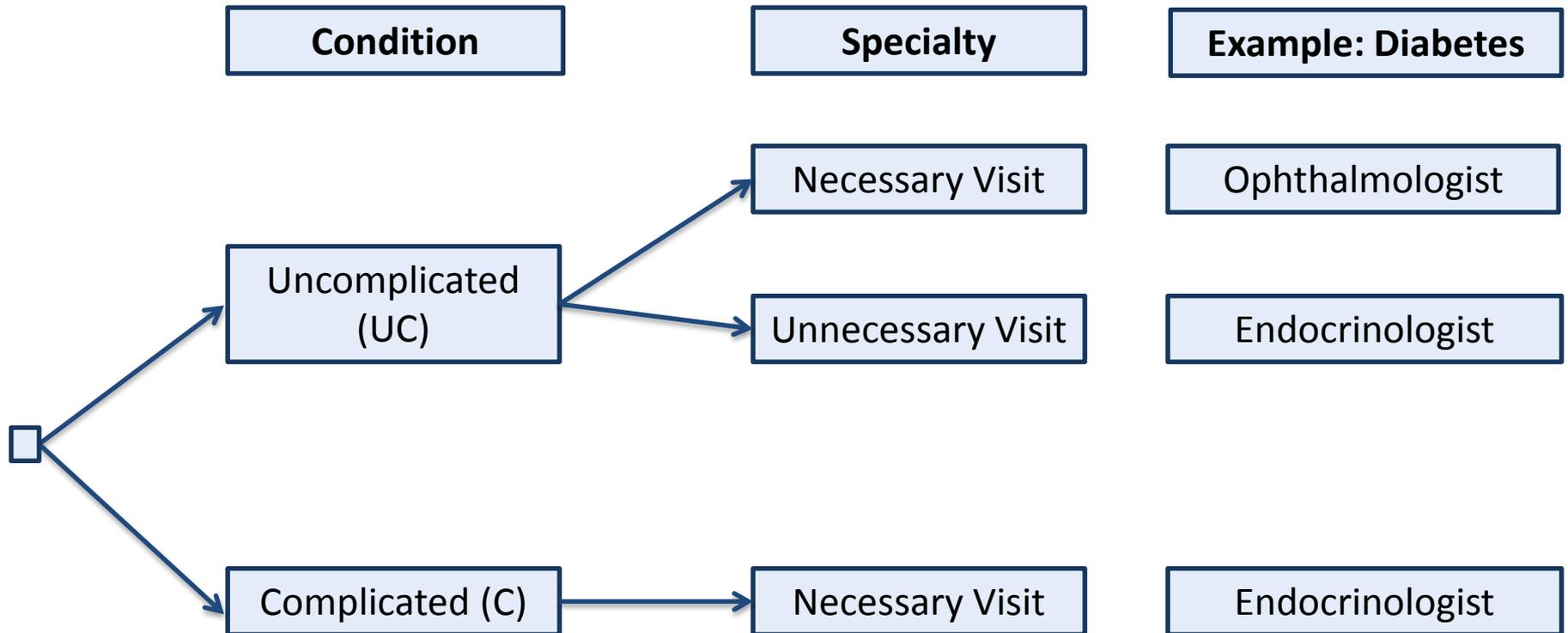
- Internationally, there is no protocol to measure the extent of avoidable specialist visits.
- Internationally, there is a general consensus that a large number of specialist visits is avoidable.
- In consultation with international experts, a protocol was developed that is currently being vetted with the Estonian Association of Family Medicine.

## Principles

- Patients with certain diseases (ICD 10) do not require visits with certain medical specialists.



# Avoidable specialist visit protocol





# Avoidable Ambulatory Specialist Visits

## **Tracer conditions:**

- Diabetes
- Hypertension

## **Construction of indicator:**

Avoidable specialist visits as a share of all specialist visits for a certain disease group



## Avoidable specialist visits

	2008		2013	
Diagnosis category	Specialist visits	% avoidable	Specialist visits	% avoidable
<b>Diabetes</b>	39,520	26.03%	42,064	19.91%
<b>Hypertension</b>	60,302	70.81%	63,917	67.49%



## Avoidable specialist visits

	2008		2013		2013
Diagnosis category	Specialist visits	% avoidable	Specialist visits	% avoidable	
<b>Diabetes</b>	39,520	26.03%	42,064	19.91%	>90% of avoid. visits with endocrinologists
<b>Hypertension</b>	60,302	70.81%	63,917	67.49%	>80% of avoid. visits with cardiologists



## Avoidable specialist visits

Diabetes	2008		2013	
	Specialist visits	% avoidable	Specialist visits	% avoidable
Regional	6,298	21.17%	6,172	13.09%
Central	12,885	29.20%	17,073	13.75%
General	7,685	33.85%	7,344	43.60%
Non HNDP providers	12,652	20.47%	11,475	17.58%
All providers	39,520	26.03%	42,064	19.91%



## Avoidable specialist visits

<b>Hypertension</b>	<b>2008</b>		<b>2013</b>	
<b>Provider type</b>	<b>Specialist visits</b>	<b>% avoidable</b>	<b>Specialist visits</b>	<b>% avoidable</b>
Regional	12,697	78.58%	14,704	67.83%
Central	26,262	69.58%	27,017	66.97%
General	10,440	53.75%	10,304	62.44%
Non HNDP providers	10,903	81.07%	11,893	72.62%
All providers	60,302	70.81%	63,918	67.49%



## Outline

### Key performance indicators

- Avoidable hospital admissions
- Extended hospital stays
- Avoidable ambulatory specialist visits
- **Provider continuity**



## (Usual) Provider Continuity

**Approach:** Canadian Institute for Health Information

**Principles:** The frequency and sequence of visits with primary care providers versus ambulatory specialists.

**Tracer conditions:**

- General population seeking care aged  $\geq 18$
- Diabetes aged  $\geq 18$
- Hypertension aged  $\geq 18$
- CVD aged  $\geq 18$

**Construction of indicators:**

Share of specialist care



## Outpatient care visits

	Average number of outpatients visits per year		
	All insurees	Female	Male
2008	5.68	6.53	4.68
2013	5.64	6.58	4.56

Visit types considered: Family Doctor, Ambulatory Specialist, Nurse, Home visits (excluding dentist visits).



## Primary care versus ambulatory specialist visits

Disease / condition*	Average number of visits per year	
	2008	2013
General population seeking care (18 years and older)	6.5	6.4
Diabetes (18 and older)	11.2	10.3
Hypertension (18 and older)	10.2	9.8
CVD (18 and older)	9.7	9.5

\*Excluding visits with obstetrician/gynecologists



## Primary care versus ambulatory specialist visits

Disease / condition*	Primary care		Ambulatory specialists	
	2008	2013	2008	2013
General population seeking care older than 18 years	63.6%	61.0%	36.4%	39.0%
Diabetes	60.3%	59.2%	39.7%	41.8%
Hypertension	62.4%	60.6%	37.6%	39.4%
CVD	62.9%	60.9%	37.1%	30.1%

\*Excluding visits with obstetrician/gynecologists



# Sequential continuity

X: GPs

Y: Ambulatory specialists

Provider category visited	X	X	X	Y	Y	X	X
Sequential Continuity	NA	1	1	0	1	0	1

Same provider category

Different provider categories



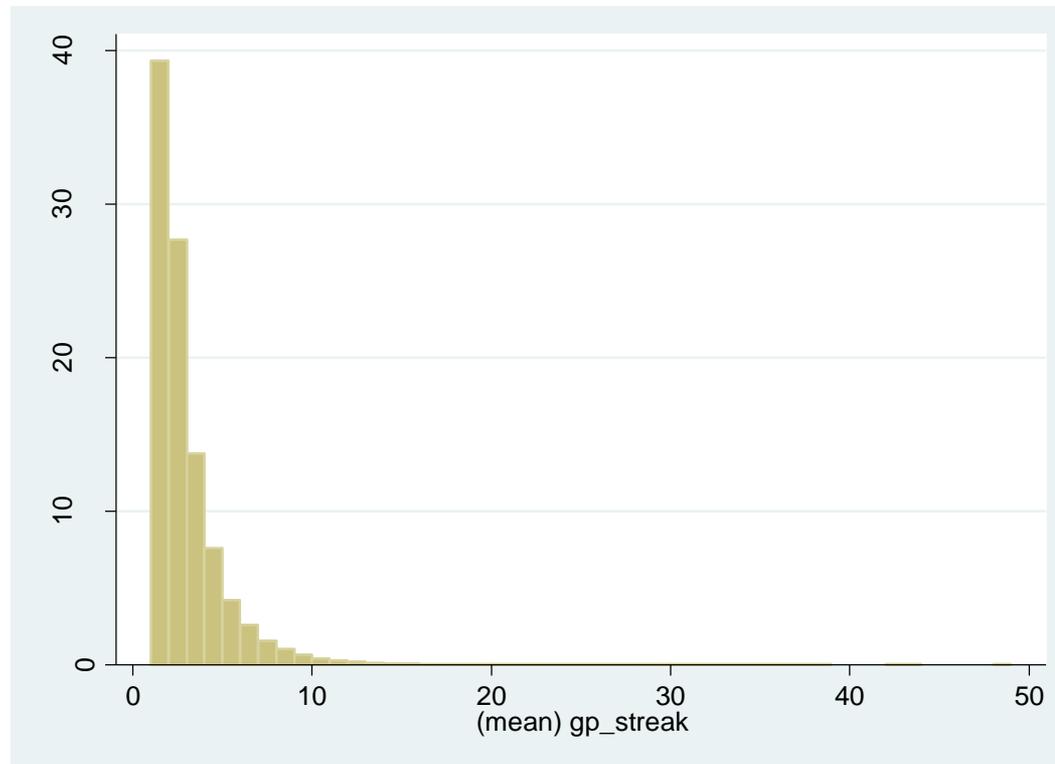
# Sequential continuity

Disease / condition	Sequential continuity	
	2008	2013
General population seeking care older than 18 years	0.79	0.79
Diabetes	0.72	0.72
Hypertension	0.72	0.72
CVD	0.73	0.72



## Sequential continuity (2013)

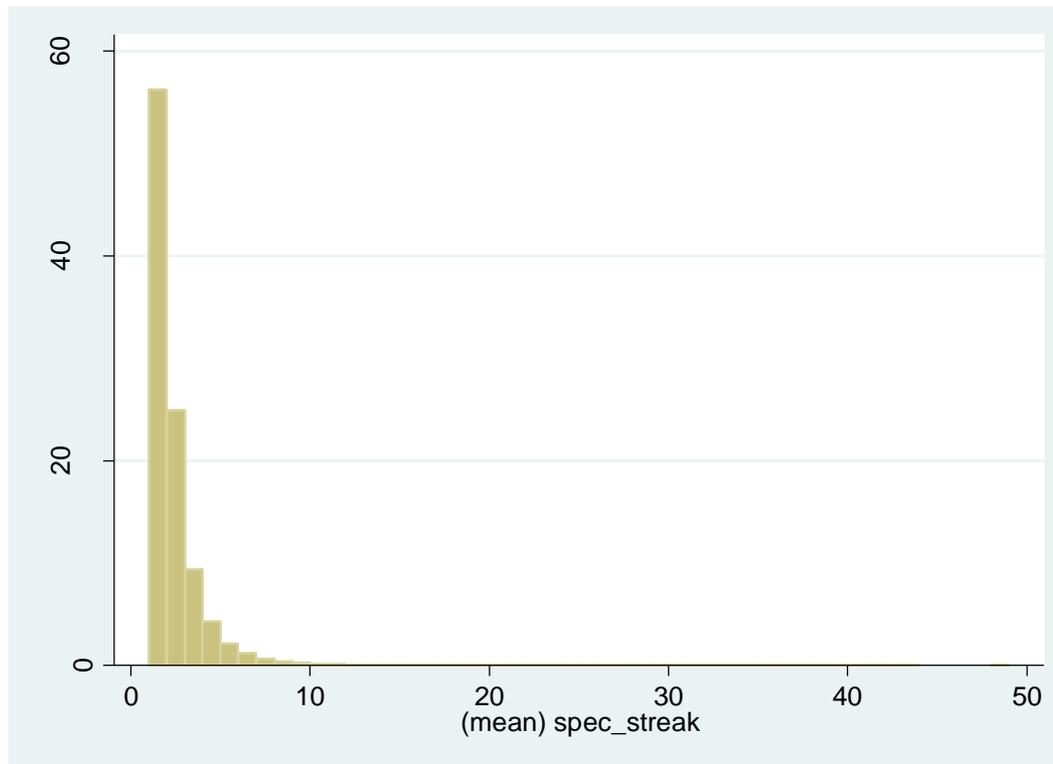
Average number of consecutive GP visits by patient before seeing a specialist again





## Sequential continuity (2013)

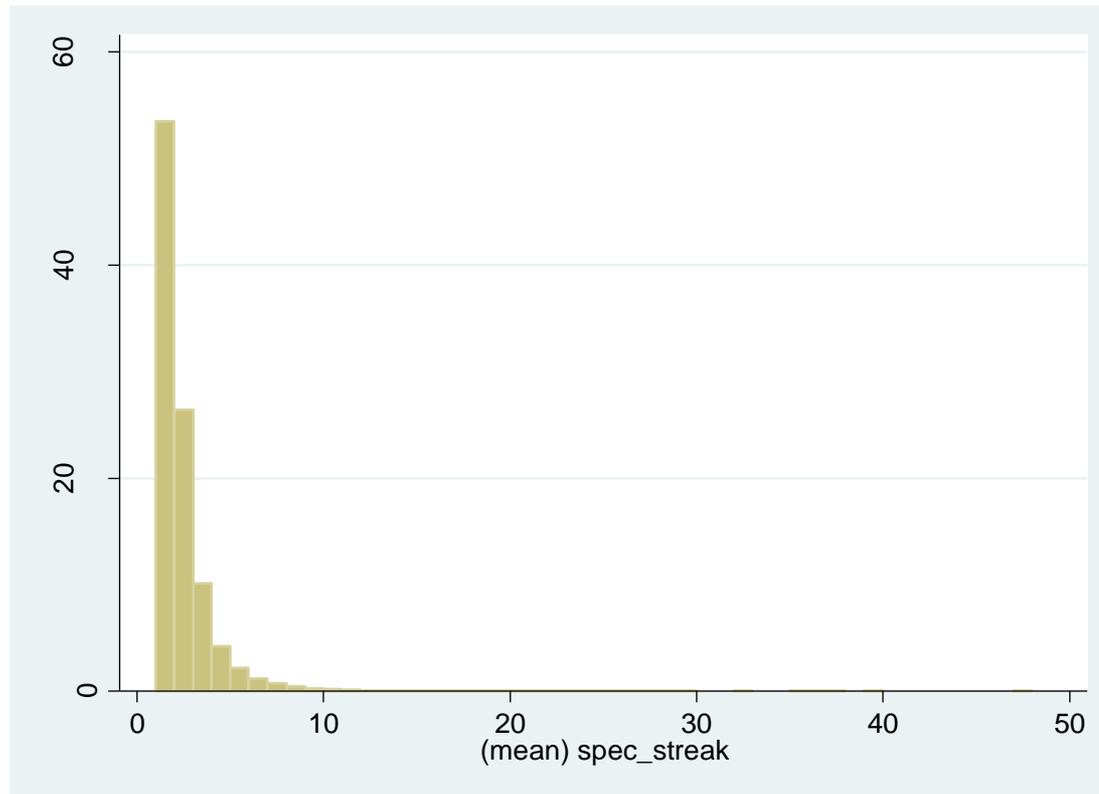
Average number of consecutive specialist visits by patient before seeing a GP again





## Sequential continuity (2013) - Diabetes

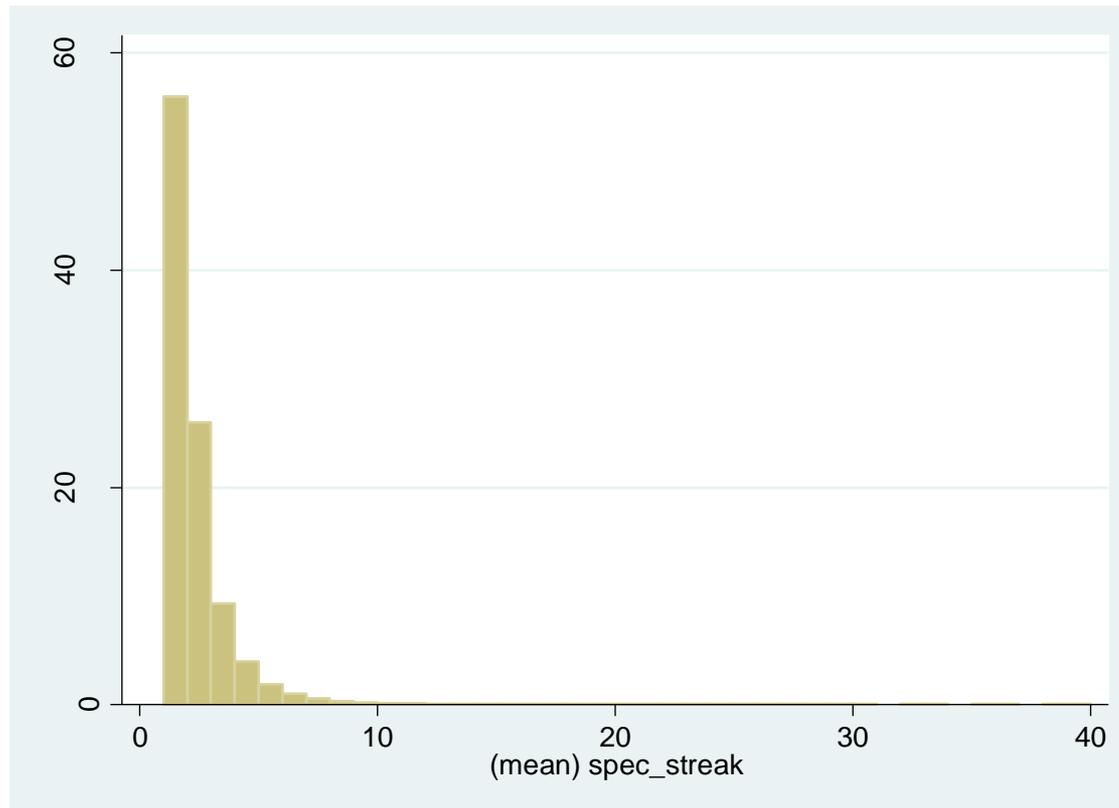
Average number of consecutive specialist visits by patient before seeing a GP again





## Sequential continuity (2013) - Hypertension

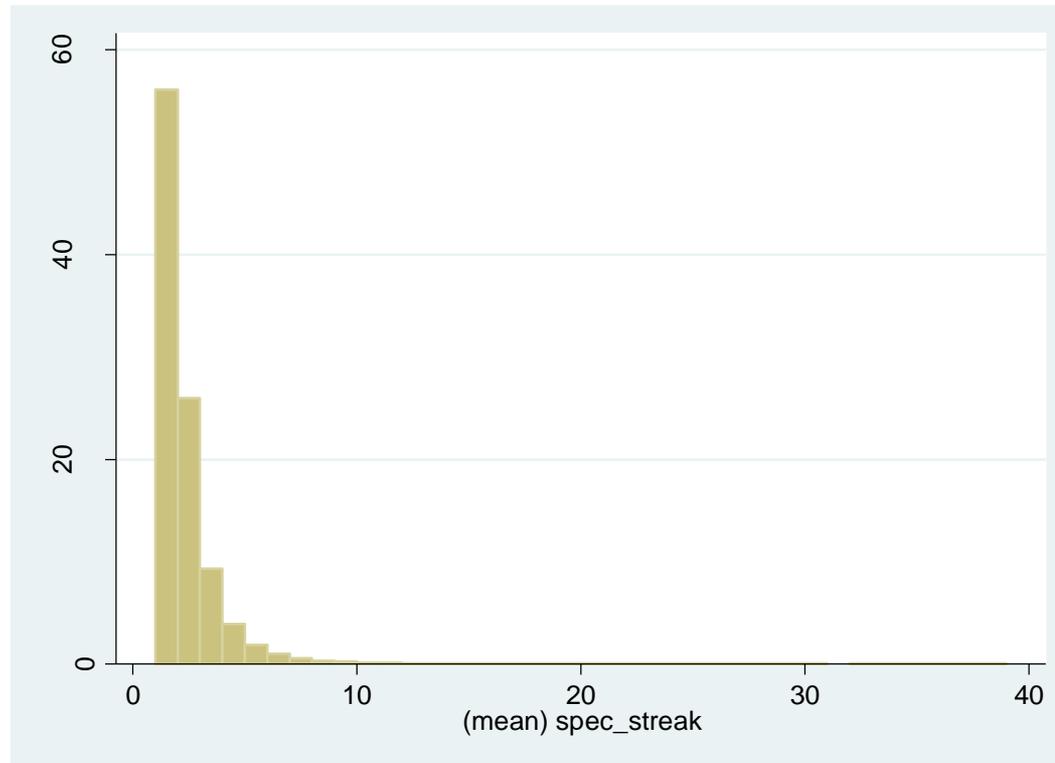
Average number of consecutive specialist visits by patient before seeing a GP again





## Sequential continuity (2013) - CVD

Average number of consecutive specialist visits by patient before seeing a GP again





# The State of Integration of Care in Estonia

## Coordination of Care

World Bank Group





# Research Questions

Integration  
of care

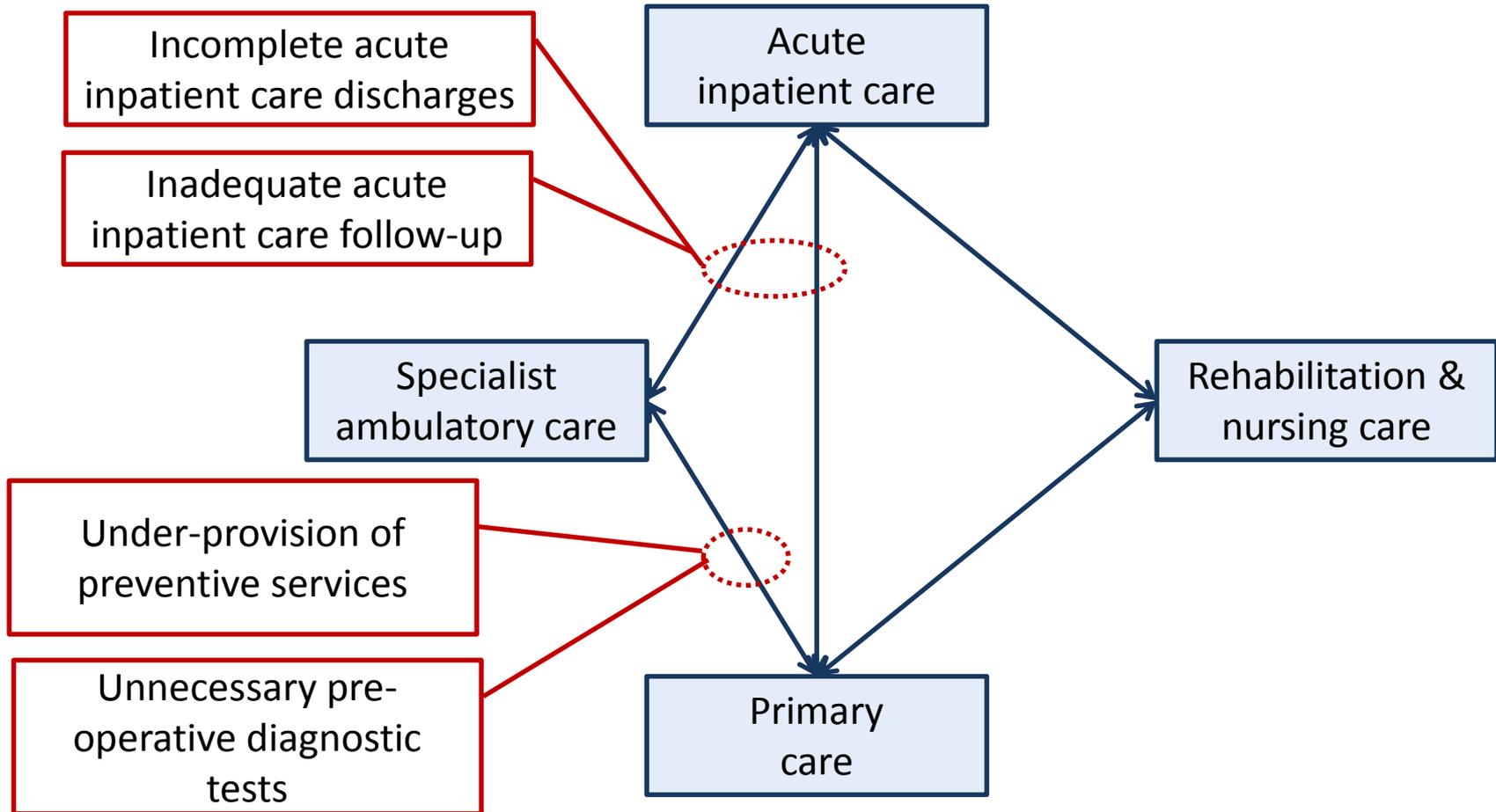
What is the most appropriate care setting for the delivery of services

How to ensure the coordination and continuity of care across care settings?

- Adherence to good clinical practice
- Timely access to care



# How to ensure the coordination and continuity of care across care settings?





## Outline

### Key performance indicators

- **Under-provision of preventive services**
- Incomplete discharges
- Inadequate acute inpatient follow-up care
- Unnecessary pre-operative diagnostic tests



## Under-provision of preventive services

**Approach:** National Australian Performance Framework

**Principles:** Compliance with national clinical guidelines

**Tracer conditions:**

- Diabetes
- Hypertension

**Construction of the indicator:** % of patients receiving diagnostic tests and counseling for secondary disease screening and prevention.



## Compliance with clinical guidelines for diabetes - % of patients receiving diagnostic tests and counseling (2008)

Procedure	Provision by GP only
Glycosylated hemoglobin	50.7%
Cholesterol	57.0%
Cholesterol fractions	45.2%
Albuminuria	25.0%
Creatinine	51.8%
<b>All</b>	<b>20.2%</b>
<b>None</b>	<b>37.4%</b>



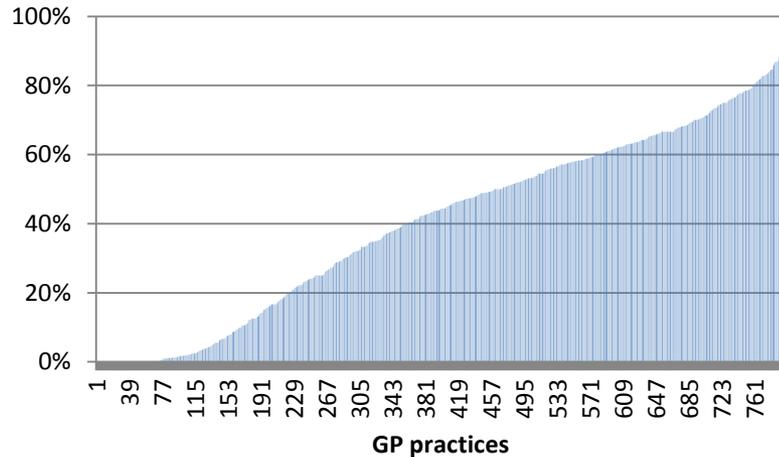
## Compliance with clinical guidelines for diabetes - % of patients receiving diagnostic tests and counseling (2008)

Procedure	Provision by GP only	Provision by GP & AS	Difference
Glycosylated Hemoglobin	50.7%	66.5%	15.8%
Cholesterol	57.0%	67.7%	10.7%
Cholesterol fractions	45.2%	56.3%	11.1%
Albuminuria	25.0%	30.0%	5.0%
Creatinine	51.8%	66.9%	15.1%
<b>All</b>	<b>20.2%</b>	<b>25.2%</b>	<b>5.0%</b>
<b>None</b>	<b>37.4%</b>	<b>20.10%</b>	<b>-17.4%</b>

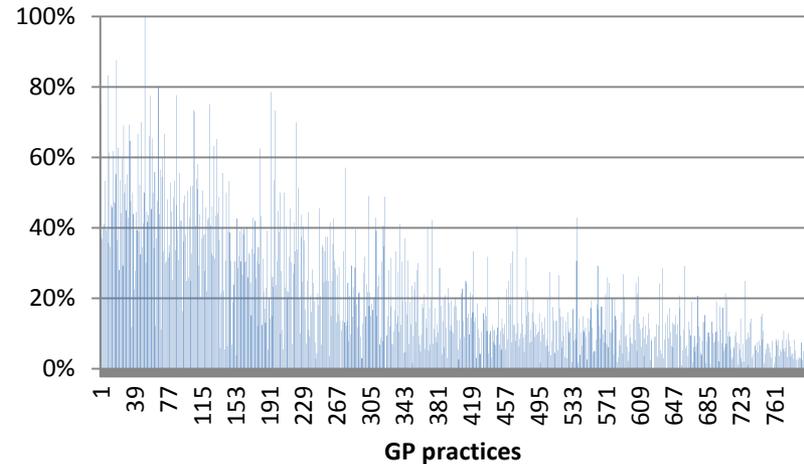


# Compliance with clinical guidelines for diabetes (GPs only) - % of patients receiving diagnostic tests by GP practice (2013)

### % of Patients Receiving All Tests



### % of Patients Receiving No Tests





## Compliance with clinical guidelines for hypertension - % of patients receiving diagnostic tests and counseling (2008)

Procedure	Provision by GP only
Glucose	53.5%
Cholesterol	51.2%
Cholesterol fractions	38.6%
Albuminuria	17.4%
Creatinine	43.3%
EKG	19.2%
<b>All</b>	<b>4.3%</b>
<b>None</b>	<b>36.3%</b>



## Compliance with clinical guidelines for hypertension - % of patients receiving diagnostic tests and counseling (2008)

Procedure	Provision by GP only	Provision by GP & AS	Difference
Glucose	53.5%	54.6%	1.1%
Cholesterol	51.2%	58.2%	7.0%
Cholesterol fractions	38.6%	44.7%	6.1%
Albuminuria	17.4%	19.5%	2.1%
Creatinine	43.3%	55.3%	12.0%
EKG	19.2%	21.4%	2.2%
<b>All</b>	<b>4.3%</b>	<b>4.7%</b>	<b>0.4%</b>
<b>None</b>	<b>36.3%</b>	<b>27.8%</b>	<b>-8.5%</b>



## Compliance with clinical guidelines for diabetes - % of patients receiving diagnostic tests and counseling (2013)

Procedure	Provision by GP only
Glycosylated Hemoglobin	72.8%
Cholesterol	74.9%
Cholesterol fractions	68.2%
Albuminuria	45.5%
Creatinine	75.0%
<b>All</b>	<b>41.1%</b>
<b>None</b>	<b>20.0%</b>
Nurse counselling	65.7%



## Compliance with clinical guidelines for diabetes - % of patients receiving diagnostic tests and counseling (2013)

Procedure	Provision by GP only	Provision by GP & AS	Difference
Glycosylated Hemoglobin	72.8%	79.6%	6.8%
Cholesterol	74.9%	79.8%	4.9%
Cholesterol fractions	68.2%	72.9%	4.7%
Albuminuria	45.5%	48.4%	2.9%
Creatinine	75.0%	82.7%	7.7%
<b>All</b>	<b>41.1%</b>	<b>44.2%</b>	<b>3.1%</b>
<b>None</b>	<b>20.0%</b>	<b>13.0%</b>	<b>-7.0%</b>
Nurse counselling	65.7%	Not applicable	Not applicable



## Compliance with clinical guidelines for hypertension - % of patients receiving diagnostic tests and counseling (2013)

Procedure	Provision by GP only
Glucose	65.4%
Cholesterol	68.4%
Cholesterol fractions	62.0%
Albuminuria	37.3%
Creatinine	66.5%
EKG	20.3%
<b>All</b>	<b>9.5%</b>
<b>None</b>	<b>24.6%</b>
Nurse Counselling	58.4%



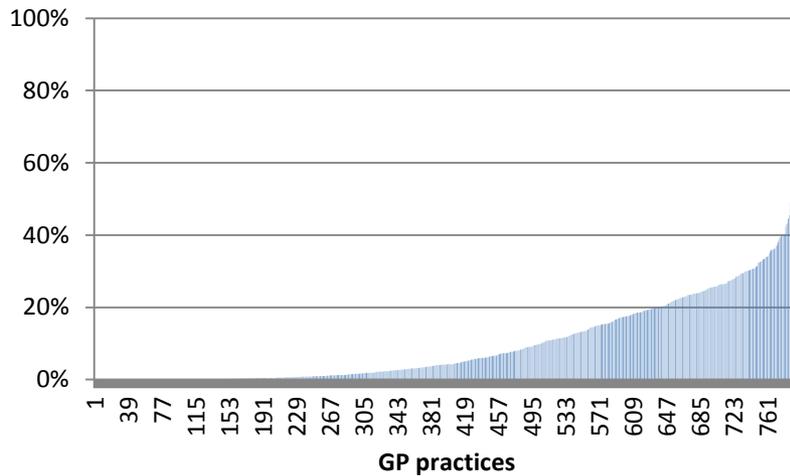
## Compliance with clinical guidelines for hypertension - % of patients receiving diagnostic tests and counseling (2013)

Procedure	Provision by GP only	Provision by GP & AS	Difference
Glucose	65.4%	65.6%	0.2%
Cholesterol	68.4%	71.7%	3.3%
Cholesterol fractions	62.0%	65.2%	3.1%
Albuminuria	37.3%	38.0%	0.7%
Creatinine	66.5%	74.0%	7.5%
EKG	20.3%	22.0%	1.7%
<b>All</b>	<b>9.5%</b>	<b>10.2%</b>	<b>0.7%</b>
<b>None</b>	<b>24.6%</b>	<b>19.4%</b>	<b>-5.2%</b>
Nurse Counselling	58.4%	Not applicable	Not applicable

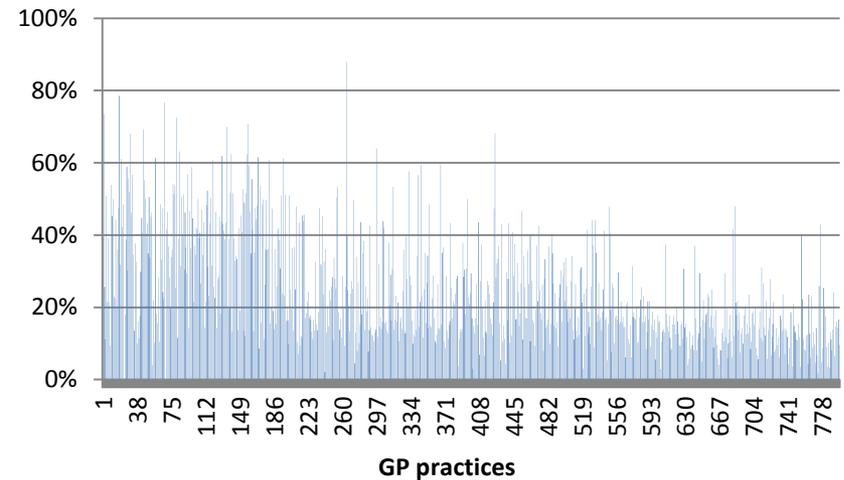


# Compliance with clinical guidelines for hypertension (GPs only) - % of patients receiving diagnostic tests by GP practice (2013)

### % of Patients Receiving All Tests



### % of Patients Receiving No Tests





## Outline

### Key performance indicators

- Under-provision of preventive services
- **Incomplete discharges**
- Inadequate acute inpatient follow-up care
- Unnecessary pre-operative diagnostic tests



# Incomplete discharges

## **Approach:**

- OECD / Protocol of quantifying incomplete discharges
- Guideline – Management of Cardiovascular Risk (New Zealand)

**Principle:** Compliance with international treatment guidelines related to discharge medications

## **Tracer conditions:**

- Unstable angina
- AMI
- Heart Failure

## **Construction of the indicator:**

- Share of patients living for at least 90 days after discharge with appropriate filled prescriptions written at discharge/up to 30 days after discharge/up to 90 days after discharge.
- **Additional analysis in 2013:** Share of patients living for at least 90 days after discharge given appropriate prescriptions at discharge/up to 30 days after discharge/up to 90 days after discharge (not necessarily filled)



## Compliance at discharge (2008) – Share of patients with appropriate filled prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	1860	7725	1101	10686
Beta-blocker	4.57%	7.07%	9.81%	6.92%
Statins	0.65%	6.71%	0.18%	4.98%
ACE inhibitor*	4.46%	7.82%	11.72%	7.64%
All	0.11%	0.85%	0.00%	0.64%
None	92.04%	83.95%	82.38%	85.20%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance including 30 days ambulatory follow-up care (2008) – Share of patients with appropriate filled prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	1860	7725	1101	10686
Beta-blocker	6.24%	8.56%	12.35%	8.54%
Statins	0.86%	7.17%	0.18%	5.35%
ACE inhibitor*	5.65%	9.05%	14.17%	8.98%
All	0.11%	0.98%	0.00%	0.73%
None	89.35%	81.40%	78.47%	82.48%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance including 90 days ambulatory follow-up care (2008) – Share of patients with appropriate filled prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	1860	7725	1101	10686
Beta-blocker	8.49%	11.62%	17.98%	11.73%
Statins	0.16%	1.26%	0.00%	0.94%
ACE inhibitor*	7.31%	11.64%	18.98%	11.64%
All	1.45%	8.10%	0.45%	6.16%
None	85.86%	76.84%	70.03%	77.71%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance at discharge (2013) – Share of patients given appropriate prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	700	4397	1460	6557
Beta-blocker	20.43%	27.66%	17.60%	24.65%
Statins	2.57%	11.10%	0.89%	7.92%
ACE inhibitor*	13.71%	24.65%	15.75%	21.50%
All	0.14%	2.30%	0.14%	1.60%
None	72.57%	58.52%	73.70%	63.40%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance at discharge (2013) – Share of patients with appropriate filled prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	700	4397	1460	6557
Beta-blocker	13.43%	20.76%	12.33%	18.10%
Statins	2.00%	9.07%	0.62%	6.44%
ACE inhibitor*	7.00%	15.58%	9.18%	13.24%
All	0.14%	2.00%	0.00%	1.36%
None	82.71%	69.66%	81.71%	73.74%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance including 30 days ambulatory follow-up care (2013) – Share of patients given appropriate prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	700	4397	1460	6557
Beta-blocker	24.57%	30.57%	22.67%	28.17%
Statins	3.00%	11.69%	1.16%	8.42%
ACE inhibitor*	17.57%	27.68%	20.96%	25.10%
All	0.14%	2.59%	0.14%	1.78%
None	66.86%	64.52%	66.58%	58.37%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance including 30 days ambulatory follow-up care (2013) – Share of patients with appropriate filled prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	700	4397	1460	6557
Beta-blocker	20.86%	26.61%	22.60%	25.10%
Statins	2.57%	10.28%	1.23%	7.44%
ACE inhibitor*	11.86%	19.81%	16.44%	18.21%
All	0.14%	2.87%	0.07%	1.95%
None	73.86%	63.09%	69.52%	65.67%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance including 90 days ambulatory follow-up care (2013) – Share of patients given appropriate prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	700	4397	1460	6557
Beta-blocker	29.86%	34.86%	30.82%	33.43%
Statins	3.57%	12.71%	1.71%	9.29%
ACE inhibitor*	22.86%	31.86%	26.71%	29.75%
All	0.14%	3.32%	0.21%	2.29%
None	60.57%	49.74%	57.60%	52.65%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance including 90 days ambulatory follow-up care (2013) – Share of patients with appropriate filled prescriptions

Prescription drug	Unstable angina	AMI	Heart failure**	All tracers
<i>Cases</i>	700	4397	1460	6557
Beta-blocker	16.71%	22.99%	16.10%	20.79%
Statins	2.29%	9.55%	0.82%	6.83%
ACE inhibitor*	8.71%	17.22%	12.60%	15.28%
All	0.14%	2.59%	0.14%	1.78%
None	66.86%	54.29%	66.58%	58.37%

\*New Zealand specific drug

\*\*New Zealand specific tracer condition



## Compliance at discharge - Share of patients given appropriate prescriptions at discharge

All tracers	2013			
	Provider type	Total cases	Beta Blocker	ACE Inhibitor
Regional	2,553	28.45%	25.33%	13.75%
Central	1,474	23.70%	18.81%	5.46%
General	2,295	17.30%	15.99%	2.28%
Non HNDP providers	235	56.97%	45.42%	7.17%
All providers	6,557	24.50%	21.32%	7.64%



# Outline

## Key performance indicators

- Under-provision of preventive services
- Incomplete discharges
- **Inadequate acute inpatient follow-up care**
- Unnecessary pre-operative diagnostic tests



# Inadequate acute inpatient follow-up care

**Approach:** Protocol established in the literature (US)\*

**Principle(s):** Follow-up within the recommended post acute inpatient interval

**Tracer conditions:**

- AMI
- Stroke
- Hip Fracture
- Cholecystectomy
- Heart Failure

**Construction of the indicator:** Share of patients living for at least 90 days after discharge with a follow-up visit (GP/ambulatory specialist) within the recommended interval.



## Inadequate acute inpatient follow-up care (2008) - Share of patients with a follow-up visit

Tracer	AMI	Stroke	Heart failure	Cholecyst.	Hip fracture
Patients with single hospital Episode	5558	2749	809	2897	1017
Follow-up visit within 30 days (GP)	25.40%	34.74%	16.56%	27.27%	20.26%
<b>Follow-up visit within 30 days (GP/AS)</b>	<b>30.32%</b>	<b>39.11%</b>	<b>21.88%</b>	<b>56.37%</b>	<b>24.09%</b>



## Inadequate acute inpatient follow-up care (2008)

Tracer	AMI	Stroke	Heart failure	Cholecyst.	Hip fracture
Patients with single hospital Episode	5558	2749	809	2897	1017
Follow-up visit within 30 days (GP)	25.40%	34.74%	16.56%	27.27%	20.26%
<b>Follow-up visit within 30 days (GP/AS)</b>	<b>30.32%</b>	<b>39.11%</b>	<b>21.88%</b>	<b>56.37%</b>	<b>24.09%</b>
Follow-up visit within 90 days (GP)	35.26%	42.67%	26.45%	28.41%	25.17%
<b>Follow-up visit within 90 days (GP/AS)</b>	<b>42.80%</b>	<b>48.27%</b>	<b>36.09%</b>	<b>57.82%</b>	<b>32.15%</b>



## Inadequate acute inpatient follow-up care (2013)

Tracer	AMI	Stroke	Heart failure	Cholecyst.	Hip Fracture
Patients with single hospital episode	4428	2819	1453	2715	929
Follow-up visit within 30 days (GP)	30.13%	35.79%	21.75%	31.71%	21.10%
<b>Follow-up visit within 30 days (GP/AS)</b>	<b>35.59%</b>	<b>38.77%</b>	<b>25.81%</b>	<b>48.91%</b>	<b>25.73%</b>



## Inadequate acute inpatient follow-up care (2013)

Tracer	AMI	Stroke	Heart failure	Cholecyst.	Hip fracture
Patients with single hospital Episode	4428	2819	1453	2715	929
Follow-up visit within 30 days (GP)	30.13%	35.79%	21.75%	31.71%	21.10%
<b>Follow-up visit within 30 days (GP/AS)</b>	<b>35.59%</b>	<b>38.77%</b>	<b>25.81%</b>	<b>48.91%</b>	<b>25.73%</b>
Follow-up visit within 90 days (GP)	40.92%	43.38%	30.97%	33.52%	27.02%
<b>Follow-up visit within 90 days (GP/AS)</b>	<b>49.23%</b>	<b>47.53%</b>	<b>38.06%</b>	<b>50.98%</b>	<b>36.38%</b>



## Inadequate acute inpatient follow-up care (2013)

AMI	2013		
Provider type (acute stay)	Total cases	GP/AS within 30 days	GP/AS within 90 days
Regional	2,131	42.70%	55.04%
Central	1,212	27.64%	43.07%
General	889	33.18%	46.46%
Non HNDP providers	185	23.78%	37.30%
All providers	4,417	35.86%	49.29%



## Inadequate acute inpatient follow-up care (2013)

<b>Stroke</b>	<b>2013</b>		
<b>Provider type</b>	<b>Total cases</b>	<b>GP/AS within 30 days</b>	<b>GP/AS within 90 days</b>
Regional	617	44.73%	54.94%
Central	979	40.65%	50.05%
General	714	32.21%	38.52%
Non HNDP providers	500	38.00%	47.60%
All providers	2,810	38.93%	47.76%



## Inadequate acute inpatient follow-up care (2013)

Heart failure	2013			
	Provider type (acute stay)	Total cases	GP/AS within 30 days	GP/AS within 90 days
Regional		220	33.18%	45.00%
Central		157	23.57%	38.22%
General		1,033	24.59%	37.17%
Non HNBP providers		37	24.32%	37.84%
All providers		1,447	25.78%	38.49%



## Inadequate acute inpatient follow-up care (2013)

<b>Hip fracture</b>	<b>2013</b>		
<b>Provider type (acute stay)</b>	<b>Total cases</b>	<b>GP/AS within 30 days</b>	<b>GP/AS within 90 days</b>
Regional	307	27.36%	42.02%
Central	228	25.88%	36.84%
General	218	24.77%	34.40%
Non HNDP providers	175	25.14%	29.14%
All providers	928	25.97%	36.53%



## Inadequate acute inpatient follow-up care (2013)

<b>Cholecystectomy</b>	<b>2013</b>		
<b>Provider type (acute stay)</b>	<b>Total cases</b>	<b>GP/AS within 30 days</b>	<b>GP/AS within 90 days</b>
Regional	869	34.41%	36.13%
Central	1,125	60.00%	61.42%
General	717	48.81%	52.30%
Non HNDP providers	-	-	-
All providers	2,708	49.00%	51.07%



## Outline

### Key performance indicators

- Under-provision of preventive services
- Incomplete discharges
- Inadequate acute inpatient follow-up care
- **Unnecessary pre-operative diagnostic tests**



# Unnecessary pre-operative diagnostic tests

**Approach:** Clinical guideline from the NHS (UK)

**Principle(s):** Provision of appropriate pre-operative tests based on patient factors and risk associated with surgical procedure.

**Tracer conditions:**

- Cataract surgery
- Lumpectomy
- Hip Fracture
- Hernia repair
- Cholecystectomy

**Construction of the indicator:** Patients are assigned ASA\* grade based on comorbidities. Surgeries are categorized according to associated risk. Guideline utilized to determine unnecessary pre-operative tests.

\*American Society of Anesthesiologists



## Unnecessary pre-operative tests (2008)

Tracer surgeries	Cataract surgery	Lumpectomy	Hernia repair	Cholecystectomy	Hip replacement
All surgeries	13,216	581	3,258	21,941	1,367

\*Chest X-rays not identifiable in 2008.



## Unnecessary pre-operative tests (2008)

Overview of pre-operative tests	
Number of relevant surgeries	21,357
Patients with relevant surgery*	18,967
Patients with some pre-operative test	6,969
Total number of pre-operative tests	17,223
Patients with some unnecessary test	3,913
Number of all tests among these patients	10,275
Number of unnecessary tests	5,387

\*Patients may have more than one surgery. (e.g.: 2 cataract surgeries)



## Unnecessary pre-operative tests (2008)

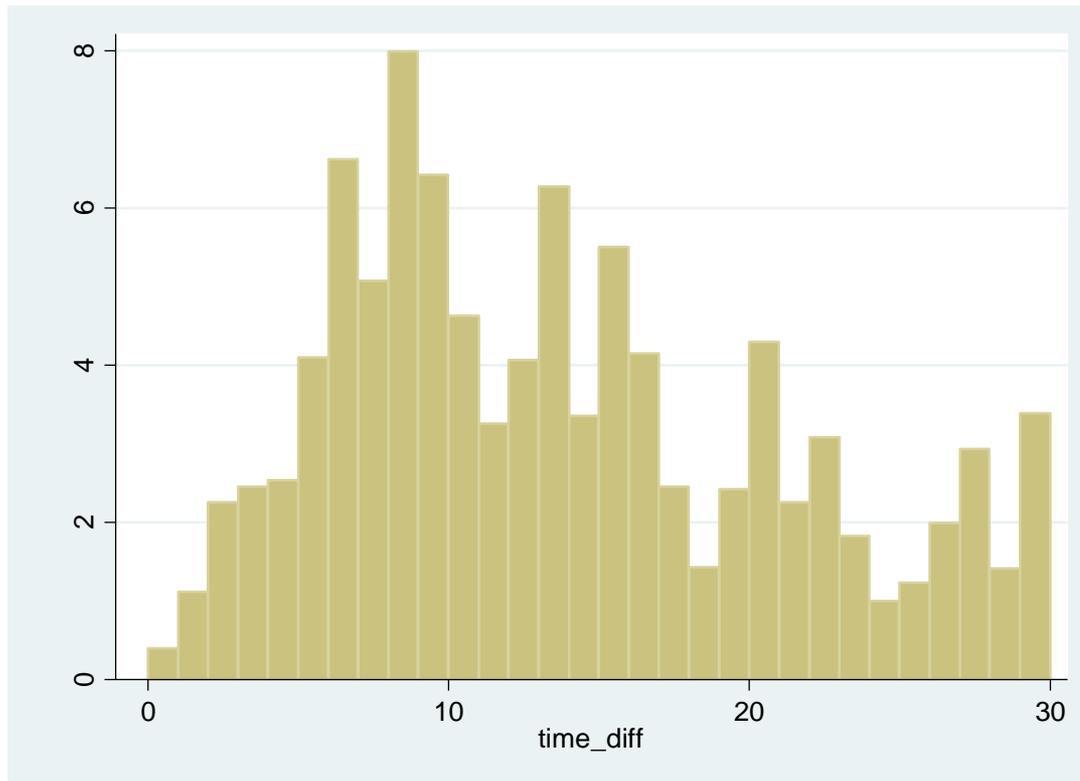
	Nr. relevant tests	% of unnecessary tests
Regional*	1,493	23.4%
Central*	4,844	22.2%
General*	876	38.5%
Non HNDP providers*	46	30.4%
GPs	9,955	36.3%
All providers*	17,214	31.3%

\* Both inpatient and outpatient services.



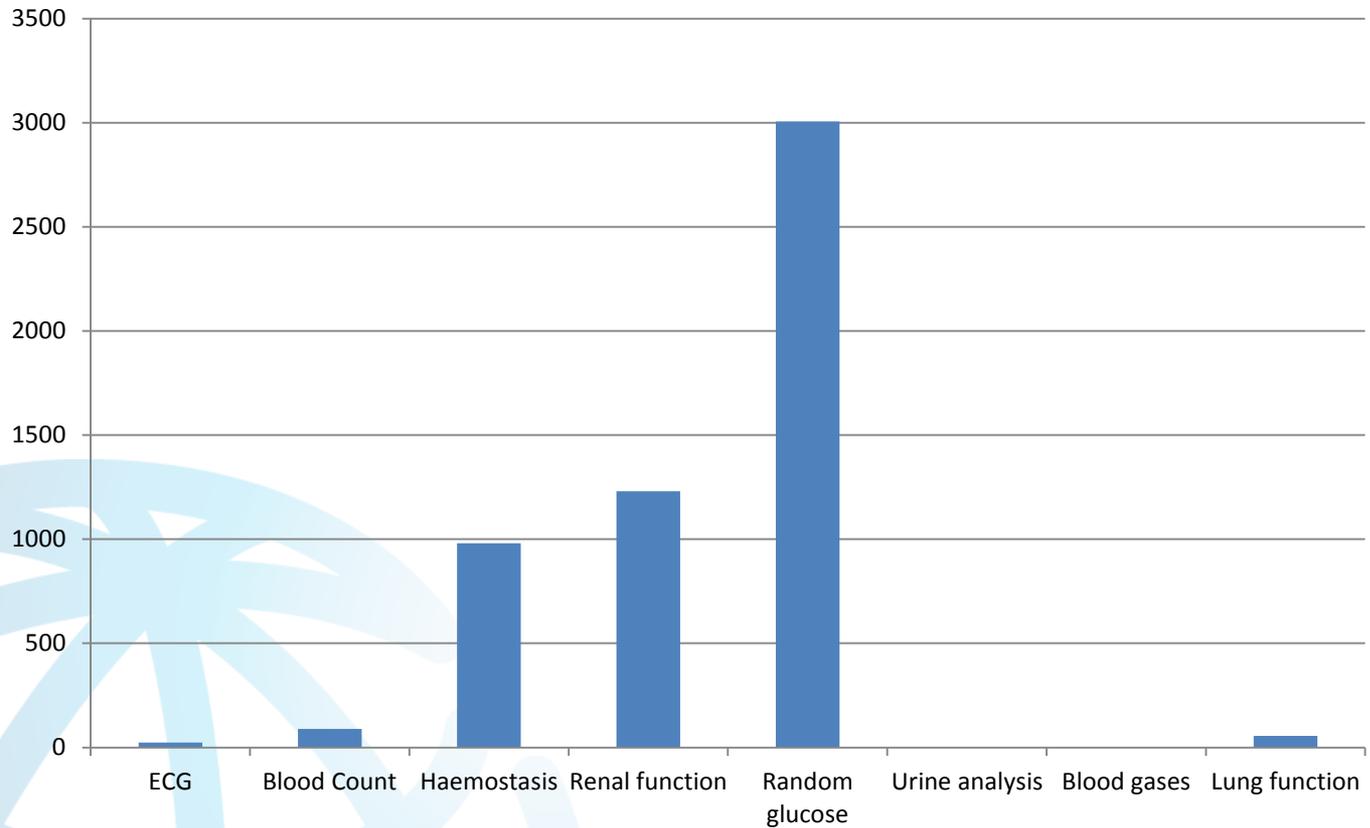
# Unnecessary pre-operative tests (2008)

Distribution of time unnecessary test and surgery.  
(Only HNDP hospitals)





# Unnecessary pre-operative tests (2008)





## Unnecessary pre-operative tests (2013)

Tracer surgeries	Cataract surgery	Lumpectomy	Hernia repair	Cholecystectomy	Hip replacement
In total	16,339	597	3,405	2,737	1,504



## Unnecessary pre-operative tests (2013)

Overview of pre-operative tests	
Number of relevant surgeries	24,582
Patients with relevant surgery*	20,692
Patients with some pre-operative test	8,046
Total number of pre-operative tests	25,466
Patients with some unnecessary test	4,755
Number of all tests among these patients	15,972
Number of unnecessary tests	7,767

\*Patients may have more than one surgery. (e.g.: 2 cataract surgeries)



## Unnecessary pre-operative tests (2013)

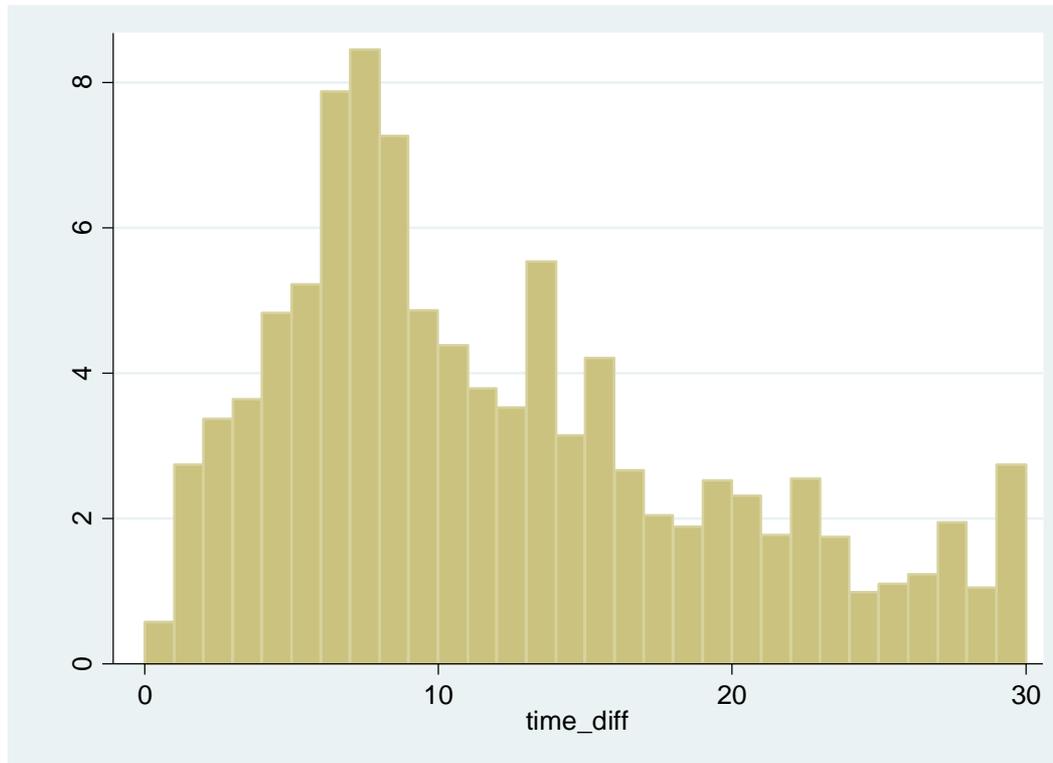
	Nr. relevant tests	% of unnecessary tests
Regional*	2,634	33.9%
Central*	8,623	27.1%
General*	2,126	23.8%
Non HNDP providers*	288	20.8%
GPs	11,802	33.6%
All providers*	25,466	30.5%

\* Both inpatient and outpatient services.



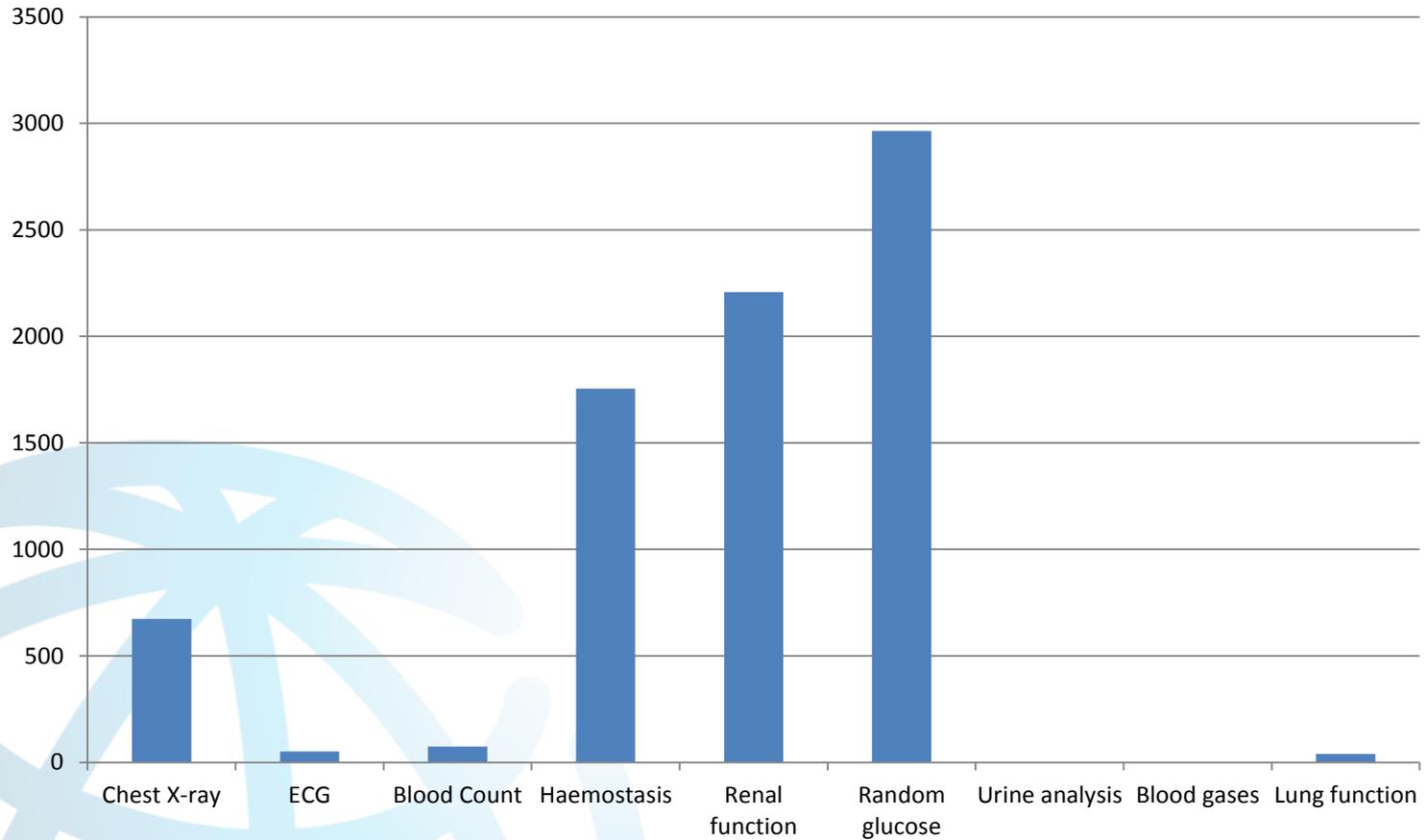
# Unnecessary pre-operative tests (2013)

Distribution of time between unnecessary test and surgery  
(Only HNDP hospitals)





# Unnecessary pre-operative tests (2013)





# Socio-economic status analysis

**Quintile 1 is the poorest one as measured by per capita household income.  
Quintile 5 is the richest one as measured by per capita household income.**

The quintiles differ considerably from each other in terms of their age and gender composition.

Age-sex standardizing the different indicator breakdowns by socio-economic status takes into account these differences.





## Socio-economic status analysis: Quintiles differ with respect to their age and gender composition

Age Group	Q1	Q2	Q3	Q4	Q5
<= 15	32,581	40,191	47,107	47,492	41,004
16 - 65	145,266	149,207	174,600	186,522	194,386
>= 66	74,680	63,129	30,820	18,515	17,135

Gender	Q1	Q2	Q3	Q4	Q5
Females	155,324	137,927	132,652	130,102	127,216
Males	97,203	114,600	119,875	122,427	125,309

\*Differences in the age and gender composition are persistent across all breakdowns. Age-sex standardization is generally applied.



# Socio-economic status analysis: Avoidable hospital admissions

## Avoidable hospital admissions – Age-sex standardized rates per 100,000 population

	Q1	Q2	Q3	Q4	Q5
Mean	1174.6	1035.1	920.7	917.5	888.3
Lower Confidence 90%	972.5	911.8	859.3	871.4	851.9
Upper Confidence 90%	1376.8	1158.3	982.1	963.6	924.7



# Socio-economic status analysis: Avoidable specialist visits

## Avoidable specialist visits – Age-sex standardized rates per 100,000 population

	Q1	Q2	Q3	Q4	Q5
Mean	3410.9	3642.9	4125.8	4375.6	5243.9
Lower Confidence 90%	2910.1	3253.0	3843.7	4087.6	4934.4
Upper Confidence 90%	3911.7	4032.9	4407.8	4663.6	5553.5



## Socio-economic status analysis: (Usual) provider continuity

All outpatients visits (Family Doctor, Ambulatory Specialist, Nurse, Home visits (excluding dentist visits)).

Outpatient care contacts – Age-sex standardized rates per 1,000 population					
	Q1	Q2	Q3	Q4	Q5
Mean	5159.6	5522.8	5642.1	5504.0	5384.1
Lower Confidence 90%	4376.482	4752.768	4883.567	4712.649	4566.375
Upper Confidence 90%	5942.727	6292.762	6400.548	6295.444	6201.905
Share of specialist visits	41.08%	40.16%	39.93%	40.31%	42.11%

Age-sex standardized per 1,000 population.



# Socio-economic status analysis: Diabetes tests

## Diabetes prevention – Age-sex standardized percentage rates

	Q1	Q2	Q3	Q4	Q5
No test received	13.37%	12.56%	12.03%	12.69%	12.13%
Lower Confidence 90%	10.98%	10.41%	10.22%	10.74%	10.09%
Upper Confidence 90%	15.76%	14.70%	13.83%	14.63%	14.18%
All tests received	44.24%	44.48%	45.91%	44.54%	44.69%
Lower Confidence 90%	39.10%	39.30%	41.25%	39.78%	39.58%
Upper Confidence 90%	49.39%	49.65%	50.58%	49.31%	49.79%



## Socio-economic status analysis: Hypertension tests

### Hypertension prevention – Age-sex standardized percentage rates

	Q1	Q2	Q3	Q4	Q5
No test received	19.47%	18.44%	18.26%	19.35%	18.38%
Lower Confidence 90%	16.29%	15.38%	15.64%	16.46%	15.46%
Upper Confidence 90%	22.65%	21.50%	20.88%	22.24%	21.29%
All tests received	10.30%	10.39%	10.42%	9.97%	9.99%
Lower Confidence 90%	8.32%	8.28%	8.60%	8.20%	8.12%
Upper Confidence 90%	12.29%	12.49%	12.25%	11.73%	11.86%



## Socio-economic status analysis: Share of patients given appropriate prescriptions at discharge

Prescriptions written	Q1	Q2	Q3	Q4	Q5
All	62.10%	62.90%	63.20%	65.10%	63.70%
None	1.52%	1.70%	1.60%	1.65%	1.40%



## Socio-economic status analysis: Follow-up rates (GP & AS)

Follow-up rates (GP & AS) - Non-standardized percentage rates					
	Q1	Q2	Q3	Q4	Q5
30 days - AMI	31.28%	36.46%	38.63%	40.48%	44.68%
90 days - AMI	45.21%	50.26%	52.52%	52.30%	56.12%
30 days - Stroke	33.23%	39.81%	47.65%	41.11%	48.09%
90 days - Stroke	42.62%	48.26%	56.30%	50.17%	55.74%
30 days - Heart failure	23.82%	27.14%	24.87%	29.17%	43.40%
90 days - Heart failure	36.66%	39.36%	39.15%	43.33%	56.60%
30 days - Cholecystectomy	45.11%	49.65%	49.37%	55.29%	48.37%
90 days - Cholecystectomy	47.39%	52.11%	51.68%	57.67%	49.02%
30 days - Hip fracture	25.13%	26.32%	24.72%	34.38%	30.51%
90 days - Hip fracture	36.18%	37.28%	38.20%	46.88%	40.68%



## Urban/rural and ethnicity analyses:

**Urban/rural analysis:** Municipalities in Estonia are of two types: urban municipalities or towns and rural municipalities or parishes. The analysis makes use of this distinction and a patient's registered place of living.

**Ethnicity analysis:** Ida-Viru county is the most north-eastern part of the country. Close to 80% of the population are of Russian origin and have limited command of the Estonian language. The analysis uses patients' residence in Ida-Viru as a proxy for their ethnicity.



## Urban/rural and ethnicity analyses: Avoidable hospital admissions

Avoidable hospital admissions – Age-sex standardized rates per 100,000 population				
	Urban	Rural	Ida-Viru	Rest of Estonia
Mean	894.5	1247.9	1164.0	978.5
Lower Confidence 90%	972.5	911.8	1034.9	906.4
Upper Confidence 90%	1376.8	1158.3	1293.1	1050.7



# Urban/rural and ethnicity analyses: Avoidable specialist visits

Avoidable specialist visits – Age-sex standardized rates per 100,000 population				
	Urban	Rural	Ida-Viru	Rest of Estonia
Mean	4325.4	3043.1	3021.7	4102.2
Lower Confidence 90%	3980.6	2774.0	2645.8	3789.4
Upper Confidence 90%	4670.2	3312.3	3397.5	4414.9



## Urban/rural and ethnicity analyses:(Usual) provider continuity

All outpatients visits (Family Doctor, Ambulatory Specialist, Nurse, Home visits (excluding dentist visits)).

Outpatient care contacts – Age-sex standardized rates per 1,000 population				
	Urban	Rural	Ida-Viru	Rest of Estonia
Mean	5237.2	6082.0	5811.6	5493.6
Lower Confidence 90%	3996.8	4698.4	4623.8	4192.8
Upper Confidence 90%	6477.6	7465.7	6999.4	6794.4
Share of specialist visits	45.99%	37.88%	48.99%	42.23%

Age-sex standardized per 1,000 population.



# Urban/rural and ethnicity analyses: Diabetes tests

<b>Diabetes prevention – Age-sex standardized percentage rates</b>				
	Urban	Rural	Ida-Viru	Rest of Estonia
No test received	12.94%	13.11%	14.74%	12.61%
Lower Confidence 90%	10.98%	10.41%	10.22%	10.74%
Upper Confidence 90%	15.76%	14.70%	13.83%	14.63%
All tests received	45.79%	41.60%	45.34%	44.29%
Lower Confidence 90%	41.13%	37.10%	40.59%	39.72%
Upper Confidence 90%	50.44%	46.09%	50.10%	48.86%



## Urban/rural and ethnicity analyses: Hypertension tests

Hypertension prevention – Age-sex standardized percentage rates				
	Urban	Rural	Ida-Viru	Rest of Estonia
No test received	18.97%	20.05%	21.75%	18.75%
Lower Confidence 90%	16.20%	17.23%	18.72%	16.00%
Upper Confidence 90%	21.74%	22.87%	24.77%	21.50%
All tests received	10.29%	9.87%	8.35%	10.60%
Lower Confidence 90%	8.47%	8.15%	6.90%	8.73%
Upper Confidence 90%	12.10%	11.59%	9.79%	12.46%



## Urban/rural and ethnicity analyses : Share of patients given appropriate prescriptions at discharge

Prescriptions written	Urban	Rural	Ida-Viru	Rest of Estonia
All	62.26%	65.35%	62.25%	63.75%
None	1.44%	1.85%	1.30%	1.68%



## Urban/rural and ethnicity analyses: Follow-up rates (GP & AS)

Follow-up rates (GP & AS) - Non-standardized percentage rates				
	Urban	Rural	Ida-Viru	Rest of Estonia
30 days - AMI	35.79%	36.06%	35.83%	35.90%
90 days - AMI	49.28%	49.30%	50.19%	49.09%
30 days - Stroke	39.98%	37.64%	38.96%	39.13%
90 days - Stroke	49.26%	45.21%	45.71%	48.08%
30 days - Heart failure	30.11%	21.79%	30.75%	24.59%
90 days - Heart failure	42.71%	34.49%	45.15%	36.65%
30 days - Cholecystectomy	51.53%	44.25%	58.99%	47.47%
90 days - Cholecystectomy	53.35%	46.73%	61.83%	49.44%
30 days - Hip fracture	25.91%	25.15%	44.23%	23.30%
90 days - Hip fracture	37.21%	34.97%	51.92%	34.47%



# Gender analysis: Avoidable hospital admissions

Avoidable hospital admissions – Age standardized rates per 100,000 population		
	Females	Males
Mean	873.7	1202.7
Lower Confidence 90%	791.9	1126.3
Upper Confidence 90%	955.5	1279.1



# Gender analysis: Avoidable specialist visits

## Avoidable specialist visits – Age standardized rates per 100,000 population

	Females	Males
Mean	4128.5	3559.3
Lower Confidence 90%	3737.3	3299.4
Upper Confidence 90%	4519.8	3819.2



## Gender analysis: (Usual) provider continuity

All outpatients visits (Family Doctor, Ambulatory Specialist, Nurse, Home visits (excluding dentist visits)).

Outpatient care contacts – Age-sex standardized rates per 1,000 population		
	Females	Males
Mean	6312.3	4413.0
Lower Confidence 90%	5506.8	3854.7
Upper Confidence 90%	7117.8	4971.4
Share of specialist visits	42.37%	38.55%

Age-sex standardized per 1,000 population.



## Gender analysis: Diabetes tests

Diabetes prevention – Age standardized percentage rates		
	Females	Males
No test received	11.83%	13.59%
Lower Confidence 90%	9.83%	11.51%
Upper Confidence 90%	13.83%	15.67%
All tests received	46.26%	42.18%
Lower Confidence 90%	41.34%	37.62%
Upper Confidence 90%	51.17%	46.75%



## Gender analysis: Hypertension tests

Hypertension prevention – Age standardized percentage rates		
	Females	Males
No test received	18.14%	19.70%
Lower Confidence 90%	15.33%	16.89%
Upper Confidence 90%	20.96%	22.50%
All tests received	10.49%	9.84%
Lower Confidence 90%	8.54%	8.18%
Upper Confidence 90%	12.44%	11.50%



## Urban/rural and ethnicity analyses : Share of patients given appropriate prescriptions at discharge

Prescriptions written	Females	Males
All	64.40%	62.32%
None	1.25%	1.97%



## Gender analysis: Follow-up rates (GP & AS)

Follow-up rates (GP & AS) - Non-standardized percentage rates		
	Females	Males
30 days - AMI	32.82%	39.54%
90 days - AMI	47.21%	51.65%
30 days - Stroke	35.76%	42.70%
90 days - Stroke	44.29%	51.47%
30 days - Heart failure	23.53%	29.03%
90 days - Heart failure	35.42%	42.52%
30 days - Cholecystectomy	50.63%	43.78%
90 days - Cholecystectomy	52.33%	46.85%
30 days - Hip fracture	24.92%	27.48%
90 days - Hip fracture	35.89%	37.79%



## Self-management impairment analysis: Avoidable hospital admissions

Avoidable hospital admissions – Age-sex standardized rates per 100,000 population				
	Total Population	Depression	Dementia	Hearing/vision loss
Mean	999.1	1495.8	2907.6	1298.2
Lower Confidence 90%	922.3	1293.8	-459.2	777.4
Upper Confidence 90%	1075.9	1697.7	6274.4	1819.0



# Self-management impairment analysis: Avoidable specialist visits

## Avoidable specialist visits – Age-sex standardized rates per 100,000 population

	Total Population	Depression	Dementia	Hearing/vision loss
Mean	3928.5	6272.3	2228.4	5837.8
Lower Confidence 90%	3607.4	5085.0	1396.7	4213.0
Upper Confidence 90%	4249.5	7459.5	3060.0	7462.5



# Self-management impairment analysis: (Usual) provider continuity

All outpatients visits (Family Doctor, Ambulatory Specialist, Nurse, Home visits (excluding dentist visits)).

Outpatient care contacts – Age-sex standardized rates per 1,000 population				
	Total Population	Depression	Dementia	Hearing/vision loss
Mean	5503.8	8636.3	5305.1	6897.9
Lower Confidence 90%	4218.1	7379.9	3891.3	5517.2
Upper Confidence 90%	6789.4	9892.8	6718.9	8278.7
Share of specialist visits	43.17%	41.71%	42.79%	52.02%

Age-sex standardized per 1,000 population.



# Self-management impairment analysis: Diabetes tests

## Diabetes prevention – Age-sex standardized percentage rates

	Total Population	Depression	Dementia	Hearing/vision loss
No test received	12.98%	10.62%	19.18%	8.62%
Lower Confidence 90%	11.00%	9.10%	13.52%	6.77%
Upper Confidence 90%	14.96%	12.15%	24.84%	10.46%
<b>All tests received</b>	<b>44.48%</b>	<b>44.57%</b>	<b>35.18%</b>	<b>48.18%</b>
Lower Confidence 90%	39.88%	40.04%	29.08%	42.40%
Upper Confidence 90%	49.07%	49.09%	41.28%	53.96%



# Self-management impairment analysis: Hypertension tests

## Hypertension prevention – Age-sex standardized percentage rates

	Total Population	Depression	Dementia	Hearing/vision loss
No test received	19.32%	15.00%	27.22%	14.14%
Lower Confidence 90%	16.53%	12.79%	20.15%	11.47%
Upper Confidence 90%	22.10%	17.21%	34.28%	16.80%
All tests received	10.15%	10.41%	7.46%	12.12%
Lower Confidence 90%	8.37%	8.61%	5.51%	9.54%
Upper Confidence 90%	11.93%	12.21%	9.40%	14.70%