

# **Non-adherence to CVD treatment: consequences and modern approaches for overcoming**

**Anna Kontsevaya, MD, PhD, FESC**

Russian Society of Cardiology  
Director of educational programs

National research center for preventive medicine  
Head of research laboratory

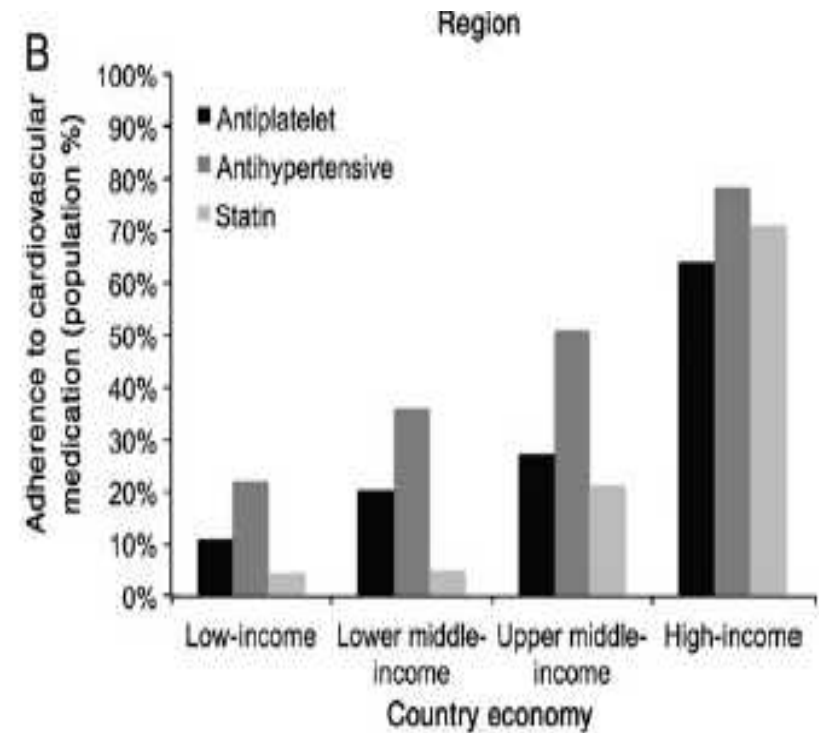
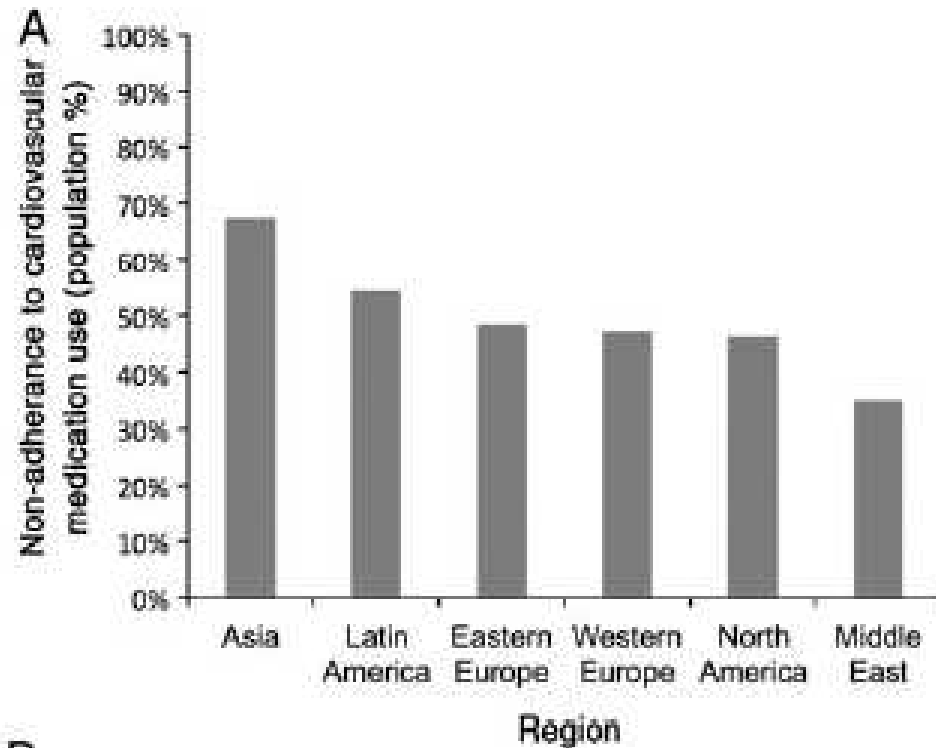
30 October 2015

# Non-adherence is pandemic

- Non-adherence to cardiovascular medications is pandemic and a leading risk factor for treatment failures and poor outcomes.
- The impact of non-adherence is medication-dependent; it must be defined and measured in the context of a particular therapy.
- Drivers for non-adherence are multifactorial and patientspecific; application of screening tools remains fragmented and ineffective.
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- Treatment of non-adherence is multimodal and resourceintensive; linking accurate screens to tailored, collaborative interventions involving patients, providers, and payers are needed to maximize cost-effectiveness.

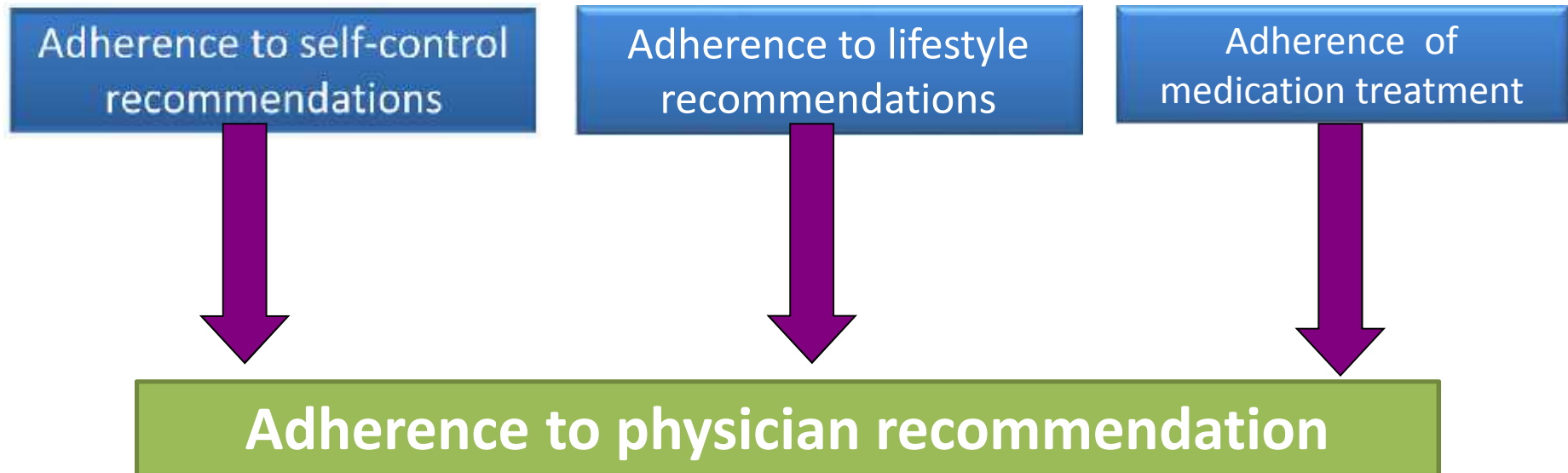
Kolandaivelu K. Clinical update. Non-adherence to cardiovascular medications. European Heart Journal (2014) 35, 3267–3276

# Non-adherence is pandemic

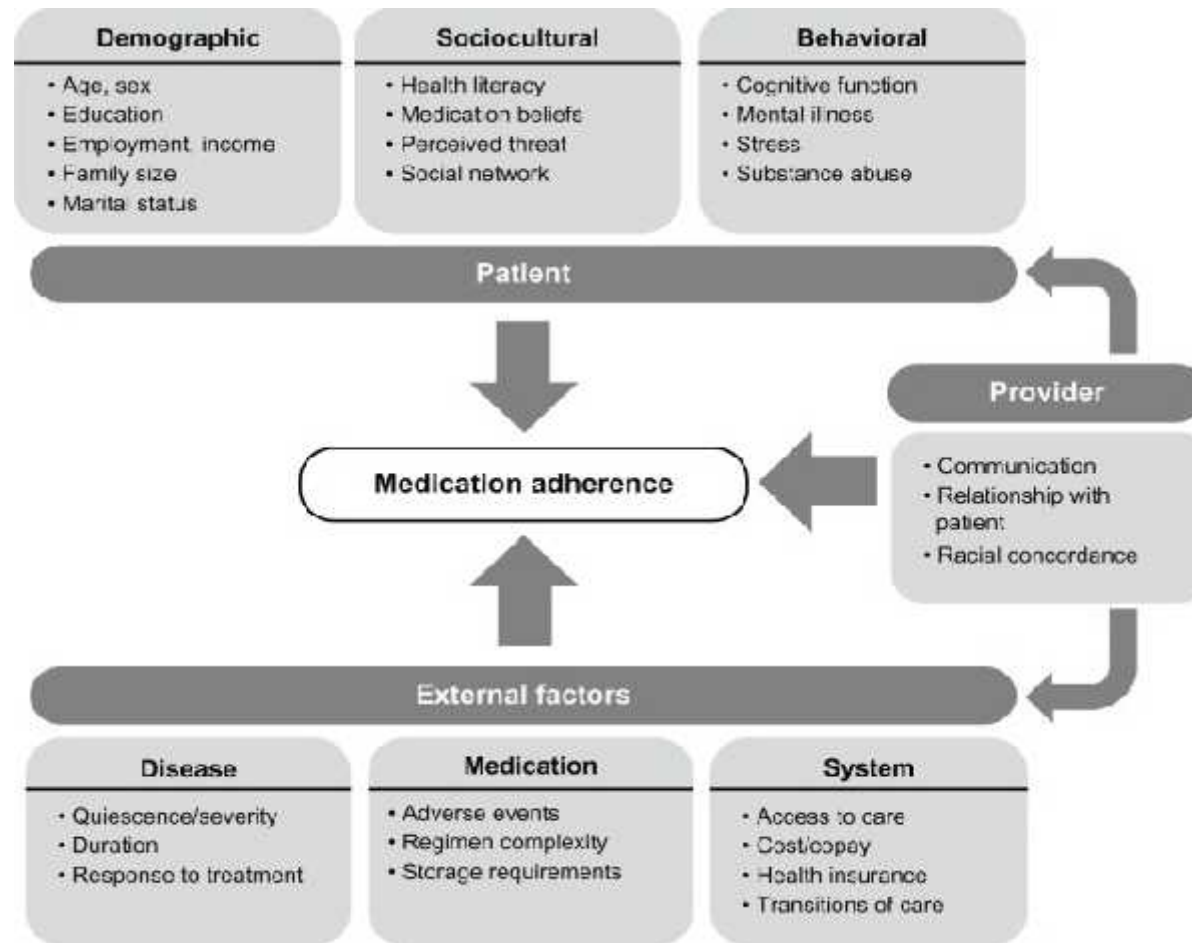


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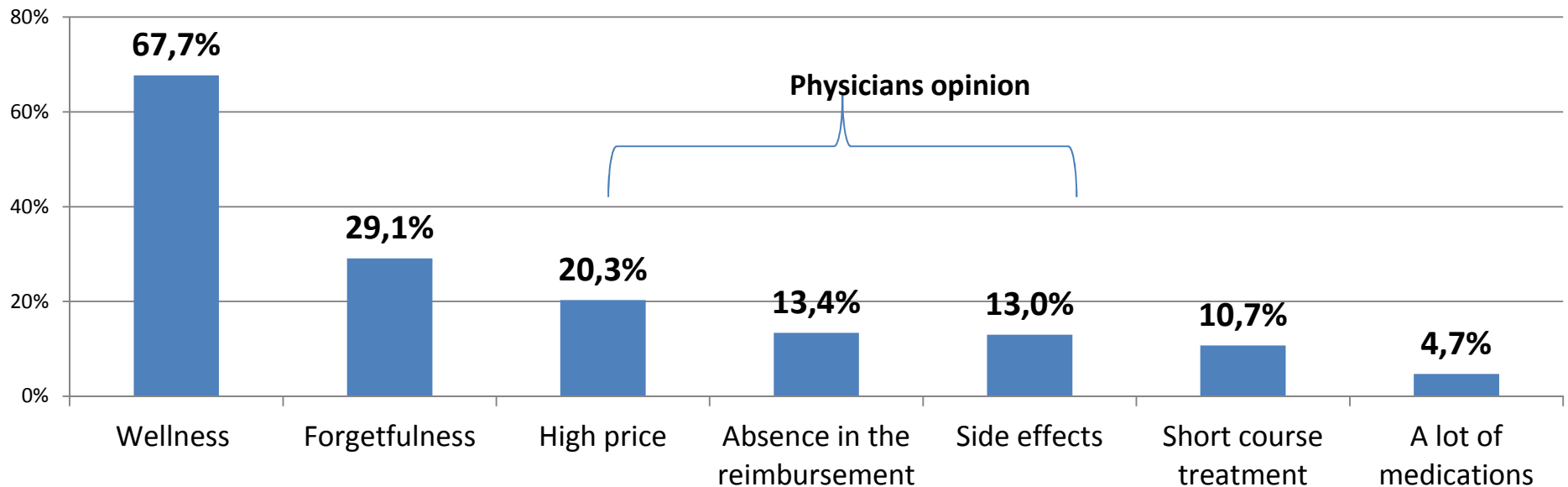
# Component of adherence to treatment



# Selected determinants of medication adherence



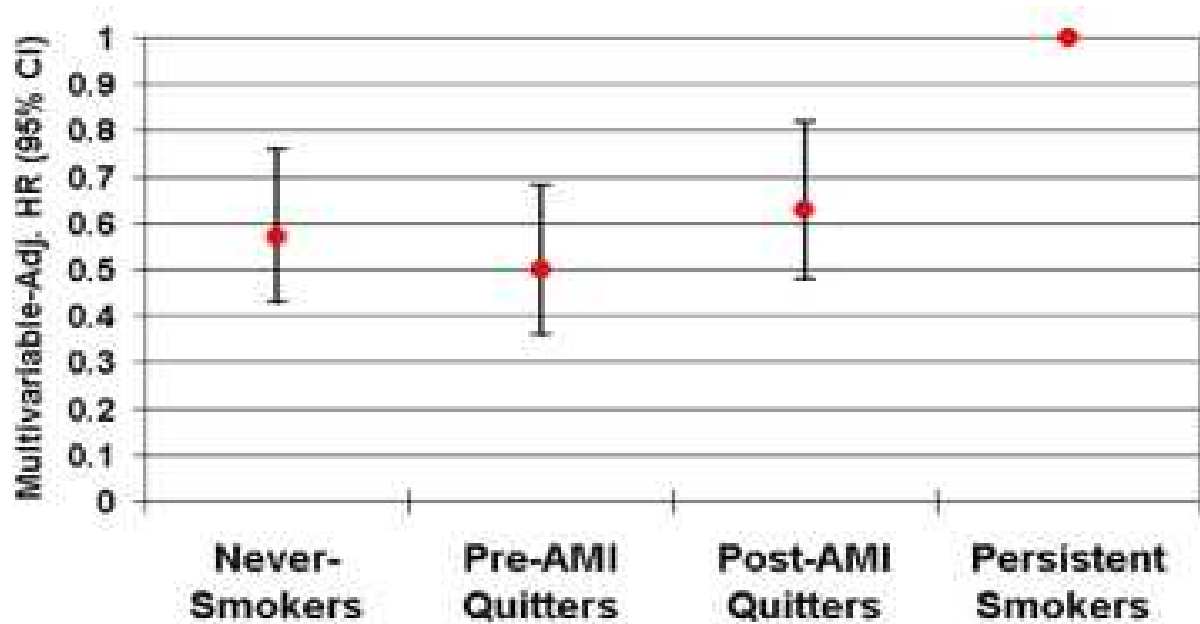
# Reasons of non-adherence to CVD drugs among patients of specialized cardiac clinic



Patients' reasons for non-adherence differ from the physicians' opinion on this topic: patients calls mainly controllable factors such as wellness, physicians consider that it is mainly uncontrollable factors as high prices on medications.

N=1200, 100% hypertension, 40% CHD

# Smoking status and long-term survival after MI

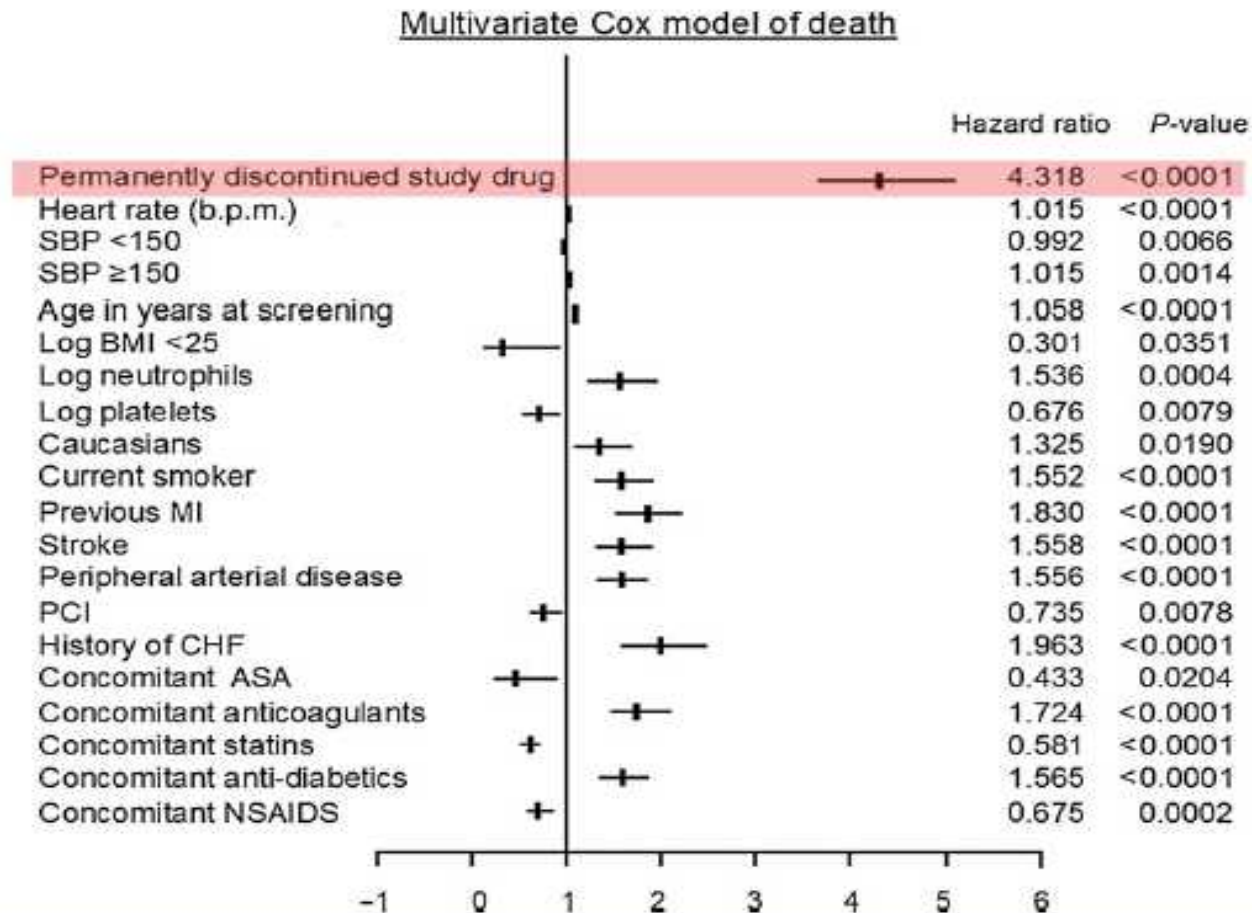


Yariv Gerber , Laura J. Rosen , Uri Goldbourt , Yael Benyamini , Yaacov Drory **Smoking Status and Long-Term Survival After First Acute Myocardial Infarction : A Population-Based Cohort Study** Journal of the American College of Cardiology, Volume 54, Issue 25, 2009, 2382 - 2387.

The same concerning rational diet.

Lifestyle modification is the best that patient can do, but they often consider that after such events as MI they can do anything they want.

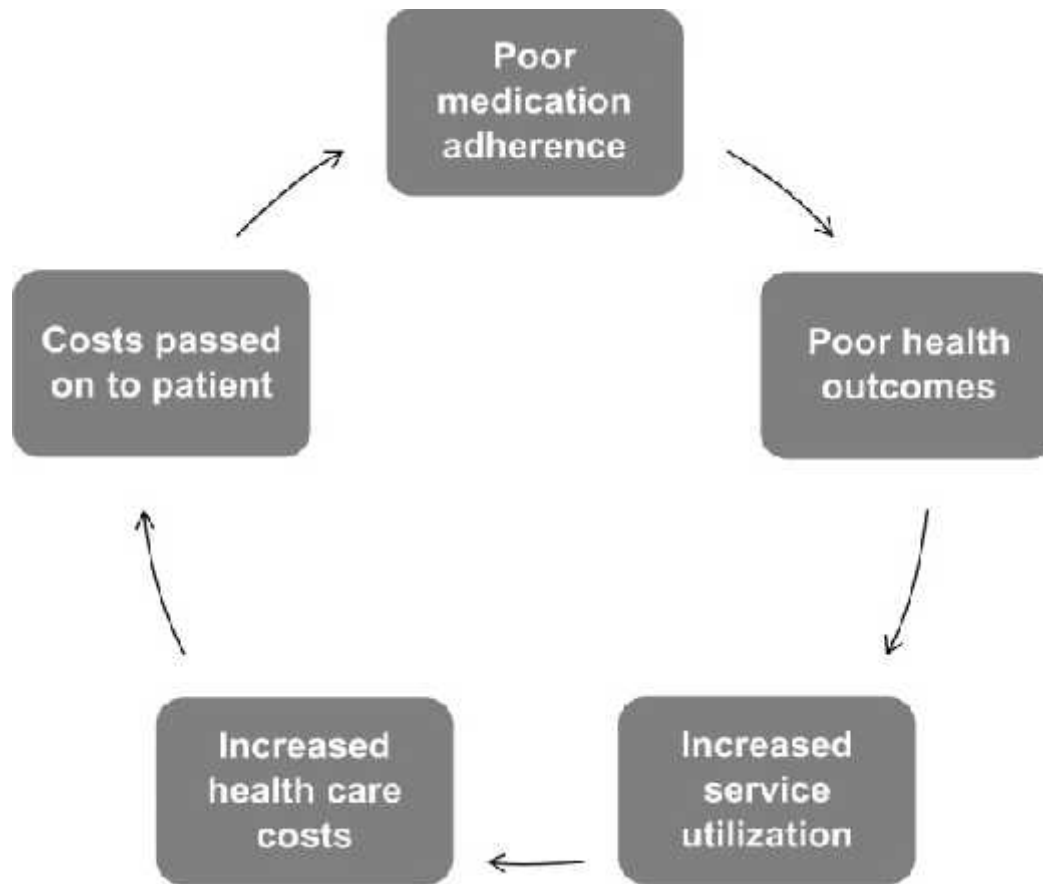
# Non-adherence dominates risk



Collet JP, Montalescot G, Steg PG, Steinhubl SR, Fox KA, Hu TF, Johnston SC, HammCW, Bhatt DL, Topol EJ. Clinical outcomes according to permanent discontinuation of clopidogrel or placebo in the CHARISMA trial. Arch Cardiovasc Dis 2009; 102:485–496.

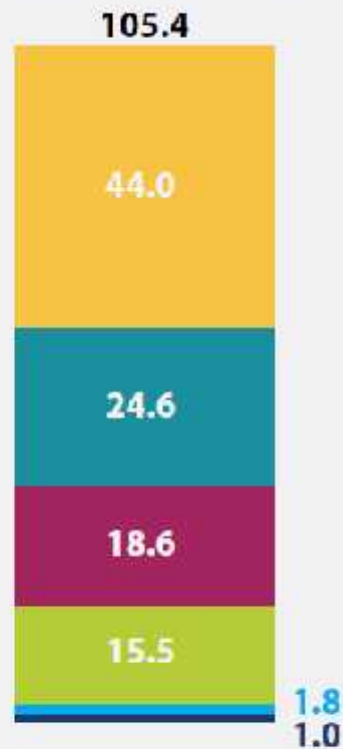


**Conceptual diagram displaying a mechanism that may contribute to the maintenance of the medication nonadherence problem**

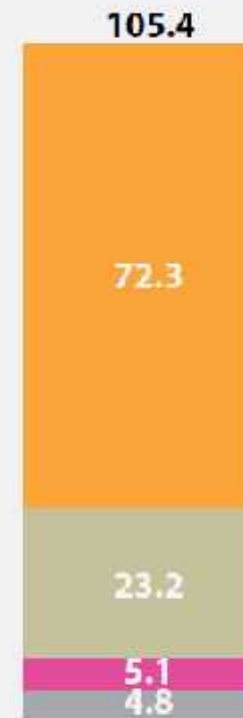


# Avoidable costs of non-adherence

Avoidable costs by disease, US\$Bn



Avoidable costs by settings of care, US\$Bn



- Congestive heart failure
- HIV
- Osteoporosis
- Hypertension
- Diabetes
- Hypercholesterolemia

- ER
- Pharmacy
- Outpatient
- Hospital

Source: Avoidable costs in healthcare study

# NICE guidance

Medicines Adherence – Involving patients in decisions about prescribed medicines and supporting adherence (Clinical Guideline 76)

- Involve patients in decisions about medicines
- Support adherence
- Review medicines
- Improve communication between healthcare professionals



# Modern technologies for improving adherence

Computers

Web-sites for patients

Web-sites for physicians



Mobile phone

Reminding

Mobile apps



SMS







In 2013 there were more than 40 000 medical mobile apps



# Different variants of mobile apps-1

Patient Journey stage	Description	No.	Functionality	Example
Prevention/Healthy Living 	Focus on factors associated with overall wellness: <ul style="list-style-type: none"> <li>• Healthy eating</li> <li>• Weight management</li> <li>• Fitness</li> <li>• Tips for healthy living</li> <li>• Smoking cessation</li> <li>• Stress management</li> <li>• Sleep</li> </ul>	8,786 apps	<ul style="list-style-type: none"> <li>• Display information</li> <li>• Display pre-loaded instructions for diet &amp; fitness</li> <li>• Record and display user entered data</li> <li>• Track weight measurements over time</li> </ul>	<ul style="list-style-type: none"> <li>• CalorieCounter</li> <li>• NikeTrainingClub</li> <li>• OneSportsMan</li> <li>• Weight and BMI diary</li> </ul>
Symptomatic/ Self-diagnosis 	<ul style="list-style-type: none"> <li>• Reference for common symptoms/conditions</li> <li>• Diagnosis based on data inputted/question answered</li> <li>• Communication with medical professionals</li> </ul>	304 apps	<ul style="list-style-type: none"> <li>• Display reference information</li> <li>• Record users answers and display appropriate guidance</li> <li>• Communication interface between patient and physician</li> </ul>	<ul style="list-style-type: none"> <li>• NHS Health and Symptom Checker</li> <li>• SingHealth Health Buddy</li> <li>• Medibank Symptom Checker</li> <li>• Melanoma Visual Risk Checker</li> <li>• Am I depressed?</li> <li>• HealthTap</li> </ul>

# Different variants of mobile apps-2

<p>Finding a Physician</p> 	<ul style="list-style-type: none"> <li>• Locate most appropriate physician or healthcare facility and find contact information</li> <li>• Rate and review physicians</li> <li>• Appointment reminders</li> </ul>	<p>931 apps</p>	<ul style="list-style-type: none"> <li>• Display search results</li> <li>• Display location information (and connect to GPS)</li> <li>• Connect to phone function</li> <li>• Display reviews</li> <li>• Remind appointments</li> </ul>	<ul style="list-style-type: none"> <li>• BetterDoctor</li> <li>• US Hospitals Lite</li> <li>• Patient fusion</li> <li>• Doctor visit manager</li> </ul>
<p>Education post-diagnosis</p> 	<p>Provide health reference material:</p> <ul style="list-style-type: none"> <li>• Drugs/medication information</li> <li>• Emergency and first aid information</li> <li>• Condition management information</li> </ul>	<p>562 apps</p>	<ul style="list-style-type: none"> <li>• Display drug information</li> <li>• Display condition information</li> <li>• Record user entered data</li> <li>• Can connect to healthcare professionals or emergency services</li> </ul>	<ul style="list-style-type: none"> <li>• Drug Guide for Consumers</li> <li>• Family Drug Guide</li> <li>• Pill identifier by drugs.com</li> <li>• Health Handbook</li> <li>• Emergency Info 4Family</li> <li>• Medical Facts+</li> </ul>
<p>Filling prescription</p> 	<ul style="list-style-type: none"> <li>• Finding pharmacy</li> <li>• Price scans for medications/special offers</li> <li>• Refilling of prescriptions</li> <li>• Drug interactions and side effects</li> </ul>	<p>200 apps</p>	<ul style="list-style-type: none"> <li>• Display search results</li> <li>• Display location information (and connect to GPS)</li> <li>• Connect to pharmacy systems to register prescriptions</li> <li>• Offer discounts on medications</li> </ul>	<ul style="list-style-type: none"> <li>• CVS Pharmacy</li> <li>• Walgreens</li> <li>• LowestMed Mobile</li> </ul>
<p>Compliance</p> 	<p>Assisting the patient to act within the prescribed interval and dose of a dosing regimen:</p> <ul style="list-style-type: none"> <li>• Pill reminders</li> <li>• Medication trackers</li> <li>• Alert support network if dose not recorded</li> </ul>	<p>225 apps</p>	<ul style="list-style-type: none"> <li>• Provide reminders</li> <li>• Display information</li> <li>• Record user entered data (e.g. register dose was taken)</li> <li>• Communicate with support network</li> </ul>	<ul style="list-style-type: none"> <li>• Medicine Reminder HD - with Local Notifications</li> <li>• MediSafe - virtual pillbox</li> </ul>

# Calories counter FatSecret

The screenshot displays the FatSecret mobile application interface. The left panel shows the main menu with a search bar and various icons for 'Quick Pick' (Foods, Restaurants & Chains, Popular Brands, Supermarket Brands) and 'My Counter' (Food Diary, Exercise Diary, Diet Calendar, Weight Tracker, Sync, Settings). The right panel shows the 'Diet Calendar' for October, featuring a table with columns for 'Calories (kcal)', 'RDI%', 'Food', 'Exer.', and 'Net'.

	Calories (kcal)	RDI%	Food	Exer.	Net
13 Wed	2,286	114%	2,286	2,868	-582 ↓
12 Tue	2,576	129%	2,576	2,695	-119 ↓
11 Mon	2,591	130%	2,591	2,620	-29 ↓
10 Sun	2,370	119%	2,370	2,367	3 ↑
9 Sat	2,131	107%	2,131	2,607	-476 ↓
8 Fri	2,358	118%	2,358	2,520	-162 ↓
7 Thu	2,294	115%	2,294	2,554	-260 ↓
6 Wed	2,607	130%	2,607	2,427	180 ↑



# Step counter



Goal is 10 000 steps per day

# Medicine reminder HD



