



# PIM-Check<sup>®</sup>: Potentially Inappropriate Medication Check-list for prescriptions in internal medicine



**Aude DESNOYER**  
PharmD – PhD student



Seminar M1  
Wednesday, 25 March 2015 - 2:00pm to 3:30pm  
Thursday, 26 March 2015 - 9:00am to 10:30am



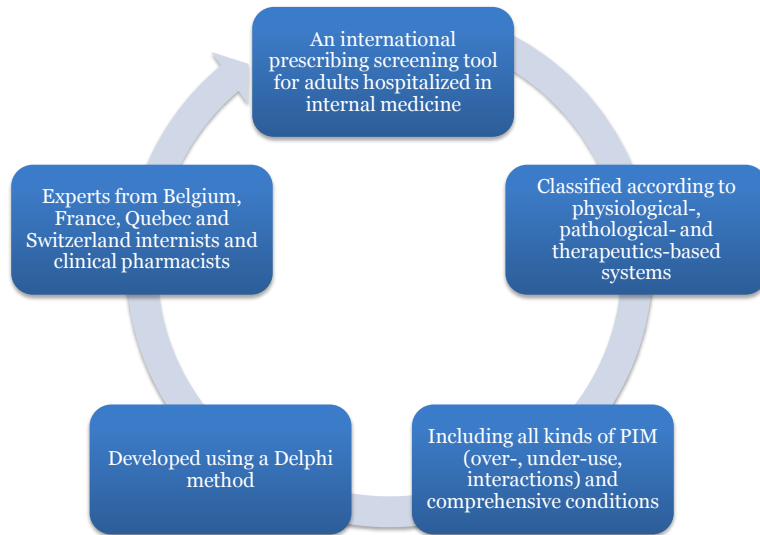
# Nothing to disclose

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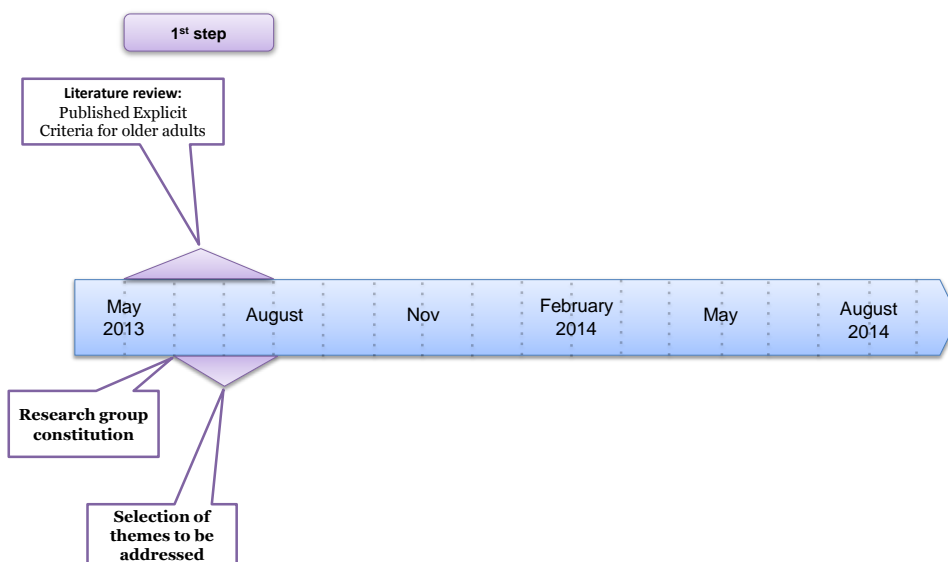


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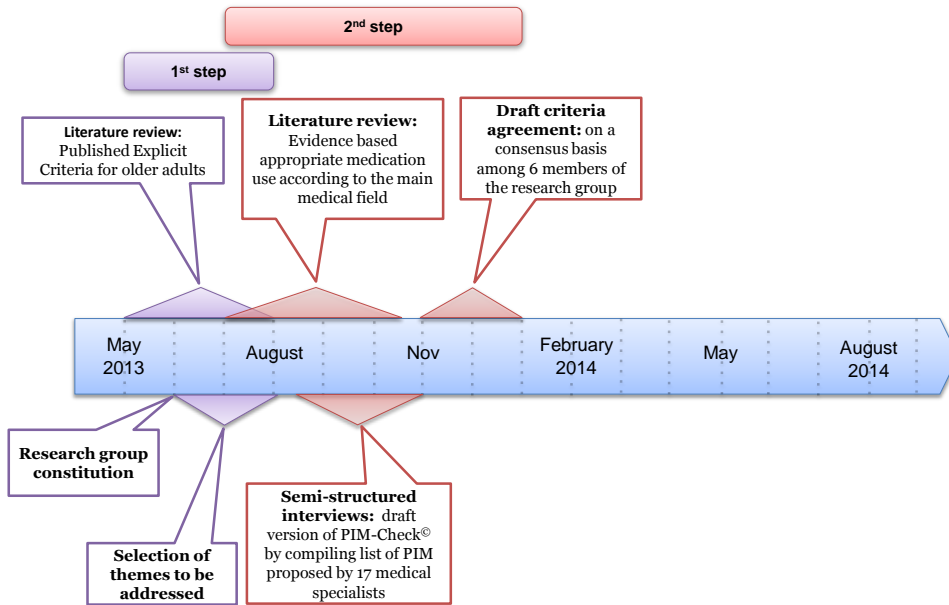
## Our objectives



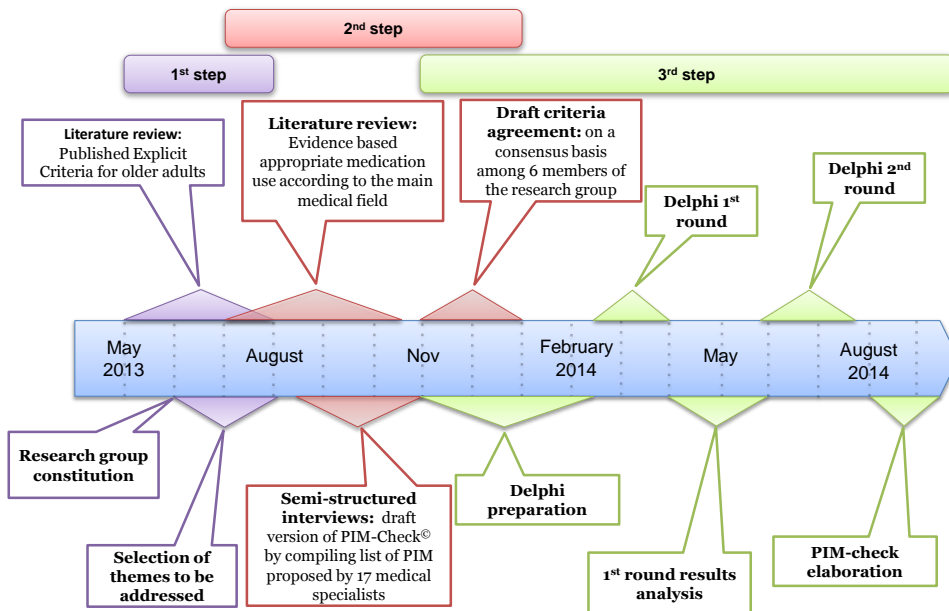
## Our method



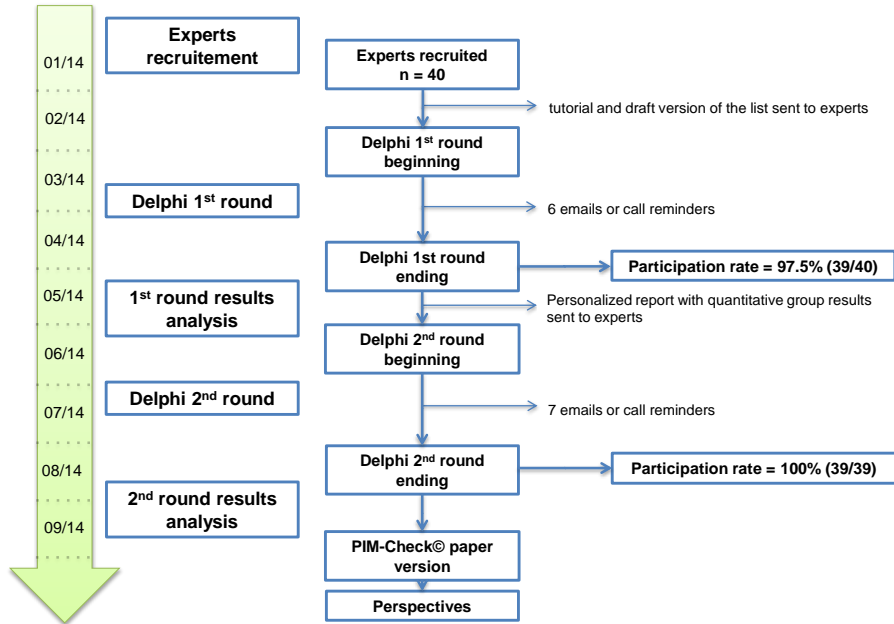
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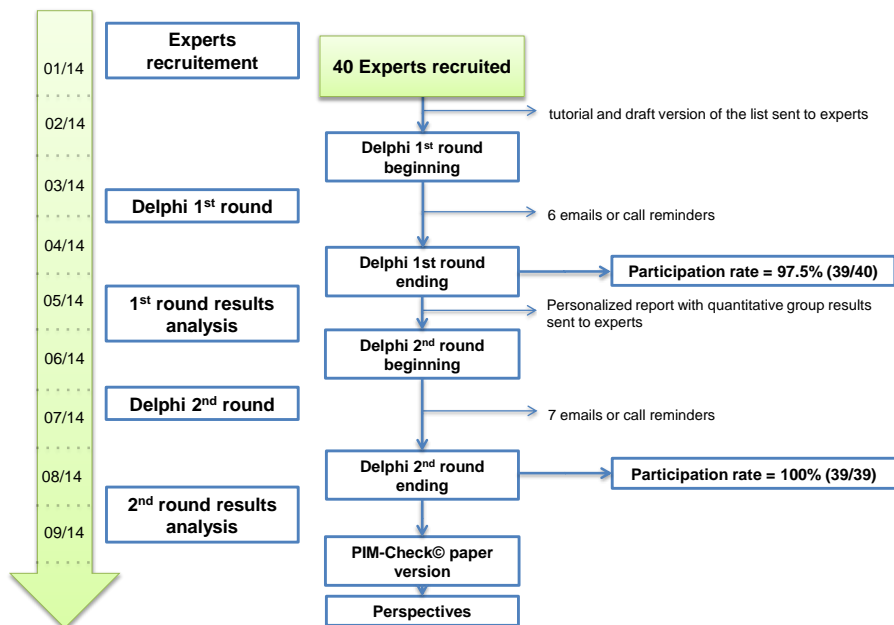
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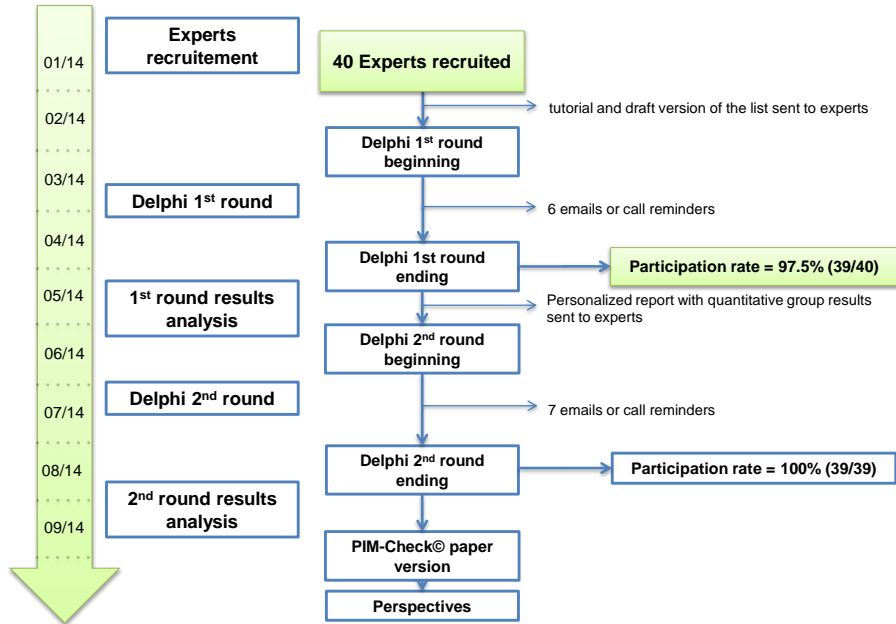
## Delphi method



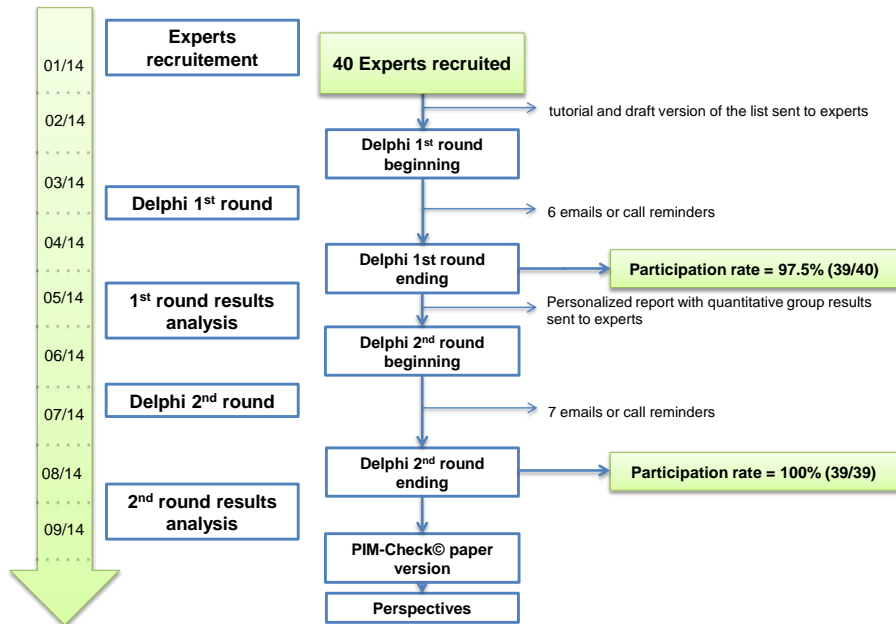
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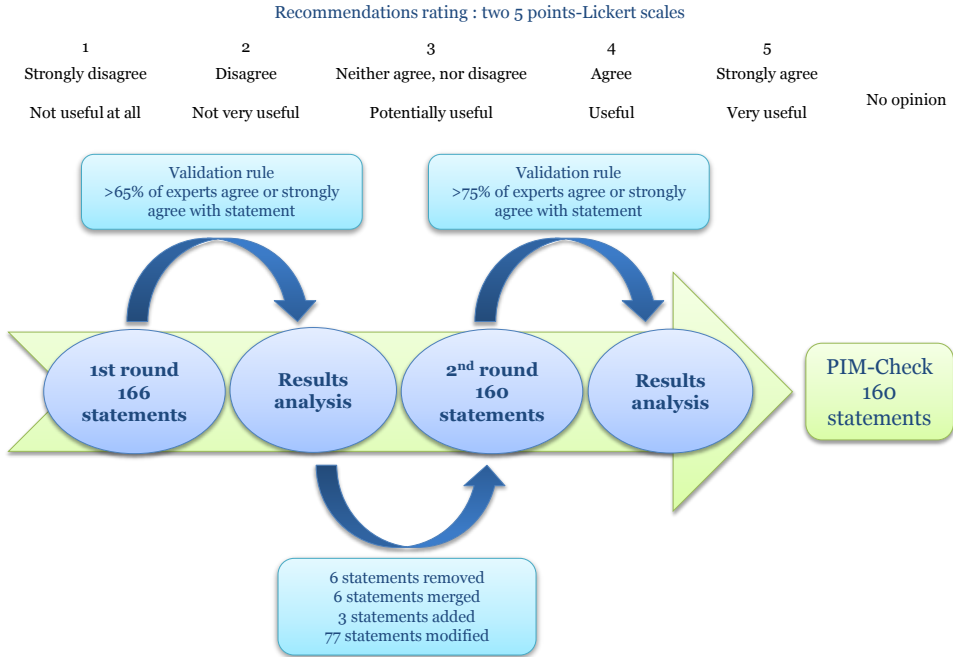
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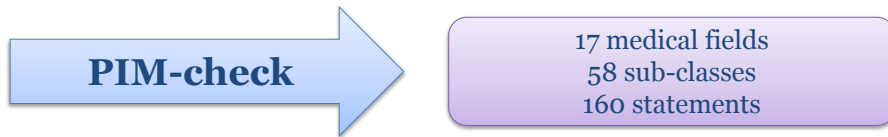
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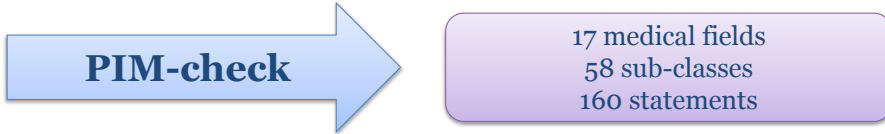


## Our Tool



Medical fields
Cardiology
Angiology/Haemostasis
Endocrinology
Pneumology
Nephrology
Gastroenterology
Rheumatology
Neurology
Psychiatry
Pain/Analgesia
Infectiology
Ophthalmology
Dependencies
Obesity
Pharmacology/Toxicology
Transplants
Vaccination

## Our Tool



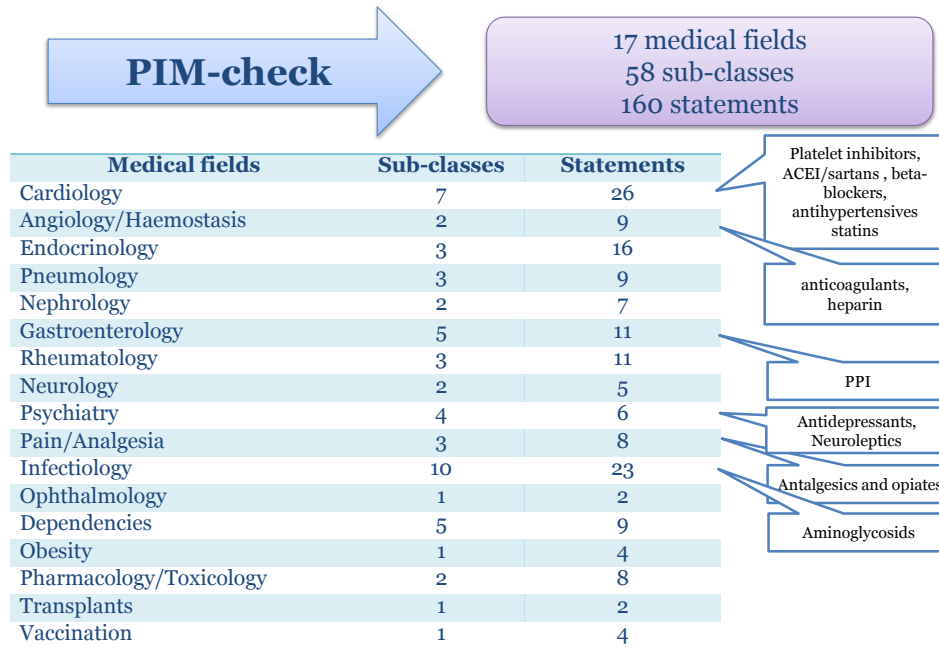
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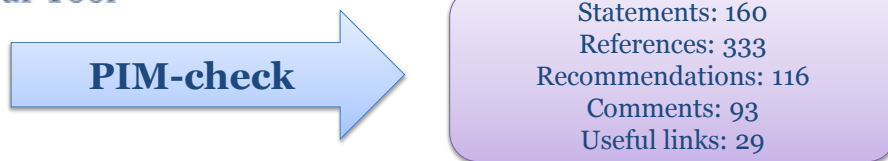


Medical fields	Sub-classes	
Cardiology	7	Hypertension Post-MI Heart failure Atrial fibrillation
Angiology/Haemostasis	2	
Endocrinology	3	Diabetes
Pneumology	3	
Nephrology	2	Renal failure
Gastroenterology	5	Gastric ulcer prevention
Rheumatology	3	
Neurology	2	
Psychiatry	4	Psychiatric diseases
Pain/Analgesia	3	
Infectiology	10	
Ophthalmology	1	Pain management
Dependencies	5	
Obesity	1	Alcoholism
Pharmacology/Toxicology	2	
Transplants	1	
Vaccination	1	

## Our Tool



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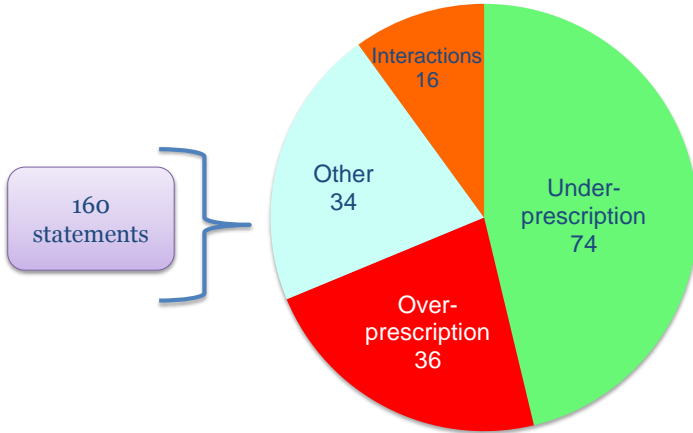




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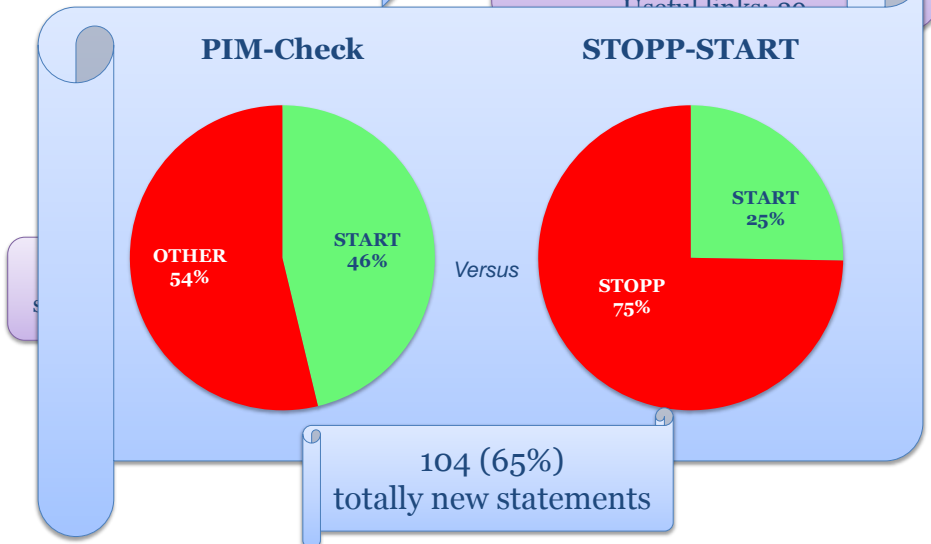
Statements: 160  
References: 333  
Recommendations: 116  
Comments: 93  
Useful links: 29



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## 4 different kinds of statements

## Under-prescription statements

CARDIOLOGY/HYPOLIPIDEMICS  
First line hypolipidemie: statins

**UP** Prescribe a first line statin in case of mixed dyslipidaemia hypercholesterolemia, when pharmaceutical care is necessary\*

**RATIONALE**  
Prevention of heart disease. Allows a decrease in the LDL-c and triglycerides and an increase in the HDL-c.

**RECOMMANDATION**  
\*Suggested dosing regimen: maximum tolerated dose making it possible to achieve the target LDL-c level, based on the cardiovascular risk (\* see item 5).

**REFERENCES**  
CCSG 2012 : Diagnosis and Treatment of Dyslipidemia for the Prevention of Cardiovascular Disease in the Adult  
ACC/AHA 2013 : Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults  
ESC 2011 : Dyslipidemias (Management of)

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## Over-prescription statements

GASTROENTEROLOGY/PROTON PUMP INHIBITORS  
PPI started during hospitalisation

**OP** Stop PPI treatment before the patient is discharged, if that treatment was started during hospitalisation to prevent bleeding

**RATIONALE**  
Avoid long-term treatments with no indication. Potential risk of pneumopathy, Clostridium difficile infection, osteoporosis and rebound effect upon stopping PPIs.

**RECOMMANDATION**  
Gradual stopping of PPI's may be suggested in order to avoid rebound acidity, if the treatment has been extended.

**REFERENCE**  
HAS 2009 : Médicaments inhibiteurs de la pompe à protons chez l'adulte : réévaluation

## 4 different kinds of statements

### Drug-Drug interactions statements

NEUROLOGY/EPILEPSY AND ANTI-EPILEPTICS  
Anti-epileptics and drug interactions

**DDI**

**Evaluate the risk of drug interactions and adapt the treatment in the event a new treatment is introduced in patients receiving anti-epileptics**  
(in particular with CYP and/or Pgp inducers/inhibitors\*)

**RATIONALE**  
Anti-epileptics (except gabapentin, pregabalin, vigabatrin and levetiracetam) at least partially undergo hepatic metabolism. Some anti-epileptics are enzyme inducers or inhibitors. Risk of toxicity, imbalance or ineffectiveness of various treatments.

**RECOMMENDATION**  
Favour a therapeutic alternative or monitor the concentrations of the anti-epileptic and/or associated treatments.

**REMARKS**  
Enzyme-inducing anti-epileptics: carbamazepine, lacosamide, lamotrigine, oxcarbazepine, phenytoin,

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Enzyme-inhibiting anti-epileptics: valproic acid, topiramate, felbamate.

**USEFUL LINK**  
[HUG 2012: Drug interactions, cytochromes P450 and P-glycoprotein \(Pgp\)](#)

**REFERENCES**  
[ILAE 2008: Antiepileptic drugs—best practice guidelines for therapeutic drug monitoring](#)  
[Fatsios P, et al. The importance of drug interactions in epilepsy therapy. Epilepsia 2002](#)

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### Other kind of PIM

PNEUMOLOGY/CHRONIC RESPIRATORY DISEASES  
Inhalation chamber

**Ot**

**Favour the use of an inhalation chamber for the administration of products in inhalers in the event of worsening of chronic respiratory disease or poor hand-lung coordination**

RATIONALE  
Improves the intrapulmonary deposit and the efficacy of treatments.

RECOMMENDATIONS  
Gradual stopping of PPI's may be suggested in order to avoid rebound acidity, if the treatment has been extended.

REFERENCES  
[NHBI/NH 2007 - Guidelines for the Diagnosis and Management of Asthma](#)

**Let's start to use it !**

## Let's start to use it

With Mrs X, 55 years old

- ✦ **Admission pattern**
  - ✦ Back pain,
  - ✦ Fever for 5 days,
  - ✦ Increased frequency of urination
- ✦ **Medical diagnostic**
  - ✦ Acute pyelonephritis with sever sepsis
- ✦ **Past medical history**
  - ✦ ST-elevation myocardial infarction (2012)
  - ✦ Post-tabacco COPD
  - ✦ Obesity with BMI = 31.2 kg/m<sup>2</sup>  
(80 kg; 160 cm)
- ✦ **Physical examination**
  - ✦ Hyperthermia, tachycardia, hypotension
- ✦ **Laboratory test results**
  - ✦ Creatinin clearance : 72ml/min/1.73m<sup>2</sup>
  - ✦ LDL-c: 2.4 mmol/L

### **Her current treatment is:**

Perindopril 10 mg – Once a day  
 Atorvastatin 20 mg – Once a day  
 Aspirin 100 mg – Once a day  
 Beclometasone dipropionate INH 500 mcg – Twice a day  
 Ceftriaxone IV 2g – Once a day  
 Gentamicin IM 5mg/kg/day (400mg/day)

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**Over-prescription**

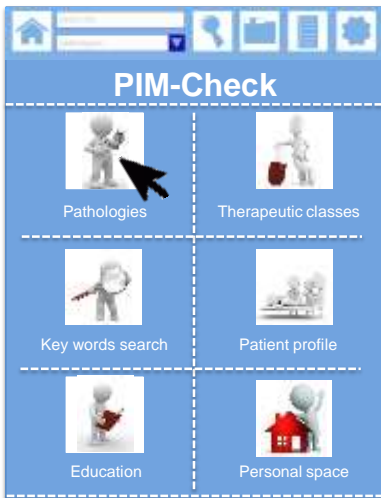
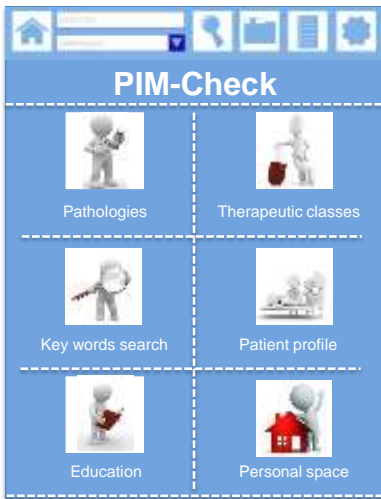
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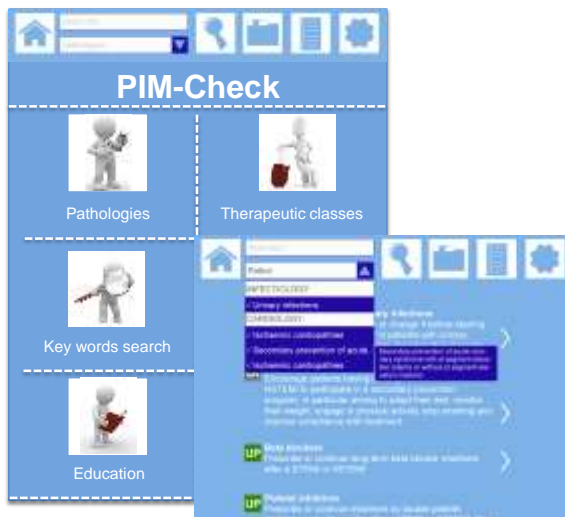
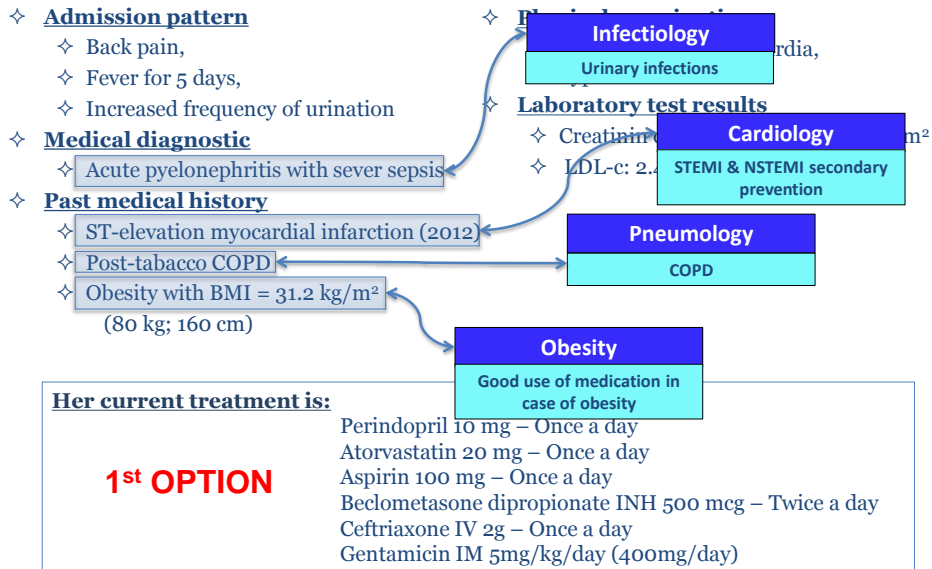
**Interactions**

**Other PIM**



## Let's start to use it

With Mrs X, 55 years old







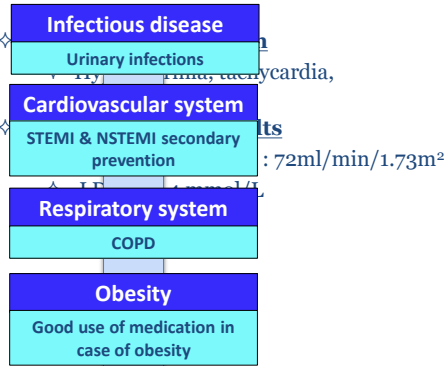
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**Her current treatment is:**

**1<sup>st</sup> OPTION**

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- Atorvastatin 20 mg – Once a day
- Aspirin 100 mg – Once a day
- ~~Beclometasone dipropionate INH 500 meg~~ – Twice a day
- Ceftriaxone IV 2g – Once a day
- Gentamicin IM 5mg/kg/day (~~400mg/day~~)

+ cardioselectiv betablocker  
+ inhaled bronchodilator

**330mg/day**

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  - ❖ LDL-c: 2.4 mmol/L

**Her current treatment is:**

- Acebutolol 400mg – Once a day
- Perindopril 10 mg – Once a day
- Atorvastatin 20 mg – Once a day
- Aspirin 100 mg – Once a day
- Salmeterol INH 25 meg – 2 inhalations twice a day
- Ceftriaxone IV 2g – Once a day
- Gentamicin IM 5mg/kg/day (330mg/day)

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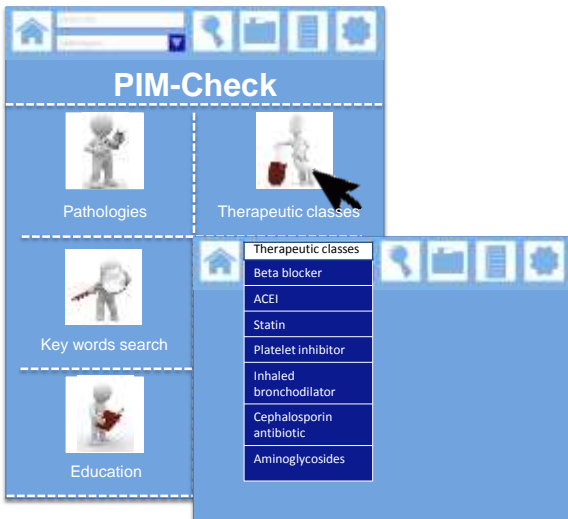
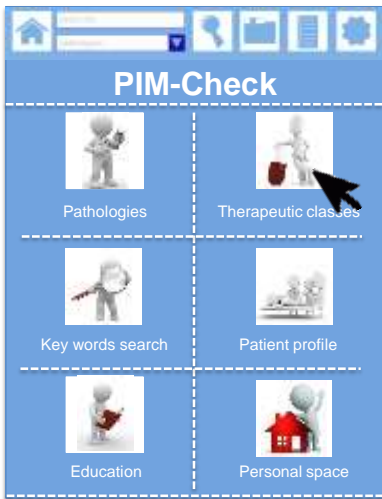
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	Perindopril 10 mg – Once a day	ACEI
	Atorvastatin 20 mg – Once a day	Statin
	Aspirin 100 mg – Once a day	Platelet inhibitor
	Salmeterol INH 25 mcg – 2 inhala	Inhaled bronchodilator
	Ceftriaxone IV 2g – Once a day	Antibiotics – C3G
Gentamicin IM 5mg/kg/day (330)	Antibiotics – aminoglycosides	

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**PIM-Check**

Pathologies      Therapeutic classes

Key words search

Education

**Therapeutic classes**

- Beta blocker
- ACEI
- Statin
- Platelet inhibitor
- Inhaled bronchodilator
- Cephalosporin antibiotic
- Aminoglycosides

CARDIOLOGY/SECONDARY PREVENTION OF ACUTE CORONARY SYNDROME WITH ST SEGMENT ELEVATION (STEMI) OR WITHOUT ST SEGMENT ELEVATION (NSTEMI)

Statin

**Prescribe or continue hypolipidemic treatment with statins following a STEMI or NSTEMI**

**RATIONALE**  
Care for cardiovascular risk factors.

**RECOMMANDATION**  
As First line: medium or high dose statins combined with lifestyle and dietary measures.

In case of intolerance: cholesterol absorption inhibitor, alone or in combination with a biliary acid or nicotinic acid sequestering agent.

Therapeutic goals: LDLc < 1.8 mmol/l or reduction > 50% of the initial LDL-c level.

**REFERENCES**  
ACC/AHA 2013 - Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults  
ACC/AHA 2013 - Guideline for the Management of ST-Elevation Myocardial Infarction  
ESC 2012 - Acute Myocardial Infarction in patients presenting with ST-segment elevation (Management of)  
ESC 2013 - Acute Coronary Syndromes (ACS) in patients presenting without persistent ST-segment elevation (Management of)

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ACEI
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Platelet inhibitor
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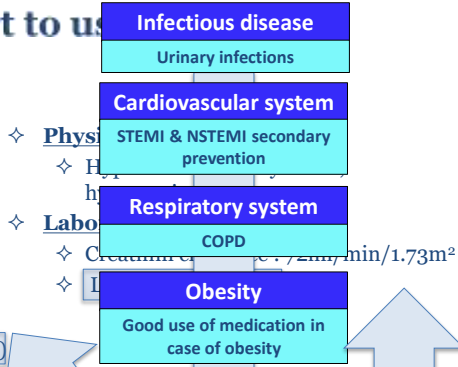
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  - ✦ Post-tabacco COPD
  - ✦ Obesity with BMI = 31.2 kg/m<sup>2</sup> (80 kg; 160 cm)



**Her current treatment is:**

<b>1<sup>st</sup> OPTION</b> + <b>2<sup>nd</sup> OPTION</b>	Acebutolol 400mg – Once a day	Beta-blocker
	Perindopril 10 mg – Once a day	ACEI
	Atorvastatin 40 mg – Once a day	Statin
	Aspirin 100 mg – Once a day	Platelet inhibitor
	Salmeterol INH 25 mcg – 2 inhalations	Inhaled bronchodilator
	Ceftriaxone IV 2g – Once a day	Antibiotics – C3G
	Gentamicin IM 5mg/kg/day (330mg)	Antibiotics – aminoglycosides

## Let's start to use it

With Mrs X, 55 years old

- ✦ **Admission pattern**
  - ✦ Back pain,
  - ✦ Fever for 5 days,
  - ✦ Increased frequency of urination

- ✦ **Medical diagnostic**
  - ✦ Acute pyelonephritis with sever sepsis

- ✦ **Past medical history**
  - ✦ ST-elevation myocardial infarction (2012)
  - ✦ Post-tabacco COPD
  - ✦ Obesity with BMI = 31.2 kg/m<sup>2</sup> (80 kg; 160 cm)

- ✦ **Physical examination**
  - ✦ Hyperthermia, tachycardia, hypotension
- ✦ **Laboratory test results**
  - ✦ Creatinin clearance : 72ml/min/1.73m<sup>2</sup>
  - ✦ LDL-c: 2.4 mmol/L

**Her current treatment is:**

<b>1<sup>st</sup> OPTION</b> + <b>2<sup>nd</sup> OPTION</b>	Acebutolol 400mg – Once a day	- Inhaled corticosteroids
	Perindopril 10 mg – Once a day	
	Atorvastatin 40 mg – Once a day	
	Aspirin 100 mg – Once a day	
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	Ceftriaxone IV 2g – Once a day	
	Gentamicin IM 5mg/kg/day (330mg/day)	

Thank you for your attention

Thank you to all participants :  
Specialists,  
Delphi's experts,  
Members of the research group, etc...

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## Seminar M1

Inspired by STOPP/START:  
a new prescription screening tool for adult patients



### QUESTION 1

What is the most frequently observed drug-related problem among geriatric patients ?

**GREEN** underprescription

**RED** overprescription



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### QUESTION 1

What is the most frequently observed drug-related problem among geriatric patients ?

**RED** overprescription

## Seminar M1

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### QUESTION 2

What is the most frequently observed drug-related problem among internal medicine patients ?

**GREEN** underprescription

**RED** overprescription

## Seminar M1

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### QUESTION 2

What is the most frequently observed drug-related problem among internal medicine patients ?

**GREEN** underprescription

## Seminar M1

Inspired by STOPP/START:  
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### QUESTION 3

A 50 years patient is known for an ischaemic cardiopathy and a congestive systolic heart failure. He receives aspirin, metoprolol and atorvastatin. Is there a problem of:

**GREEN** underprescription

**RED** overprescription

## Seminar M1



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