

# Multifaceted intervention to curb the over-prescription of proton pump inhibitors (PPI) in hospitalized patients

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## Background

The Swiss Society of Internal Medicine, when promoting the Smarter Medicine campaign, recommend to avoid long term therapy with Proton Pump Inhibitors (PPI) unless a reduction to the minimal effective dose is done. In fact, PPI misuse can lead to several adverse effects. We aimed to achieve a significant reduction of new PPI prescriptions at discharge in hospitalized patients by testing the efficacy of a multifaceted strategy consisting in a continuous transparent monitoring-benchmarking system and capillary educational interventions.

## Method

Multicenter longitudinal quasi-experimental before and after study conducted from July 1st 2014 to June 30th 2017 in a network of 5 public teaching hospitals of the Italian-speaking region of Switzerland (Ente Ospedaliero Cantonale, EOC). The intervention was applied in the internal medicine departments. The primary outcome was the reduction of PPI prescriptions at discharge. To confirm the causality of the results we monitored, as a control group, the trend of new prescriptions in the surgery departments of the same hospital network.

**Recommendations regarding the use of proton pump inhibitors (PPIs)**

Justified PPI use	
Recognised indications	<b>Acute therapy:</b> Gastric ulcer, duodenal ulcer Prevention of gastroduodenal ulcers caused by ulcerogenic co-medication in high-risk patients Helicobacter pylori eradication
	<b>Chronic therapy:</b> Reflux oesophagitis Gastro-oesophageal reflux disease (treatment and prevention) Zollinger-Ellison syndrome
<b>OR PPI FOR PREVENTIVE PURPOSES IF:</b>	
<b>at least 1 risk factor + Ulcerogenic co-medication</b>	
History of ulcers	NSAIDs or LD Aspirin + other oral antiaggregants NSAIDs or LD Aspirin + oral anticoagulants
	NSAIDs or LD Aspirin + corticosteroids NSAIDs + LD Aspirin Oral antiaggregants + corticosteroids Oral anticoagulants + corticosteroids Oral antiaggregants + oral anticoagulants
<b>OR</b>	
- Suspected upper gastrointestinal bleeding - Stress ulcer prophylaxis (intensive treatment ONLY)	

**Unjustified PPI use**

**Absence of risk factors, or rather:**

< 65 years	+ 1 ulcerogenic medication only
No history of ulcers	NSAIDs or LD Aspirin
	Oral antiaggregants or anticoagulants*
	Corticosteroids

**THERE ARE VARIOUS OTHER SITUATIONS IN WHICH IT IS NOT CLEAR WHETHER OR NOT IT IS BENEFICIAL TO PRESCRIBE A PPI FOR PREVENTIVE PURPOSES!**

For example:

- if the patient has no risk factors and is given an ulcerogenic co-medication
- OR
- if the patient has at least one risk factor and takes just one ulcerogenic drug

**SPECIFY THE DURATION OF PPI THERAPY**

**REVIEW REGULARLY WHETHER THERE ARE INDICATIONS TO CONTINUE PPI THERAPY**

NSAIDs = non-steroidal anti-inflammatory drugs; LD Aspirin = low-dose aspirin (100-300 mg)  
 \*Anticoagulants do not have ulcerogenic effects per se

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**PPI SIDE EFFECTS: RARE BUT SIGNIFICANT!**

**Short-term therapy:**

- > community-acquired pneumonia
- > enteric infections, particularly from *C. difficile* and *Campylobacter*

**Long-term therapy (> 1 year):**

- > osteoporosis and bone fractures
- > hypomagnesaemia
- > reduced vitamin B12 absorption
- > interstitial nephritis, deteriorating kidney function
- > increased risk of dementia (limited data)
- > atrophic gastritis

**Bibliography:**

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STOP

PPI, STOP HERE!!!

Awareness campaign designed to ensure that Proton Pump Inhibitors are prescribed appropriately.

Figure 1: Internal pocket guidelines used to train Doctors and Nurses

## Results

44'973 patients admissions were analyzed over the 36 months of the study. On admission, 44,9% of patients admitted in internal medicine wards were already treated with a PPI compared to the 23.3% of patients entering the surgical wards. The internal medicine wards showed a decreasing-trend of the annual rate of new PPI prescriptions: 19% [2014], 19% [2015], 18% [2016], and 16% [2017], (p<0.001 year 2014vs. 2017; p-for-trend < 0.001), while an increasing trend was found in the surgical wards in the same years: 30% [2014], 29% [2015], 36% [2016] and 36% [2017] (p<0.001, year2014vs.2017; p-for-trend<0.001). The case mix was significantly associated with the probability of new PPI prescriptions in both departments (OR1.35,95%CI 1.26-1.44 for internal medicine and 1.24,95%CI, 1.19-1.30 for surgery).

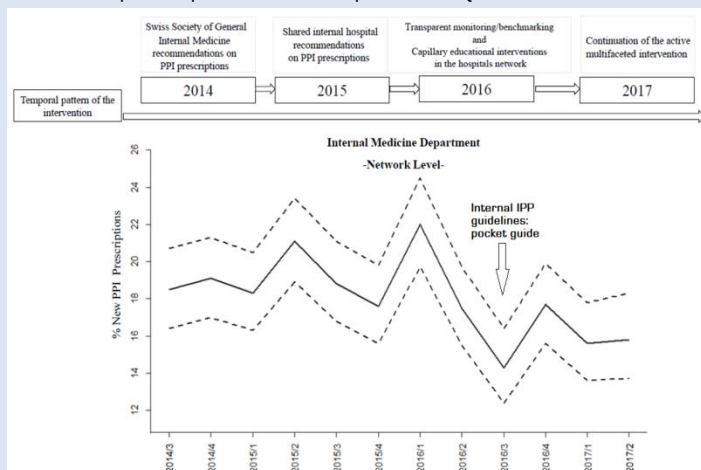


Figure 2: Evolution of the new PPIs prescriptions in EOC medicine wards according to the intervention time

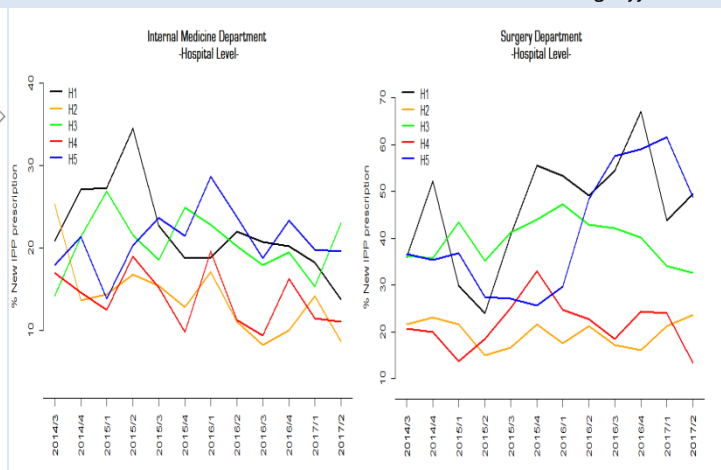


Figure 3: Evolution of PPI prescription in medicine and surgical wards in the 5 hospitals (monitoring system accessible by health care providers)

## Conclusion

The introduction of a multifaceted intervention significantly reduced the trend of PPI prescriptions at hospital discharge in internal medicine wards. Further studies are needed to confirm if the strategy proposed could contribute to optimize the in-hospital drug prescription behavior in other settings as well.