The challenge of implementing *less is more* medicine in Switzerland

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THE CHALLENGE OF IMPLEMENTING *LESS IS MORE* MEDICINE IN SWITZERLAND

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SUMMARY

After decades of remarkable development, medicine is facing a tough economic reality and new challenges. These challenges include defining the values, objectives and tasks of sustainable medicine. In this context, the concept of *less is more* emerged in North America, which serves as an invitation to recognize the potential risks of overuse of medical care that may result in harm rather than in better health, tackling the erroneous assumption that more care is always better. It is now necessary to eliminate unnecessary and costly practices by streamlining care without rationing. In response, several medical societies across the world launched anti-waste campaigns and "top-five lists" of low-value medical interventions that should be used to help make wise decisions in each clinical domain, by engaging patients in conversations about unnecessary tests, treatments and procedures. These low-value interventions include reducing inappropriate antibiotic prescriptions, limiting abdominal X-rays in emergency wards, and lowering the threshold for red blood cell transfusions.

However, several barriers and challenges for the implementation of less is more medicine have been identified in a rich country like Switzerland, where overuse is rooted in our culture and demanded by a society that requests certainty at almost any cost. Patients' high expectations, physician behavior, lack of monitoring and pernicious financial incentives have all indirect negative consequences for medical overuse.

There is agreement that publication of these "top-five lists" represents only the starting point and that translating these lists into action is a major challenge. Multiple interventions and quality-measurement efforts are necessary to widely implement *less is more* recommendations. These include financial incentives, patient education, physician behavior change with data feedback, communication training and systems interventions. The optimization of care with a quality-oriented approach rather the maximization promoted by *less is more* medicine can be an intellectual challenge but also a real opportunity to promote sustainable medicine.

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1 INTRODUCTION

Healthcare systems in developed countries are facing a tough economic reality and new challenges. These challenges include defining the values, objectives and tasks of sustainable medicine. Following a dual perspective, with both qualitative (patient safety and avoidance of low-value care) and quantitative aspects (finances), a new trend emerged in medicine: *less is more*. "Less is more" medicine seeks to recognize the potential risks of overuse of medical care that may result in harm rather than in better health, with an accompanying potential increase of cost. The purpose of this review is to explain the origin of this concept and to explore the challenges to implementing this approach in Switzerland.

1.1 History

The industrial revolution was a major turning point marked by a dramatic drop in the mortality rate. This led to the famous "demographic transition," the decrease in both birth and death rates in the shift from a pre-industrial to an industrialized economy. The effects were particularly profound on health and longevity, mainly due to environmental factors. Aseptic techniques and the discovery of antibiotics during the twentieth century also affected population health and the mortality rate, leading some experts to call it: "the miracle of antibiotics."

With the continuous development of new technologies catalyzed by the Second World War, some physician optimistically predicted that access to and use of health care systems would eradicate all communicable diseases and even cancer. Following this remarkable and enthusiastic evolution, health care systems operated on the belief that more care allows for more health. Modern medicine has indeed produced some spectacular interventions, including antiretroviral agents for people with human immunodeficiency virus, detailed imaging to obviate the need for diagnostic surgery, and cardiac catheterization for treatment of acute coronary syndrome.

However, how much of the improvement in mortality and active years of life is due to medical care? According to the World Health Organization, many factors affect the health of individuals and communities (figure 1).[1,2] Those factors encompass intrinsic and extrinsic determinants such as genetics, lifestyle, and environmental and societal characteristics. It is however estimated that the most common factors, such as access to and use of health care services, have less impact on health and are not predominant determinants of health.[1]

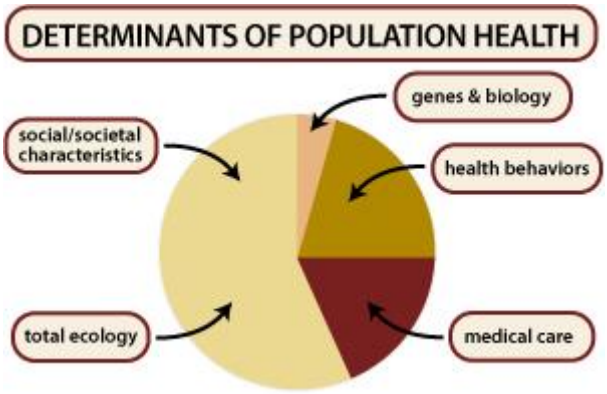

Figure 1. Estimates of how each major determinant influences population health[2] (Tarlov AR. Public policy frameworks for improving population health. Annals of the New York Academy of Sciences. 1999;896:281-29)

Indeed, the decline of mortality in the last 100 years seems largely due to broader social and environmental changes rather than to access to and use of medical care. Some experts argue that antibiotics were introduced after mortality from infectious disease had already fallen substantially (figure 2).[3]

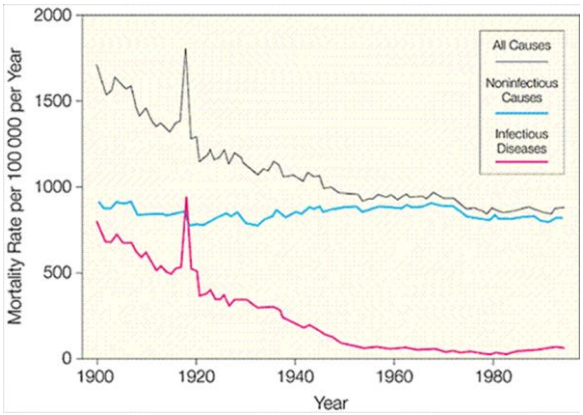

Figure 2. Crude mortality rates for all causes, non-infectious causes and infectious diseases over the period 1900–1996 in the US[3] (Armstrong GL, Conn LA, Pinner RW. Trends in infectious disease mortality in the United States during the 20th century. Jama. Jan 6 1999;281(1):61-66.)

In addition, the correlation between expenditure on health and outcomes reveals that although there is a positive relationship between life expectancy and initial health

expenditure per capita, the additional increase in health care expenditure is only marginally associated with life expectancy (figure 3).[4]

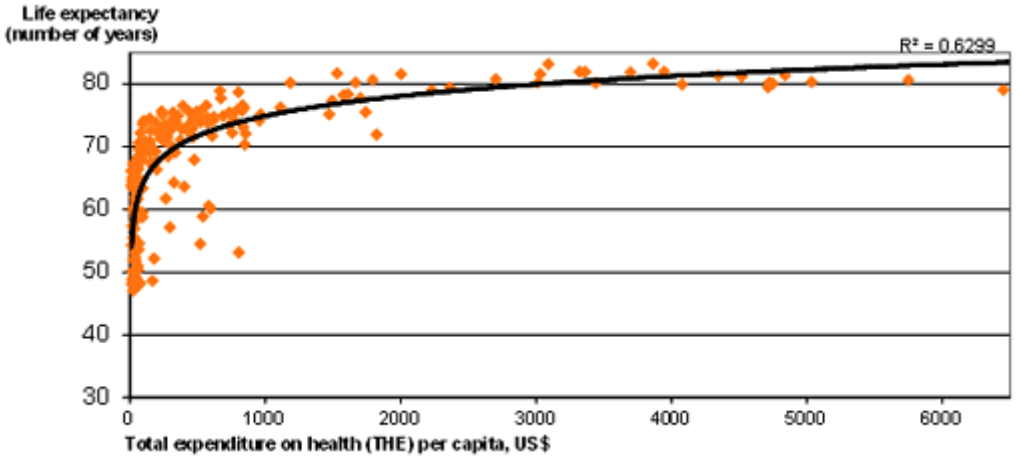

Figure 3. Correlation between expenditure on health and outcomes[4]

(http://www.who.int/mediacentre/factsheets/fs319/en/). Spending on health: A global overview. 2012. Accessed 2016.)

In this context, dissenting voices began to be heard arguing that medicine is not always useful and can actually be harmful. The notion that patients can suffer from side effects, hospital-acquired infections, and complications from poorly indicated surgery emerged. Patient advocacy groups participated in the emergence of an emphasis on patients' safety.[5] Medical treatments are then also analyzed in terms of their potential risk. The benefits of some medical interventions are not always proven and are often overstated or misinterpreted.[6]

1.2 Cost of healthcare system

Healthcare expenditure as a percentage of gross domestic product (GDP) for the 34 member nations of the OECD between 1980 and 2012 increased dramatically as depicted in figure 4.[7] The increase is particularly notable for the US but there is a global increase across OECD countries, including Switzerland, where total health expenditure per capita reached 8,725 CHF in 2013 (11.1% of total GDP[7]).

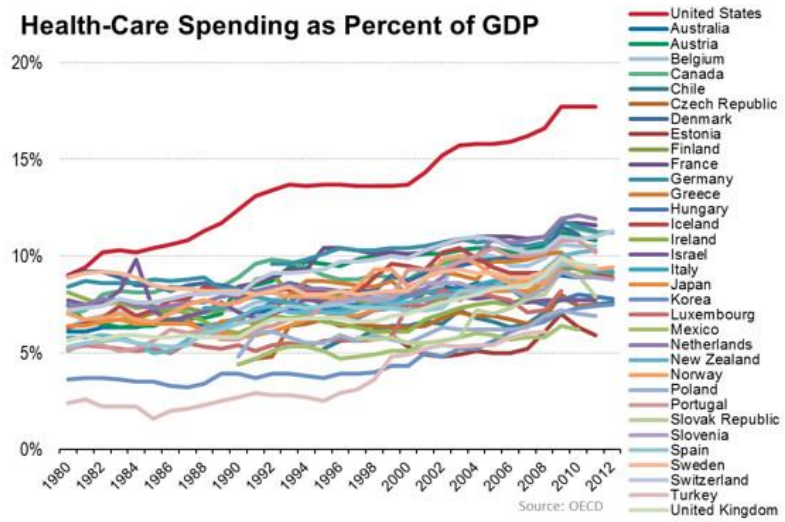

Figure 4. Healthcare spending as percent of GDP[7] (http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2015_health_glance-2015-en. Health at a Glance OECD indicators. 2015. Accessed 2016.)

Healthcare spending directly impacts insurance premiums that rise every year. Today in Switzerland, more than 30% of health expenditures are directly borne by households through co-payments and deductibles, one of the highest annual out-of-pocket household spending on health of all countries. It has become a real public health problem, as 15% of Swiss citizens waive medical care for financial reasons even while being required to purchase mandatory insurance.[8] At the same time, the Swiss population is aging with an unprecedented speed and magnitude; similarly, the proportion of the global population over age 60 will double from 11% today to 22% in 2050. An aging population has profound implications, as this population consumes more resources that are dependent on medical technology. Furthermore, these new technologies are more expensive, which contributes to spiraling health care costs, even when their use is in accordance with the needs and priorities of patients.

Even in a rich country like Switzerland, resources are limited. Containing costs and avoiding unnecessary practices have become a priority to ensure quality and access to care for everyone in the long term. One of the approaches to tackle health care spending is to avoid waste in the healthcare system. In the US, the use of inappropriate medical services is estimated at 30% or more of the country's GDP, representing a loss of 750 CHF billion on unnecessary healthcare.[9] Although in Switzerland no such accurate data are available due to a lack of studies evaluating low-value care, it is estimated that between 22% and 30% of

health care interventions may be considered potentially inappropriate.[10] The expectations of a high- to average-income population and the “fee-for-service” payment system in Swiss clinical practice both have indirect negative consequences on medical overuse.

2 LESS IS MORE

2.1 Origin

The architect Ludwig Mies Van der Rohe (1886–1969) used the *less is more* concept in his works, which are recognized for their minimalist design. In the medical field, *less is more* implies that "less care may lead to better care." Interventions bringing no benefit are not only unnecessary and expensive, but can also be dangerous in certain circumstances. With this qualitative perspective, the philosophy of *less is more* makes sense and is in fact ethically required.

This concept emerged from the notion of "quaternary prevention" (prevention of overuse) that was first reported by Marc Jamoulle, a Belgian general practitioner, in 1986. Quaternary prevention is a critical look at medical activities with an emphasis on the mandate not to harm.[11] It tackles the obsession of progress and its implication that no limits should be set on improving health, and seeks to protect patients from unnecessary medicine. The aim is to offer alternatives to patients who are at risk for excess medical interventions.[12] Quaternary prevention brings together the patient's expectations and the doctor's appraisal, forging a new relationship as depicted in figure 5. When there is illness but not necessary disease, the physician following quaternary prevention should question the decision to pursue investigations, even if it is hard to convince the patient to take a "wait and see" approach.

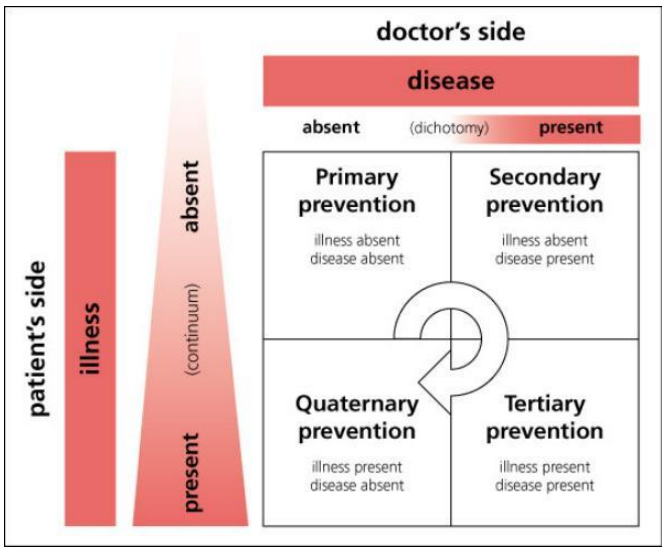

Figure 5. Different forms of prevention[12] (http://www.primary-care.ch/docs/primarycare/archiv/de/2010/2010-18/2010-18-368_ELPS_engl.pdf.)

Surprisingly, quaternary prevention has rarely been reported in North-American literature, possibly because of its European roots. More recently, it has been emphasized in the *Affordable Care Act,* signed by US President Obama to permit millions of American citizens to obtain insurance coverage and to reduce the costs of health care for individuals and the government. The challenge was to provide healthcare insurance to 30 million Americans, without a significant overall increase in health care costs. Different health stakeholders were called upon to propose measures to enable "Obamacare" to be viable. The ethicist Howard Brody wrote in an editorial in the *New England Journal of Medicine*, "Physicians have sworn an oath to place the interests of their patients ahead of their own ones. . . . How could physicians refuse to contemplate any meaningful measure they might take to reduce health care costs?"[13] American doctors agreed to make efforts to reduce the costs of the entire system, which led to the launch of the *Choosing Wisely* campaign.

2.2 The *Choosing Wisely* campaign in the US

The *Choosing Wisely* campaign was launched in April 2012 by the American Board of Internal Medicine (ABIM), Consumer Reports, and nine medical specialty societies.[14] ABIM is a foundation dedicated to promoting medical professionalism and improving the quality of care. The *Choosing Wisely* campaign seeks to help physicians and patients engage in conversations about unnecessary tests, treatments and procedures. Among different interventions, this campaign published lists of healthcare interventions that have little value in order to improve the quality of care as well as to decrease health care costs. Each participating society compiled evidence-based lists of five tests or procedures within its clinical domain that are performed too often and that should be questioned and discussed when deciding on the most appropriate care based on a patient's individual situation. Each society was free to develop its own method to create its "top-five" list, although each was required to document the process and make it publicly available. As of 2016, 70 societies have joined in this effort. The top-five list for family medicine is shown in Appendix A.

The initial goal was not necessarily to reduce costs by reducing inappropriate interventions but rather to encourage physicians and patients to discuss which interventions are truly necessary, tackling the erroneous assumption that more care is always better.[15] *Choosing Wisely* remarkably focused on the physician/patient interaction and it empowered patients to engage in conversations with physicians. In this context, ABIM found an

important partner in Consumer Reports. It is an independent, nonprofit organization that serves consumers through unbiased product testing and ratings, research, journalism, public education and advocacy.[16] Consumer Reports participated by conducting surveys with ABIM to explore underuse and overuse in health care, identifying a large number of consumers who had experienced wasteful screening tests. It helped to disseminate this information and to translate it into consumers' language in order to have a maximum impact on the population. Framing unneeded care as "waste" was essential to draw the attention of consumers, who were more likely to follow those recommendations. In parallel, a second initiative was launched by *Internal Medicine*, a Journal of the American Medical Association journal.[17] Following the campaign launch of *Choosing Wisely*, the editors of *Internal Medicine* pledged to publish a series of articles on "less is more" and to document its impact. More recently, other journals such as *Journal of Hospital Medicine* have followed the same objective by publishing articles on "what not to do in hospital medicine."

The *Choosing Wisely* campaign spread rapidly, becoming a truly national campaign in the US and Canada and being adopted in more than 15 other countries, including Australia, Brazil, Germany, Italy, Japan and the Netherlands.

Similarly, in the United Kingdom (UK), the National Institute for Health and Care Excellence (NICE) gathered the best available evidence to identify "low-value" activities[18] . Following the *less is more* philosophy, NICE published *do not do* recommendations, identifying clinical practices that should be discontinued completely or should not be used routinely, due to evidence that the practice is not on balance beneficial or a lack of evidence to support its continued use. NICE was originally set up in 1999 as a special health authority to advise the National Health Service (NHS) and to reduce variation in the availability and quality of NHS treatments and care in UK. This authority developed public health guidance helping to prevent ill health and to promote healthier lifestyles. NICE is operationally independent of UK government and their recommendations are made by independent committees. In 2009, NICE also set up its medical technologies evaluation program that assesses new devices in terms of whether their use would offer benefits to the patient and NHS at a lower cost compared with current practice, or increased benefits for equal cost[19]. Benefits of various programs run by NICE have been largely reported in the literature[18]. For instance, a before-after study revealed a positive impact of the NICE guideline recommending cessation of antibiotic prophylaxis for prevention of infective endocarditis[20].

Of note, NICE produced guidance taking mainly into consideration issues of value for money, stemmed in part from a willingness to emphasize the role of health technology assessment (HTA) and decision analysis in the pricing and reimbursement processes. Subsequently, NICE achieved a pivotal role in determining the uptake and refund of medical therapies into the NHS that has been criticized as merely cost-containment measures. NICE guidance is indeed largely, but not exclusively, based on the cost effectiveness of procedure, using an arbitrary threshold ranged between 20 and 30'000 pounds sterling, that led to considerable discussion and debate in the UK around issues relating to the allocation of healthcare resources. [21,22]

2.3 *Smartermedicine* campaign in Switzerland

In 2012, a position paper entitled "Sustainable Medicine" released by an expert group of the Swiss Academy of Medical Sciences (ASSM) identified factors affecting the sustainability of medicine and proposed measures for its improvement.[23] According to their definition, "sustainable medicine" is a medicine that meets the needs of the present population without compromising healthcare access for future generations. The *less is more* approach to medicine is the cornerstone of this document, as it promotes optimal medicine rather than maximal medicine. Among the different solutions identified, mirroring the *Choosing Wisely* campaign, the ASSM invited specialist disciplines to develop a list of unnecessary interventions that should not be practiced and may be not refunded as long as they do not meet the criteria of efficacy, appropriateness and efficiency.[23]

The Swiss Society of General Internal Medicine (SSGIM) played a pioneering role when it launched in 2014 the *smartermedicin*e campaign, in order to optimize quality and efficiency in the Swiss health system[24]. In 2014, this campaign published the first list of five low-value interventions to be avoided in Swiss ambulatory internal medicine; these, according to the available evidence, do not provide benefit to patients[24] (Appendix B). The campaign was led by an expert committee with seven members who reviewed the international lists from the *Choosing Wisely* campaign and picked out relevant items, tailored to Swiss ambulatory general internal medicine. They then used a three-round Delphi process addressed to 59 experts of general internal medicine and family medicine, among whom 35 agreed to participate. A total of 23 recommendations received a high

agreement score, which were then rated empirically based on frequency, cost and potential harms.

In 2016, SSGIM extended the campaign into the hospital setting, launching "*smartermedicine* in the Hospital" to create another "top-five list" of evidence-based recommendations targeting hospital interventions that have shown to provide little meaningful benefit and present a risk of generating harms and costs (Appendix C). This campaign was led by an expert committee of six hospitalists.[25] The selection process had to take into account the practices and challenges in the Swiss healthcare system and was based on evidence level, frequency, cost savings, risks and benefits for patients. Of note, the *smartermedicine* campaign emphasizes the importance of sharing decision making with patients in order to choose as wisely as possible.

2.4 Overuse in medicine

The *less is more* approach to medicine promoted in the *smartermedicine* campaign is based on the assumption we should tackle waste in medicine. However, the definition of waste in healthcare remains highly debated as it includes failure to use prevention measures, system inefficiencies, materiel inefficiencies, administrative waste, clinical overuse and overdiagnosis. Clinical overuse definition used in the *smartermedicine* campaign implies the use of additional low-value care that offers ~~little to~~ no benefit to patients and may even cause harm with unfortunate outcomes such as adverse drug reactions, cumulative radiation exposure from diagnostic imaging or errors during procedures.[26,27] Interventions with little benefit, even marginal but safe and at higher cost, have been voluntarily excluded from the definition as they deserve a real economic analysis. Overuse encompasses the notion of overtreatment and overdiagnosis[26]. Indeed, overuse may decrease health care quality by leading to overtreatment like surgery or chemotherapy that provides the patient no benefits, but only adverse effects. Additionally, overdiagnosis can cause a lot of concern and anxiety. In the screening setting, overdiagnosis means the detection of disease that meets the pathologic definition of cancer but will never progress to cause symptoms.[28] Of note, when screening was introduced, the incidence of cancers (e.g., prostate cancer) increased massively, while the mortality rate remained constant. All those interventions are considered inappropriate because they are ineffective or inadequate.[23,26,29] Clinical overuse becomes obvious when there is adequate evidence demonstrating no added benefit from

the medical intervention but the burden of higher risk, higher cost, or both. However, as we will see further in this review, without knowing the clinical circumstances that led to ordering a service, the consensus definition of overuse is often challenging. Furthermore, this lack of consensus on definition precludes adequate comparison across healthcare systems.

Another accepted way to identify whether there is overuse in medicine is to identify the variability in medical practice among practitioners.[30] Variability analyses can show significant differences that are warning signs of overuse and a strong quality indicator. For instance, there is high frequency and geographical variation in knee replacement surgery for adults in Switzerland.[30] Although it is difficult to determine an exact threshold beyond which variations in practice may be considered overuse, this high variability reveals a potential waste in health care requiring standardization of processes in order to promote the appropriate use of this procedure.

Notwithstanding the absence of clear definition, this notion of overuse seems now accepted in the population and among clinical practitioners. In 2012, a survey revealed that 22% of the Swiss population feels that they have been treated unnecessarily by a doctor.[31] Similarly, primary care physicians in the US and in Switzerland also think patients receive too much care.[32,33] Reducing overuse shouldn't lead to the omission of necessary treatment, or underuse, which in addition to overuse forms the concept of misuse in health care (figure 6). Underuse is also a challenge for some health care systems, but this topic is beyond the scope of this review and Switzerland is less concerned about this issue as the health care system provides universal access to health care. Of note, the proportion of physicians who believe that patients do not receive an adequate range of services is only 2% in Switzerland.[33]

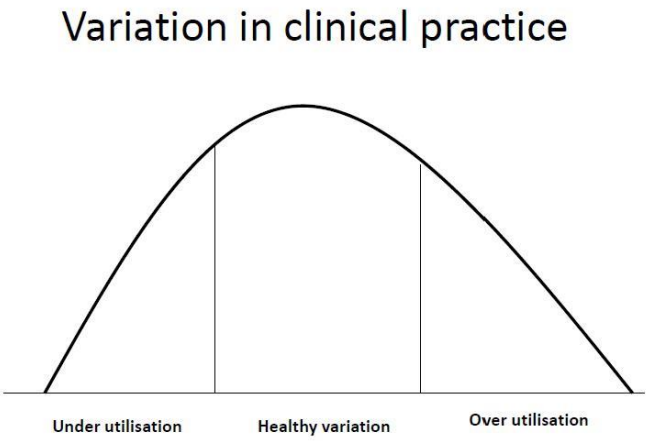

Figure 6. Concept of misuse in health care (Roberto Grilli – Less is more symposium, Bern, Nov 9th 2015[34])

2.5 Examples of low-value interventions

Several studies based on adequate evidence, including those collected in the *less is more* articles published by JAMA's *Internal Medicine*, have explored situations in which less care may result in better health care or at least situations in which more care doesn't give additional benefit with an excess of risk. To illustrate some examples of low-value interventions, I draw upon the work of Dr. H. Gilbert Welch, author of the book *Less Medicine, More Health*, who refers to seven assumptions that drive too much care.[35] Three assumptions are listed in Table 1, and discussed in the examples below. Clinical trials that we conducted will be used to illustrate these false assumptions.

Table 1. Examples of assumptions that drive too much medical care

Assumption	Examples
1) Action is always better than inaction	Antibiotic prescription in airway tract infection
2) It's always better to fix the problem	Red blood cell transfusion
3) It never hurts to get more information	Radiation therapy overuse in the Emergency Department

2.5.1 Antibiotic prescription in airway tract infection

General population

In the outpatient setting, respiratory disease is one of the most common reasons for consulting a general physician, alongside rhinosinusitis, pharyngitis and bronchitis.[36] In many patients' minds, such illness requires antibiotics to be cured, and the belief that purulent sputum is correlated with bacterial infection is deeply rooted in the minds of patients and even doctors.[37] However, it well established that the majority of infectious respiratory diseases are self-limiting viral infections, for which early antibiotic therapy doesn't give any significant additional benefit.[38-41] Furthermore, inadequate antibiotics expose the patients to side effects such as allergic reactions and diarrhea that may lead in some cases to serious pseudomembranous colitis.[42] Additionally, inadequate outpatient antibiotic use is correlated with antimicrobial resistance and this correlation has been confirmed even at the individual prescription level.[43]

Despite these adverse effects, it is estimated that 60-80% of patients receive antibiotics in this situation despite international initiatives trying to improve the appropriateness of antimicrobial use.[44] According to international recommendations, the introduction of antibiotic therapy should be discussed only if symptoms worsen or if there is no improvement several days after the medical visit.[45] So there is a time dimension to be respected during respiratory infection before initiating antibiotic therapy.[46] Deferring antibacterial treatment and limiting management to symptom alleviation may provide the body the opportunity to heal with time.[35] Delaying was not associated with clinically greater symptom burden or duration when compared with an immediate strategy.[47]

COPD population

The situation is slightly different for those with chronic respiratory disease, including chronic obstructive pulmonary disease (COPD) and bronchiectasis. Acute exacerbations of COPD (AECOPD) have a profound impact on the patient's quality of life and prognosis.[48] According to international recommendations, severe AECOPD should be systematically treated with antibiotics.[48] However, these recommendations are based on clinical criteria with limited evidence, including old studies with a small group of patients.[49] This strategy leads inevitably to the overuse of antibiotics, which is estimated to occur in approximately 55% of all AECOPD incidents. Simultaneously, several studies have confirmed the participation of viral

infections in AECOPD.[50] However, it has been difficult to demonstrate that the presence of these viruses in the airways was sufficient to explain the AECOPD. Most clinical studies, being interested in the role of viral infections in exacerbations of COPD, have been limited by their methodology, comparing the index cases with COPD in stable conditions or healthy patients.[51]

In order to establish a temporal relationship between the presence of viruses and AECOPD using the methods of the most modern molecular diagnostics, we conducted a clinical trial identifying 14 respiratory viruses collected on nasopharyngeal swabs in 86 patients, when hospitalized for AECOPD and after recovery in stable condition. Viruses were identified in 51% of cases at admission against 8% of patients in convalescence period ($p < 0.01$), confirming a temporal association and suggesting a role of viruses in the pathogenesis of exacerbation.[52] These results support the idea that antibiotics may be overused even in these particular COPD patients. However, neither clinical characteristics nor biological markers are currently sufficient to identify viral exacerbations. Further trials to distinguish between purely viral infections and mixed or bacterial infection are of major importance in identifying appropriate treatment strategies.

2.5.2 Red blood cell transfusion threshold

There is a prevalent belief in medicine that we can fix a problem, bringing abnormality back to normality. Among the range of abnormal results in critically ill patients, anemia is highly prevalent especially amongst those with cardiovascular disease.[53] Yet, there is no cost-effective alternative to red blood cell (RBC) transfusion for rapidly increasing the hemoglobin level and restoring O_2 carrying capacity in order to decrease the risk of damage to vital organs. However, RBC transfusion is not harmless as it may be associated with adverse events such as infection, hemolytic reaction, transfusion-associated circulatory overload (TACO) and transfusion-related acute lung injury (TRALI)[54,55] (figure 8). Furthermore, RBCs are a scarce and expensive resource.

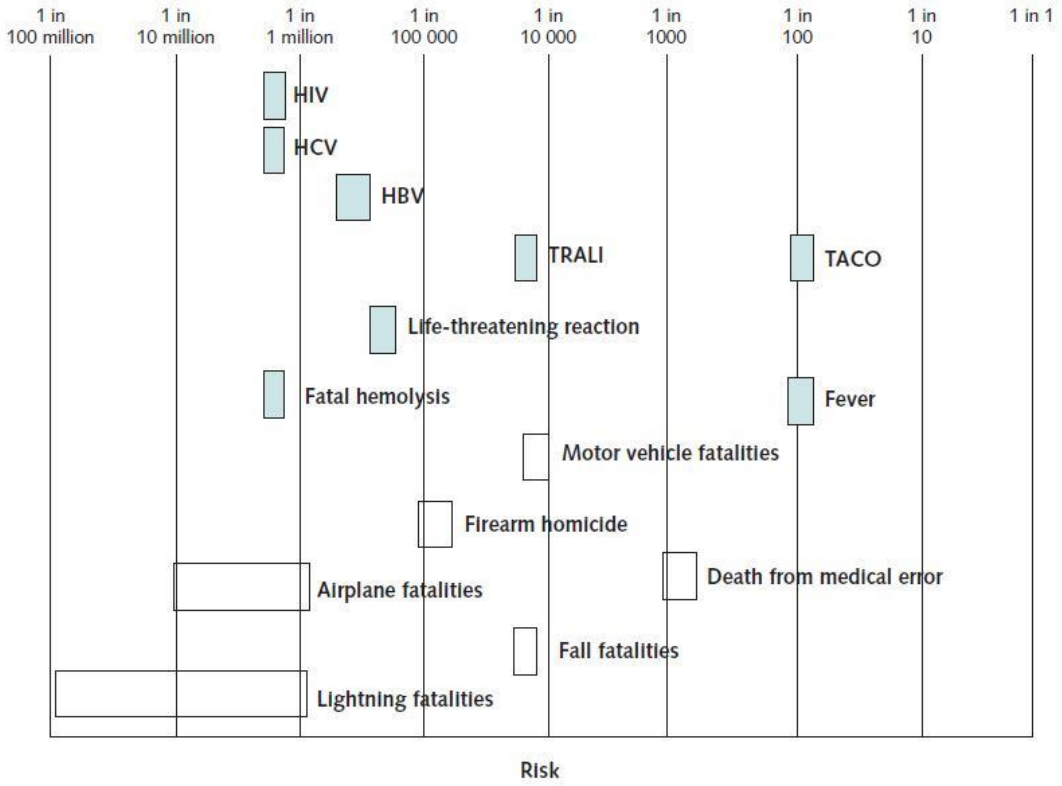

Figure 7. Adverse effects of RBC transfusion contrasted with other risks[55] (Carson JL, Grossman BJ, Kleinman S, et al. Red blood cell transfusion: a clinical practice guideline from the AABB*. Ann Intern Med. Jul 3 2012;157(1):49-58.)

Some authors have suggested that hematocrit should maintain at around 30% and hemoglobin concentration at 10g/dl. However, data from several randomized trials and meta-analyses show that aggressive correction of anemia does not improve clinical outcomes in a variety of settings.[55-59] One even saw a trend to lower mortality in the restrictive group with a transfusion threshold of 7g/dl of hemoglobin versus a liberal strategy with a hemoglobin threshold between 9 and 10g/dl of hemoglobin.[56,60]

The challenging clinical setting of acute upper gastrointestinal bleeding (UGIB) has also been explored. A hemoglobin threshold of 7 g/dL may be safer for patients with UGIB with a better six-week survival because it seems to reduce portal pressure and decreases the chance of rebleeding, as reported in one Spanish study that included mainly patients with cirrhosis and variceal bleeding.[61] We reported similar results in non-variceal UGIB as well.[62,63] Despite major advances in the management of non-variceal UGIB, it still carries considerable morbidity, mortality and economic burden. Of particular note, the rebleeding rate, which is one of the most important predictive factors of mortality, has not significantly

improved in the past years. Interestingly, based on large Canadian registry of patients with upper gastrointestinal bleeding and endoscopy (RUGBE), we have been able to demonstrate in a real-life study an association between RBC transfusion following non-variceal UGIB and subsequent rebleeding, after appropriate and extensive adjustment for confounding. The mechanisms of harm and particularly rebleeding associated with RBC transfusions are poorly understood. In addition to the exacerbation of pre-existing portal hypertension as an explanation for the rebleeding rate in variceal UGIB, some authors argue the existence of a hypercoagulable response linked to a rise in factor VIII following hemorrhage that may partially be impaired by blood transfusion.[54] Prospective randomized trial has confirmed that in the setting of non-variceal UGIB, the liberal strategy added no benefit.[64] Taken together, these data confirm that a liberal strategy of RBC transfusion does not impact positively clinical outcomes and may have a deleterious effect in some patients making even the bleeding worse or promoting recurrent bleeding.

There is now compelling evidence to use a hemoglobin threshold of 7g/dl in clinically stable hospitalized patients and in the situation of GI bleeding, particularly in cirrhotic patients with variceal UGIB. This threshold may be raised to 8/dl or more for patients with previous cardiovascular disease and after cardiac and non-cardiac surgery. These data constitute a rationale for the third recommendation on the top-five list from the *smartermedicne* campaign[24] (Appendix C). This restrictive approach to blood transfusion not only reduced blood use by half but also did not cause harm as overall mortality is not adversely affected. Of course, all the guidelines emphasize that the decision to transfuse should not be based only on hemoglobin level but should incorporate individual patient characteristics and symptoms. Clinical judgment remains then critical in the decision to transfuse.

2.5.3 Overuse of diagnostic radiology in emergency departments

With minimal barriers to use and the appeal of diagnostic certainty, imaging (X-ray and CT scan) has spiraled out of control in emergency departments (EDs).[65] Among different procedures in medicine, growth in volume of imaging is of major importance and plays a significant role in the increase of health care costs (figure 8).[66]

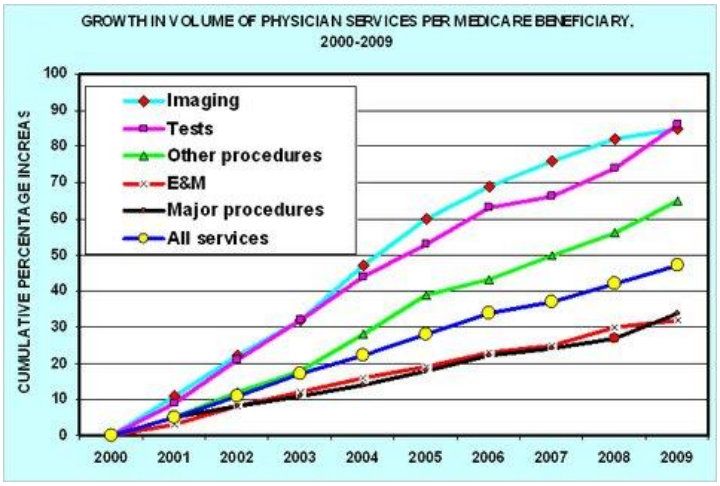

Figure 8. Growth in volume of physician services per Medicare beneficiary from 2000 to 2009 (US)[66] (http://economix.blogs.nytimes.com/2010/12/24/fees-volume-and-spending-at-medicare/?_r=0). Fees, Volume and Spending at Medicare. 2010, 2016.)

In response, several societies have categorized the excessive use of imaging as low-value care in their top-five lists for the *Choosing Wisely* campaign.[14] Putting aside the financial aspect, there is compelling evidence on the risk of radiation exposure and secondary cancers caused by imaging. According to some experts, between 1.5% and 2% of cancers diagnosed in the US could be linked to imaging by CT.[67,68] Also, incidental findings lead to additional medical procedures and expenses that can impact negatively patient well-being. As many as 50% of patients may have such findings identified through CT imaging.[69]

In the challenging setting of EDs, CT was though shown to change the diagnosis, improve diagnostic certainty, and affect potential patient management decisions.[70] It is very difficult to identify when a CT scan was provided inappropriately without knowing the clinical circumstances that led to ordering this test. However, before ordering a CT scan, physicians should ensure that it is clinically indicated and will enhance patient health or change clinical care.

Conversely, some radiological tests are considered unnecessary and should not be performed anymore, except in select situations. In EDs, conventional abdominal X-rays are commonly ordered due to being readily available, somewhat cheap, easily interpretable and because of their supposed low dose of radiation. However, according to the American College of Radiology (ACR) appropriateness criteria, which are evidence-based guidelines to assist referring physicians in making the most appropriate imaging for a specific clinical condition, the conventional abdomen X-ray has very few indications in EDs.[71] It has been

shown to have high sensitivity (90%) for detecting intra-abdominal foreign bodies and moderate sensitivity for detecting bowel obstruction (49%). According to ACR appropriateness criteria and rating score, abdominal X-rays "may be appropriate" only in order to evaluate bowel perforation. However, its low sensitivity for sources of abdominal pain limits its role in the ED setting as this test helps change clinical management in less than 5% of cases.[72,73] Furthermore, abdominal X-ray is one of the most irradiating conventional radiological techniques (1.5 mSv against 0.1 mSv for a chest radiograph). It produces more or less the same relative radiation level as a low-dose CT scan that has supplemented abdominal X-ray in some situations.[74]

Therefore, the abdominal X-ray is most often inappropriate and unnecessary in the ED and can potentially be hazardous for patients' health. Nevertheless, each year, more than 400 conventional abdominal X-rays are performed in the ED of Geneva University Hospitals and nearly 250 at the ED of La Tour Hospital, located in the same city.

In response, we are currently undertaking a retrospective study analyzing all the abdominal X-rays performed at the EDs of Geneva University Hospitals and La Tour Hospital. The aim of this study is to assess the indication of the abdominal X-rays in both emergency centers and to evaluate whether this exam contributes to changing clinical management. We hypothesize that abdominal X-rays are probably overused in this setting and we plan to perform a quality improvement intervention to educate physicians and reduce the overall prescription of such X-rays. The assumption that "it never hurts to get more information" is shown to be false again, particularly if obtaining this information exposes the patient to unnecessary risk.

3 CHALLENGE TO IMPLEMENTING *LESS IS MORE* MEDICINE IN SWITZERLAND

3.1 Barriers to reducing overuse

Eliminating unnecessary care and enhancing high-value care has received increasing attention from policy and health care systems. Compelling evidence reveals that some waste can be minimized. However, some physicians argue that the scientific content of these campaigns is already known, and that simple awareness of these guidelines is insufficient to change physician behaviors; other factors influence their practice, which is why these campaigns have only modest success.[75] Efforts to reduce low-value interventions are indeed struggling, especially in countries that have higher income levels and more specialists relative to primary care physicians, like Switzerland.

In order to identify the barriers to implementing the *less is more* approach in Switzerland, we must analyze the various reasons for overuse. Several factors contribute to the problem: patient expectations, physicians' fears of missing a diagnosis or committing malpractice, financial incentives, physicians' education, communication challenges with patients and technological advances (see figure 9).[15,26] At this time, there are no reliable metrics to verify and control whether *less is more* recommendations are being followed.

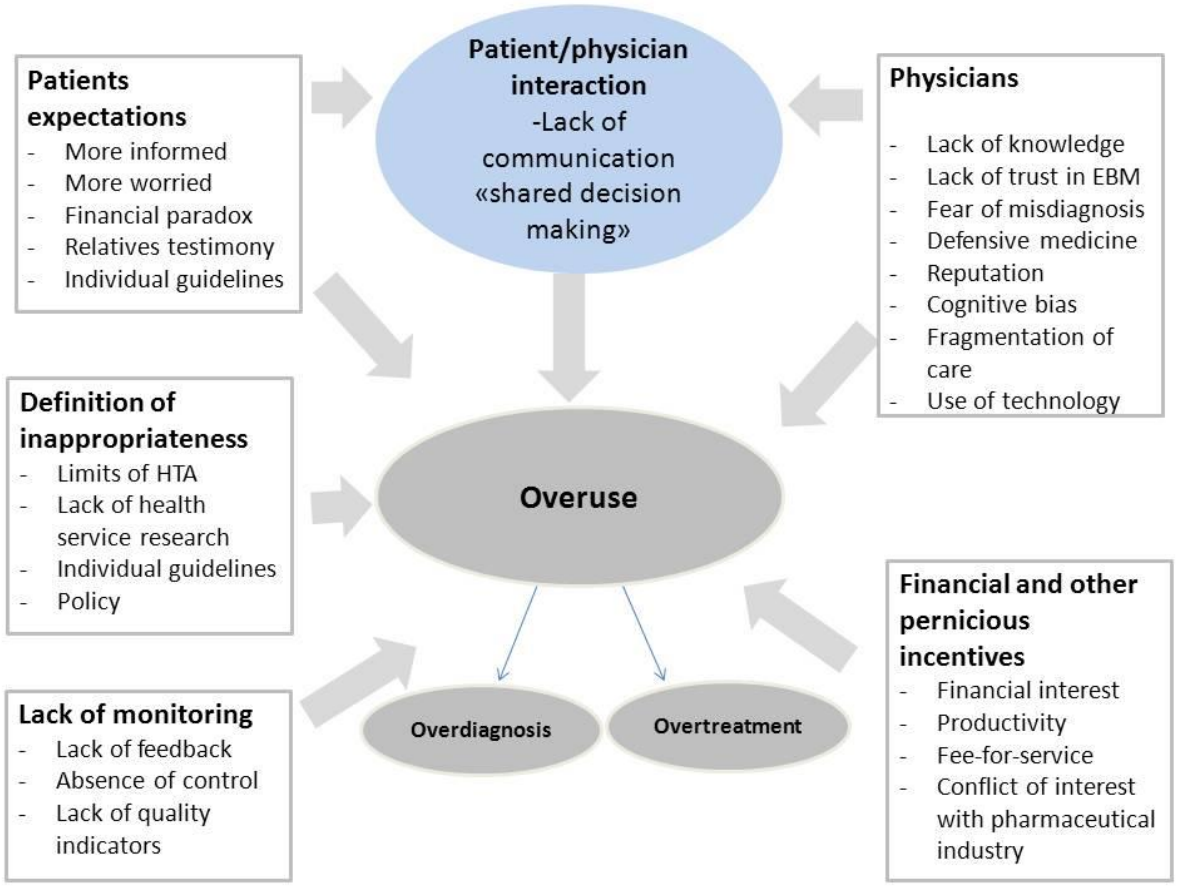

Figure 9. Drivers of overuse (adapted from ref [26] Gerber M, Kraft E, Bosshard C. La surconsommation de prestations médicales: un problème de qualité. BULLETIN DES MÉDECINS SUISSES. 2016;97(7):236-243)

3.2 Patients' expectations

For years, patients have been sold the idea that seeking medical care is key to maintaining wellness, and that action is preferable to inaction, as expressed in the maxim "better safe than sorry."[35] There is always pressure to do something: one study revealed that parents' expectations regarding the prescription of drugs by pediatricians have a great influence on the effective prescription of antibiotics for children.[76] Patients often do not understand that any action in medicine may have unintended consequences and that good medicine does not necessarily mean taking action. Patients have a lay perception of medicine, often based on testimonials on the benefit of treatment or survival stories of early cancer detection. There is an enthusiasm for early diagnosis as prevention, as patients feel heard and reassured.[77] Unexpected consequences of unnecessary screening are sometimes difficult to convey, and patients are quick to give doctors credit for trying to do something.[78]

Furthermore, recommendations are often based on studies performed at the population level, while patients think about their treatment at the individual level. Patients will often reject treatment guidelines when abstracted from their individual circumstances. Even if they agree that some treatments may be unnecessary, most patients do not feel concerned about this problem when it comes to their own treatment.

A financial aspect plays a role too for patients. Switzerland is a rich country with one of the highest per capita incomes.[7] All Swiss residents must purchase basic health insurance on an individual basis, but every year, these premiums rise faster than personal incomes, often at a level that households can barely afford. Paradoxically, squeezing the household budget has a negative effect on consuming: the more patients pay, the more they are waiting to be covered. In addition, patients have huge expectations of their expensive health care system, and often bristle at recommendations that seem to limit choice, as illustrated with the votation on managed care in 2012. Any attempt to limit to access to doctors might be interpreted in relation to its economic dimension, raising fears about "rationing."[79,80] A 2012 survey in Switzerland revealed that 60% of the population categorically refuses any decrease in health care coverage or access to a new treatment for economic reasons. (moniteur de la santé 2012; gfs bern (n=1200) 2012). Furthermore, the Swiss population places great confidence in physicians and in Swiss health system[81,82]. Tackling the *less is more* concept from an economic perspective only and portraying the program as cost cutting could deeply undermine this confidence.

3.3 Physicians' behavior

There are many reasons physicians order unnecessary tests or treatments, or employ clinical practices that do not help in managing a case. First of all, unnecessary testing may occur if a physician is not familiar with the characteristics of the test or the evidence challenging its usefulness. That has led to much discussion about how to best educate physicians, primarily through clinical guidelines. But the reasons for overuse go beyond the limited knowledge of some physicians. Indeed, most physicians are aware of the guidelines and enthusiastic about limiting access to expensive tests that have little or no benefit as a way to curb costs and to improve patients' safety.[83]

So why do physicians use low-value services that are not supported by evidence? Patients' expectations, which are probably overestimated by physicians, are insufficient to

explain entirely this behavior.[84] Some tests are ordered out of fear of missing a diagnosis. Cognitive biases, such as anticipated regret for missing a diagnosis, and commission bias, or the tendency toward action rather than inaction, lead to more testing. This is particularly true in primary care where the availability of diagnostic procedures is generally limited, contributing to diagnostic uncertainty and driving overuse even when there is no clear indication for an intervention. An analysis of ambulatory practice in the US confirmed that physicians seem reluctant to follow new recommendations when they are asked to refrain: the underuse of some evidence-based recommendations decreased, while the overuse of others that are no longer recommended remained stable.[27]

The fear of being sued for malpractice is of major importance, particularly in the US, where three-quarters of physicians report practicing defensive medicine, though defensive medicine is rising as well in Europe and Switzerland.[85-87] In the event of medical error, a physician who was exhaustive in his care is less likely to be sued. This was confirmed by a study revealing that high-spending physicians who use more resources face fewer lawsuits.[88] In Switzerland, these results may be surprising, as physicians who do not recommend a test whose effectiveness is controversial are unlikely to face malpractice claims. However the fear of criticism from the patient or his relative may at least partially explain this behavior.[89] While overdiagnosis is not often sanctioned, physicians fear being blamed for failing to pursue a test or treatment. This raises the issue of how physicians can balance the growing focus on patient satisfaction scores with the drive for evidence-based medicine. In hospital medicine, a recent study revealed that the main reason for overuse in the evaluation of syncope was the desire to reassure patients and family members that they are receiving top-quality care.[90]

Some physicians are aware of the guidelines but disagree with the evidence and more broadly with the evidence-based medicine (EBM) approach. They find that guidelines are too academic or strictly scientific, and are often not adaptable to their patients. Evidence of equivalent benefit and higher risk is based on averages, and may not apply to the unique patient. For clinicians, whose primary concern is the unwell individual, population-level impacts, such as societal antibiotic resistance, may not be an important consideration. For them, medicine is not an exact science but rather an art.[91,92] They promote a narrative-based medicine (NBM) approach, which recognizes the value of people's narratives in clinical practice and the relational and psychological dimensions that

occur in tandem with physical illness.[93] These physicians want to leave the determination of whether an intervention is appropriate up to the health providers, on a case-by-case basis. Indeed, strict adherence to standardized protocols cannot be generalized to all of medicine.[92]

The challenge is to convince such physicians that NBM is not incompatible with *less is more* medicine, as they both emphasize including the patient in the conversation. However, in order to explain the *less is more* strategy to a specific patient, physicians must first know the available scientific data and understand statistical principles in order to use the data in the communication of risk. Some statistical notions such as *number needed to treat* and *harm* should be integrated in their decision analysis, and these notions are derived from EBM. Even if it may be criticized for several aspects, EBM must be integrated in the whole process. Medicine may be considered as an art but it is an art of communication with a robust scientific foundation.

Finally, some tests are ordered unnecessarily because of logistical problems, such as the fact that electronic medical records often do not translate across different institutions. Supportive health systems with clinical decision-making tools can help in multiple ways (electronic decision support, feedback to providers on their ordering practices, academic detailing, recognition, etc.).

3.4 Patient and physician interaction

The key mechanism for change lies in creating a shared decision-making process between physicians and patients during routine clinical encounters. Physicians are often reluctant to speak about overdiagnosis. Most participants in a US cross-sectional online survey who underwent routine cancer screening reported that their physicians did not tell them about overdiagnosis and overtreatment.[94] The few who received information about overtreatment had unrealistic beliefs about the extent of that risk.[95] Physicians tend to convey their inaccurate risk perceptions to patients, leading to overstatements about treatment benefits and minimization of risks, in a phenomenon called “therapeutic illusion,” which may produce an unjustified enthusiasm for treatment.[96] Both benefits and harms of action or inaction must be discussed in order to help make better decisions about when care is necessary. Clinicians and patients must share the responsibility for the final decision, as

both parties experience the potential consequences. Indeed, criticisms or malpractice claims often originate from communication failures between physicians and patients.[97]

The whole *Choosing Wisely* campaign is patient oriented and promotes shared decision making.[98] That means using personalized assessments of potential benefits and harms, as well as taking into account the preferences of patients who are well informed about their options. The interaction between patients and doctors must be indeed enhanced especially as the influence of patient wait on overconsumption is probably overstated[26]. The *Choosing Wisely* campaign can help educate patients about why an unnecessary test may be harmful so that doctors and patients can have more constructive conversations about the tests. For this purpose, it has partnered with Consumer Reports to create website material directed toward patients. In Switzerland, *smartermedicine* also took into consideration the key role of the patient and a process of raising awareness has been undertaken with the Fédération Romande des Consommateurs and the Swiss association of patient centers (DVSP). Furthermore, specific communication skills are needed to discuss the possible benefits and harms of an intervention. Instructional videotapes of exemplary conversations are available on the US *Choosing Wisely* website.

3.5 Lack of evidence

Defining high- and low-value care is a difficult task. Some experts argue that health care is appropriate when it manages to integrate the three parts of the "triple aim" – population health, experience of care and per capita cost – reasonably well[99]. The Institute of Medicine defines high-value care as "the best care for the patient, with the optimal result for the circumstances, delivered at the right price."[100] Sometimes, low-value care is obvious, as for example in an US study that revealed that in 69% of cases, women continued to have Pap smears despite a complete hysterectomy. It would not be difficult to convince physicians and the public that this intervention is inappropriate and a misuse of available resources.[101] However, there are many gray areas, situations with ill-defined boundaries, and overlapping benefits and harms. Frequently medical innovations lead to health benefits (even marginal) but with greater cost. Such interventions require a medico-economic analysis, using cost-effectiveness analyses and health technology assessments (HTA). Experts integrate the potential benefit and costs of an intervention to determine the value of a service, and may

conclude that despite adequate evidence demonstrating a small comparative benefit, this benefit is not large enough to justify a higher risk to patients, higher cost, or both.

Unfortunately, the definition of value is not straightforward and both value and costs depend on the perspective we take into consideration. Despite HTAs, guidelines and other instruments, it is not always easy to determine which services are really unnecessary. Sometimes it is just impossible as there is insufficient evidence to evaluate comparative benefit. There are many cases where an objective assessment is difficult or impossible not only because the priorities of the patient must be taken into account but also because the question arises of where to locate the boundaries of diagnostic and therapeutic utility. The value of a health care intervention is often defined as fitness for purpose, relating to its ability to meet stated needs. These needs can be those patients, providers, payers or families. Furthermore, when we consider an intervention to be inappropriate, it presupposes that we know what will happen to a person in the future and that he will not develop any symptoms.

These controversies may explain why some countries, which are setting up stringent regulatory measures and trying to reimburse only medical interventions that are cost-effective, have experienced difficulties, such as has happened with NICE in the UK.[102] Indeed, there is continuing debate about what constitutes reasonable cost for health care. It is important to evaluate the understand the value of medical services from the individual, medical and societal perspectives.

In Switzerland, the Swiss Medical Board (SMB) produces HTA reports and evidence-based recommendations. It has encountered the same type of difficulties as NICE has when experts concluded that the low utility of the mammography screening program didn't justify the effort (and the cost) to conduct such programs. They face an angry response from the executive board of the Swiss society of senology, who argued that the reduction of more than 100 premature deaths due to breast cancer every year is not of marginal magnitude. One of the main criticisms was that the conclusion of the SMB were too restrictive and did not represent the opinion of the interviewed experts, which led people to question the legitimacy and the representativeness of SMB.[103] During NICE guidance development, advisory bodies identify not only areas of practice that are ineffective but also lack sufficient evidence to support its continued use. However, the absence of evidence doesn't necessarily prove the absence of effect and some authors think that guidelines shouldn't be

produced if high quality research evidence is not available to support them[104]. This debate confirms that it is important to evaluate the benefits and understand the value of medical services from the individual, medical and societal perspectives. If cost-containment strategies are unilaterally applied in order to reduce waste in clinical practice, there will be a mismatch between health service research, health care providers and policy. In the absence of consensus on who can decide whether the price of an intervention is worthwhile and what constitutes medically necessary care, health care leaders may have difficulty convincing frontline physicians to change their practices, leaving it up to individual health providers to determine what to do, on a case-by-case basis.

The challenge of *less is more* medicine is to integrate value from all perspectives. In order to reduce overuse and maintain both physician engagement and public trust, it is necessary to not use cost as the motivating factor and focus on unnecessary tests that may be harmful. *Less is more* campaigns use standard definitions of inappropriateness, based on scientific evidence, such as top-five lists or the RAND Appropriateness Method (RAM), because these combine the best available scientific evidence with expert opinion. These definitions must be timely and evolve with the release of new evidence and discovery of medical technology. However, there is agreement that defining appropriateness is, to a large degree, a sociopolitical process, involving multiple players and preferences.

3.6 Lack of health services research and policy

In Switzerland, there has long been an imbalance between clinical research and health services research[34]. Health services research focused on process metrics has long been neglected[34]. Among different reasons, we can note the fragmentation of the political system (federalism), the limited health policy leadership of the federal government, direct democracy, corporatism and the legitimate advocacy of private interests, and the fragmentation of healthcare financing. Reducing unnecessary care requires the same attention to guideline development and performance measurement that was directed at reducing the underuse of needed therapies. Indeed, reducing overuse has not been a real focus of the quality of care movement.

Overuse, unlike underuse, is not easily studied within publicly reported databases or hospital claims data. Furthermore, overuse and overdiagnosis can only be proven by studies at the population level and not at the individual level, as it is impossible to know in advance

if symptoms will appear in a specific patient. To reduce some interventions, it may therefore be important to highlight the negative effect of unnecessary interventions for individuals.

Health service researchers need an additional scientific basis to study overuse and to distinguish between low- and high-value care. The necessary tools must meet quality criteria such as transparency about scientific evidence. Determining if a patient inappropriately received a procedure requires a much more detailed set of clinical criteria than what is required for assessments of underuse; this may be very expensive and time consuming, and thus explain the lack of comparative efficacy studies on health services. Practical local guidelines should be developed, as there are some limits for general guidelines particularly in elderly populations with polymorbidities.

In addition, there are some mismatches between health services research and policy. Researchers provide relevant information, pointing to the complexity of the issues, while policy makers look for simple answers and tools. Better communication between policy makers and health service researchers may help to properly define appropriateness of care and determine strategies for policy implementation.

3.7 Fragmentation of care

Research has confirmed that overuse is widespread and occurs across multiple specialties.[105] For this reason, the *Choosing Wisely* campaign is notable as it initially included several specialty organizations. In Switzerland, this enthusiasm is not really shared, and, to date, the SSGIM is the only society that has published a top-five list. Healthcare systems with strong primary care medicine often offer better quality care with lower costs, which is partly explained by better coordination and less fragmentation. But to have a global impact, additional societies must join the effort. Cautions must be taken in order to ensure physicians are willing to make recommendations to improve healthcare, even if it conflicts with their own financial interest, which was not always the case in the US. Indeed, the services included on the *Choosing Wisely* lists varied widely in terms of their potential impact on care and spending. For instance, the orthopedics society did not include any major surgery despite some evidence for the inappropriateness of knee replacement in some situations. Further, specialty societies should focus on their own activity, and not name other specialties' services as low-value.

The problem in Switzerland is that nobody really feels responsible: there is no institute or money to conduct the creation of these top-five lists here. The pharmaceutical industry is not interested, and insurance providers argue that they cannot financially support such monitoring since the LAMAL doesn't allow such procedures.

3.8 Lack of monitoring

Measuring the impact of *less is more* medicine is complex. In the US, only 20% of physicians are aware of the *Choosing Wisely* campaign.[15] A recent survey including primary care physicians across Switzerland and members of the SSMIG demonstrated that knowledge of *smartermedicine* is higher (>60%).[106] Among them, about 70% of physicians say they nearly always follow the recommendations. However, these data are self-reported on a questionnaire, and thus bear a risk of reporting bias. To date, we cannot measure whether physicians really follow the recommendations in their routine practice. A major obstacle is the lack of systematic monitoring of practice in Switzerland, which is an essential procedure if you want to measure the real impact of the campaign. Even in the US, reliable metrics are still little used. The top-five lists draw attention to low-value services, but they should be translated into measurable recommendations and valid quality indicators to assess their effect on changing behavior.

There are multiple challenges in measuring progress in reducing overuse of unnecessary care. First, as mentioned, defining the appropriateness of a service is a difficult task as clinical circumstances are not included in administrative databases that are routinely used as metrics. Additionally, physicians are autonomous and are attached to their freedom to practice: an external control may be seen as a threat to this freedom. For both these reasons, we often do not have a good sense of the extent of overuse in clinical practice. An international collaborative working group was created at in order to develop quality indicators that might be used to compare countries on specific measures of overuse.[15]

3.9 Financial and other pernicious incentives

Pernicious incentives, such as financial and personal career-oriented incentives, are also of major concern. Let's take the example of coronary angiography: a Swiss study shows that in 34% of patients, coronary angiographies performed to determine cardiovascular disease were inappropriate.[107] Swiss physicians and healthcare institutions have a financial incentive

in a fee-for-service system: as the number of exams increases, income rises. Some hospitals express their financial interests to their physicians by measuring (and rewarding) physician "productivity," thus providing the same pernicious incentive. Besides, cardiologist have personal incentives, as increasing their number of procedures can be a way to improve their expertise. The pharmaceutical industry plays a role too by improving test accuracy and by promoting tests and treatments such as new stents, with some conflict of interest. Patients who have paid for comprehensive insurance may also have a financial interest: they want to get their money's worth. Furthermore, they feel reassured if their vessels are checked invasively, especially if they do not receive information on safety issues, as is often the case. Indeed, physicians rarely fully discuss the harms, benefits, and alternative treatment for stable coronary artery disease with their patients.[108] When more elements of informed decision making are fulfilled, patients are less likely to choose an invasive procedure.

Health care spending simply cannot continue to rise at its current pace. Both the providers who deliver care and the patients who receive it need to start considering the concept of limited resources in their expensive health care system. Reducing waste can help reduce healthcare costs for the benefit of the entire population.

4 PERSPECTIVES

The *smartermedicine* campaign in Switzerland is only the starting point. There is agreement that multiple interventions and quality-measurement efforts are necessary to widely implement *less is more* recommendations, such as financial incentives, patient education, physician behavior change with data feedback, communication training and systems interventions. C*hoosing Wisely* and *smartermedicine* campaigns represent tremendous platforms for implementing original quality improvement programs that are key elements to change physician behavior and patient attitude[15]. The value of a medical intervention is classically defined as the ratio between the quality and the cost[109]. *Less is more* medicine may be considered as a quality-oriented approach trying to distance itself from the financial aspect and to give its own definition of value, mostly based on effectiveness and safety that are unifying concepts. Furthermore, other dimensions of quality in health care have been reported in the literature such as classical 6 dimensions described by Maxwell[110]: access of care, relevance to need (for the whole population), effectiveness (for individual patients), equity (fairness), social acceptability and efficiency and economy. By reducing inappropriate use of low value intervention, the *less is more* approach fulfills all these criteria. From the ethical point of view, limiting these interventions even becomes morally required[111]. Overuse of low value care will consume resources that as a result will not be available for real needs.

For the purpose of this review, I focus on the processes that may impact physician behavior most directly and for which some local and national projects are ongoing.

4.1 Data reporting and peer control

Health care institutions and providers cannot claim to offer high-quality services unless quality is measured with reliable quality indicators. We can distinguish three dimensions of quality: a) structural quality, b) the quality of the process, and c) the quality of the outcome.[27] In Switzerland, we have for many years focused our attention on the structural quality of care and we have been primarily interested in measuring patient satisfaction. These key points are not enough to determine the quality of our medical care and our adherence to top-five lists. The traditional paradigm where quality could be demonstrated

by the presence of good provider credentials, high caliber facilities or equipment, the style in which care was provided is now considered incomplete[112].

Therefore, we should now focus on two other critical dimensions: the quality of the process and the quality of the outcome. Process standardization can dramatically decrease variability that is accepted as validated quality indicator and can eventually improve performance[30,112]. Following the *less is more* approach, process quality indicators are easier to fix than outcome indicators as this approach targets activities that clinicians control most directly.[23] Furthermore, the case mix of studied populations has little importance when interpreting results, which avoids some bias and makes benchmarking between providers easier.

For this purpose, data measuring and reporting are essential. In the US, a recent study estimated the rate of inappropriate outpatient antibiotic prescription, using national registers and the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) for coding the diagnoses.[113] In addition to experts' reviews, authors used regional variability as estimates of appropriate antibiotic prescriptions. These kinds of data are essential in order to give feedback to physicians. Indeed, another study confirmed that reporting data had a positive effect, reducing the level of inappropriate care. In this study, the use of accountable justification and peer comparison as behavioral interventions resulted in lower rates of inappropriate antibiotic prescribing for acute respiratory tract infections.[114]

4.1.1 Ambulatory setting

To date in Switzerland, we do not have a national register that includes both diagnoses and therapies. Changing clinician decision making is therefore challenging, particularly in the ambulatory setting. Quality improvement programs show that the dissemination of guidelines on its own does not change physician behavior, and compliance and accurate documentation remain suboptimal[115].

In Geneva, two big managed care networks, which include 500 general physicians and 50 specialists, represent a tremendous platform to implement the concept of *less is more* through *smartermedicine*. The "Delta" and "La Tour Managed Care" networks collaborate on quality improvement projects, ensuring continuous training programs. They

have developed “quality circles” to promote peer collaborations, partnership, and education to optimize quality of care and disseminate best practice guidelines, such as the top-five lists published by the SSMIG[116].

Additionally, an ambitious project using educative data reporting in order to change physician behavior is ongoing. Using a Plan, Do, Study Act (PDSA) model, we implemented a quality improvement program in the network practices[112]. In October 2016, leader of “quality circles” planned to assess and benchmark the acceptability of and self-adherence to the top-five list recommendations, based on insurance claims and laboratory and radiological data. These process metrics have been gathered for the years 2014-2016 as the ambulatory top five list has been published in 2014. As we do not have yet access to diagnoses through electronic health records, we will give feedback to physicians about their performance based on utilization data, such as the number of ordered tests or amount of prescribed antibiotics, using the variability of practice among physicians as estimates of appropriate adherence. These data will be reported on a monthly basis to physicians participating in quality circles, staring in the beginning of 2017. We hypothesize that this feedback loop will provide significant support in establishing successful approaches to team-based adherence to top-five lists. During these quality circles, the reasons why some recommendations are not followed may be discussed, and specific interventions may be proposed. Before-and-after studies will be undertaken with run chart analyses in order to see the impact of these interventions after a virtuous PDSA cycle of 3 months. We hope that through this reflective, peer-based process, physicians will compare their practice with that of top-performing physicians and subsequently change their behavior.

Of course, this process would be enhanced if all physicians working in the ambulatory setting were sharing their data in the same accessible electronic medical record. Indeed, in addition to its utility in the optimization and standardization of care, the impact of the shared electronic medical record is strengthened by peer control, through the Hawthorne effect, which explains why physicians modify their behavior in response to their awareness of being observed.[117]

4.1.2 Hospital setting

As *smartermedicine* recently published the top-five list for hospital medicine, we want to launch a clinical study in this setting. In Ticino, where there is a network of four acute-care

public hospitals, some doctors who are committed to *less is more* medicine compared five standard diagnostic or therapeutic procedures in the medical and surgical departments of the four hospitals.[118] This benchmarking with continuous monitoring found significant and unexpected practical differences between specialties and institutions. The results of the first analysis have convinced prescribers of the usefulness of a monitoring system with benchmarking. The next step is to export this monitoring to Geneva University Hospitals and La Tour Hospital in order to demonstrate the feasibility and effectiveness of pragmatic automated, computerized, continuous monitoring. Each participant in the study will be provided with both dedicated hardware and software that has already been tested for applicability and effectiveness. Aligned with the *smartermedicine* campaign, we will focus on measurable items from the top-five list, such as blood sampling, red blood cell transfusion and benzodiazepine use. The objective of the project is to generate awareness regarding the potential inappropriateness of medical interventions prescribed upon discharge after hospitalization in the internal medicine department, starting with a study of variability. Using again a PDSA model, this computerized continuous monitoring will be part of a quality improvement program in the two Geneva hospitals. In 2017, we will contact a mix of frontline health workers and a quality control director in order to start the program as soon as possible. As we already have the authorization of medical directors from both hospitals, data collection and extraction should reasonably start by the end of 2017. If we succeed to prove the feasibility of this monitoring, we will then extend its use to another Swiss hospital by 2020. Scaling-up at a national level will require funding and may be easier if we can demonstrate significant improvement.

This project is aligned with a national procedure for peer review, as developed by alliance partners H+, to identify the potential improvements to therapeutic procedures[119]. At the hospital level, such peer review involves a retrospective analysis of statistically anomalous cases with the assistance of external experts and, if necessary, jointly developing measures to improve quality. They are extremely important for generating awareness and self-criticism among providers in order to promote behavior change[119].

4.2 Financial intervention

The Swiss health care system is a fee-for-service system that provides excellent access to health care but with some pernicious incentives. Fee-for-service systems encourage

procedure-based care rather than population-based patient management, which poses a challenge to the implementation of *less is more* medicine. Paradoxically, payment is not based on indicators of quality and physicians are not rewarded when they limit the use of low-value services.

Transitioning physicians to a performance-based system may be a step towards restructuring the underlying incentives in health care in order to deliver high-value care. Physicians under this arrangement may be rewarded for meeting targets for delivery of health care services based on quality and efficiency. Linking low-value service use to financial penalties could speed change, but may have a high risk of deterring physicians from participating in the program. Conversely, rewarding physicians for providing high-quality care and using only high-value interventions may be a solution. The reward could be financial or reputational through certification and labelling. The experience in the UK with a pay-for-performance system revealed some improvement in process measures without a significant impact on mortality.[120]

However, excessive links to incentives may trigger unintended consequences (such as risk selection) and major controversy and opposition, so caution is needed.[121] Furthermore, in order to create a transparent and reliable process for rewards, we need reliable metrics, informatics and coding systems that are not available yet in Switzerland.

4.3 Education

Finally, there is a broad agreement that education plays an important role in disseminating *less is more* medicine. Increasing knowledge about high-value care among residents and medical students has been associated with reducing inappropriate health care delivery.[122] The *less is more* philosophy should be taught early in medical school to train doctors to distinguish between high- and low-value care, and these should be reinforced in the clinical practices learned during residency training. Evidence shows the durable impact of *less is more* education on formation: physicians who trained in high-spending regions tended to have higher mean spending compared with those who trained in low-spending regions.[123] This underlines the importance of medical education in all teaching hospitals and private practices and for faculty in Switzerland as role models for appropriate behaviors. Providing background evidence for decision making is a key form of instruction from the beginning of training, and faculty require competency in defining low-value care and integrating the

patient perspective. The amount of support for sustainable practices within an institution and a performance-oriented culture may be critical to successfully training these physicians.[122] Continuing medical education in private practices, assisting physicians in carrying out their professional responsibilities more effectively and efficiently is also a key component.

The next generation of physicians ("Generation Y," born in 1980-90s) grew up with technology, and it is a generation characterized by a deep will to work meaningfully and efficiently. They are not afraid to question authorities about the best practice for their patients, and integrate more easily the notion of value of care and cost, based on evidence in the literature. There is then hope that adequately training this generation will ultimately shape their practice in delivering high-value and cost-conscious care.

5 CONCLUSION

5.1 Policy conclusion and recommendation

There is substantial overuse of some common procedures that demonstrate no benefit and that present potential harm in everyday practice. Compelling evidence based on several studies, and summarized in different practical guidelines, demonstrates that this waste can be minimized in our healthcare system. The optimization of care rather the maximization promoted by *less is more* medicine can be an intellectual challenge but also a real opportunity to promote sustainable medicine.

The *smartermedicine* campaign launched in Switzerland is an innovative approach to implement *less is more* medicine by changing physician and patient attitudes. However, this task must preserve both physician judgment and patient choice, as the individual patient remains unique and efforts to reduce waste cannot be one size fits all. *Smartermedicin*e leaders themselves accept that translating top-five lists into action is a big challenge, as it requires breaking down several barriers to transform the whole culture of healthcare. Such change will require new patterns of practice and revised patient expectations. We need to move from an individual fee-for-service system that allows unstructured use of services to a system that promotes quality and develops reliable indicators helping providers and patients make better decisions about when care is necessary. This patient-centered, quality-oriented cultural shift should eventually reduce overuse. To meet these goals, system changes are also required to create adequate electronic health records that can serve as useful clinical decision tools.

In order to promote the reduction of unnecessary interventions and to impact the whole health system, *smartermedicine* should network with all stakeholders, including consumers, policy makers, economists, opinion leaders, academic institutions, administrative staff, press, and even insurance groups. However, there is a legitimate fear of rationing in relation to these campaigns. Physicians seem to accept some responsibility to address healthcare costs but are less enthusiastic for external oversight by insurance groups. The top-five lists should not be used to determine payment for individual services, even if it seems appealing to insurance providers. Of note, an important insurance provider in Switzerland recently published a top three list of interventions that are unnecessary and will not be reimbursed anymore. Conversely, in order to keep physicians and patients

committed to the program *less is more* efforts must be physician-led initiatives. Physicians and their societies must develop the top-five lists, not the insurance providers. Cost-saving shouldn’t be the primary goal of *less is more* medicine, though it can be a collateral effect: the pressure to reduce costs is beneficial when it converges with the patient's health interests and serves to improve medical quality, as part of a sustainable global economy.

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Appendix A

Top-five list for family medicine according to the *Choosing Wisely* campaign[14]

Top 5 List in Family Medicine

1. Don't do imaging for low back pain within the first 6 weeks unless red flags* are present
- Imaging of the lumbar spine before 6 weeks does *not* improve outcomes but does increase costs
- Low back pain is the fifth most common reason for all physician visits

* *Red flags include but are not limited to severe or progressive neurological deficits or when serious underlying conditions such as osteomyelitis are suspected*
Sources: AHCPR and Cochrane

2. Don't routinely prescribe antibiotics for acute mild to moderate sinusitis unless symptoms (which must include purulent nasal secretions AND maxillary pain or facial or dental tenderness to percussion) last for 7 or more days OR symptoms worsen after initial clinical improvement
- Most maxillary sinusitis in the ambulatory setting is due to a viral infection that will resolve on its own
- Despite consistent recommendations to the contrary, antibiotics are prescribed in over 80% of outpatient visits for acute sinusitis
- Sinusitis accounts for 16 million office visits and $5.8 billion in annual healthcare costs

Source: Cochrane and Ann IM

3. Don't order annual ECGs or any other cardiac screening for asymptomatic, low-risk patients
- Little evidence that detection of coronary artery stenosis in asymptomatic patients at low risk for coronary heart disease improves health outcomes
- False-positive tests are likely to lead to harm through unnecessary invasive procedures, over-treatment, and misdiagnosis
- Potential harms of this routine annual screening exceed the potential benefit

Source: USPSTF

4. Don't perform Pap tests on patients younger than 21 years or in women status post hysterectomy for benign disease
- Most dysplasia in adolescents regresses spontaneously; therefore, screening Pap tests done in this age group can lead to unnecessary anxiety, morbidity, and cost
- Pap tests have low yield in women after hysterectomy (for benign disease), and there is poor evidence for improved outcomes

Sources: ACOG (for age), USPSTF (for hysterectomy)

5. Don't use DEXA screening for osteoporosis in women under age 65 years or men under 70 years with no risk factors*
- Not cost-effective in younger, low-risk patients, but cost-effective in older patients

* *Risk factors include but are not limited to fractures after age 50 years, prolonged exposure to corticosteroids, diet deficient in calcium or vitamin D, cigarette smoking, alcoholism, thin and small build*

Sources: NOF, USPSTF, AACE, ACPM

Appendix B

Top-five list for ambulatory medicine according to *smartermedicine*

Top-5-list

The SSGIM's Top Five recommendations for treatments/tests to be avoided in ambulatory care are:

ambulatory care

1 Obtaining imaging studies during the first six weeks in patients with non-specific low back pain.

Non-specific low back pain excludes red flags such as severe or progressive neurological deficits, or when conditions such as malignancy or osteomyelitis are suspected. Imaging studies in non-specific low back pain do not improve outcomes, but do increase ir-radiation and costs.

Sources: Agency for Health Care Research and Quality, National Institute for Health and Care Excellence
Evidence level: Meta-analysis of randomized controlled trials

2 Performing the Prostate Specific Antigen (PSA) test to screen for prostate cancer without a discussion of the risks and benefits.

The benefits of PSA screening are unclear as there are conflicting results from randomized trials. Men should understand the risks of overdiagnosis and overtreatment before being tested. Screening should not be offered over age 75.

Sources: American College of Physicians, National Health Service, Swiss Society of Urology
Evidence level: Randomized controlled trials

3 Prescribing antibiotics for uncomplicated upper respiratory tract infections.

The majority of uncomplicated upper respiratory tract infection are viral infections, for which antibiotics have no impact.

Sources: Centers for Disease Control, American Academy of Family Physicians, National Institute for Health and Clinical Excellence
Evidence level: Multiple randomized controlled trials

4 Obtaining preoperative chest radiography in the absence of a clinical suspicion for intra-thoracic pathology.

Provides no meaningful change in management or improvement in patient outcomes in asymptomatic patients.

Sources: American College of Radiology, Royal College of Radiologists
Evidence level: Multiple retrospective cohort studies

5 Continuing long-term treatment of gastro-intestinal symptoms with proton pump inhibitors without titrating to the lowest effective dose needed.

The indication for treatment should be regularly reviewed with patients, as side-effects may outweigh benefits, particularly with long-term treatment. Also applies to histamine 2 receptor antagonists.

Sources: American Gastroenterological Association, National Institute for Health and Clinical Excellence
Evidence level: Randomized controlled trials and prospective cohort studies

Appendix C

Top-five list for hospital medicine according to *smartermedicine*

Top-5-list

The Swiss Society of General Internal Medicine recommends this Top-5 interventions to be avoided in hospital care:

hospital

1 Don't order blood tests at regular intervals (such as every day) or routine extensive lab panels including X-rays without specific clinical questions.

Many diagnostic studies (including chest radiographs, arterial blood gases, blood chemistries and counts and electrocardiograms) are ordered at regular intervals (e.g., daily). Compared with a practice of ordering tests only to help answer clinical questions, or when doing so will affect management, the routine ordering of tests increases health care costs, does not benefit patients and may in fact harm them. Potential harms include anemia due to unnecessary phlebotomy, which may necessitate risky and costly transfusion, and the aggressive work-up of incidental and non-pathological results found on routine studies.

2 Don't place, or leave in place, urinary catheters for incontinence, convenience or monitoring of output for non-critically ill patients.

Catheter Associated Urinary Tract Infections (CAUTIs) are the most frequently occurring health care acquired infection (HAI). Use of urinary catheters for incontinence or convenience without proper indication or specified optimal duration of use increases the likelihood of infection and is commonly associated with greater morbidity, mortality and health care costs. Published guidelines suggest that hospitals and long-term care facilities should develop, maintain and promulgate policies and procedures for recommended catheter insertion indications, insertion and maintenance techniques, discontinuation strategies and replacement indications.

3 Don't transfuse more than the minimum number of red blood (RBC) units necessary to relieve symptoms of anemia or to return a patient to a safe haemoglobin range.
(7 g/dL in stable non-cardiac patients and 8 g/dL in stable patients with pre-existing cardiovascular disease)

Transfusion of the smallest effective dose of RBCs is recommended because liberal transfusion strategies do not improve outcomes when compared to restrictive strategies. Unnecessary transfusion generates costs and exposes patients to potential adverse effects without any likelihood of benefit. Clinicians are urged to avoid the routine administration of 2 units of RBCs if 1 unit is sufficient.

4 Don't let older adults lie in bed during their hospital stay. In addition, individual therapeutic goals should be established considering the patients' values and preferences.

Up to 65% of older adults who are independent in their ability to walk will lose their ability to walk during a hospital stay. Walking during the hospital stay is critical for maintaining functional ability in older adults. Loss of walking independence increases the length of hospital stay, the need for rehabilitation services, new nursing home placement, risk for falls both during and after discharge from the hospital and increases the risk of death for older adults. Bed rest or limited walking (only sitting up in a chair) during a hospital stay causes deconditioning and is one of the primary factors for loss of walking independence in hospitalized older adults. Older adults who walk during their hospital stay are able to walk farther by discharge, are discharged from the hospital sooner, have improvement in their ability to independently perform basic activities of daily living, and have a faster recovery rate after surgery.

5 Don't use benzodiazepines or other sedative-hypnotics in older adults as first choice for insomnia, agitation or delirium and avoid prescription at discharge.

Large-scale studies consistently show that the risk of motor vehicle accidents, falls, and hip fractures leading to hospitalization and death can more than double in older adults taking benzodiazepines and other sedative-hypnotics. Older patients, their caregivers, and their providers should recognize these potential harms when considering treatment strategies for insomnia, agitation, or delirium. Use of benzodiazepines should be reserved for alcohol withdrawal symptoms/delirium tremens or severe generalized anxiety disorder unresponsive to other therapies.