

# Postoperative Pain Surveys in Italy from 2006 and 2012: (POPSI and POPSI-2)

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**Abstract. – OBJECTIVE:** Despite established standards, effective treatments, and evidence-based guidelines, postoperative pain control in Italy and other parts of the world remains sub-optimal. Pain control has been recognized as a fundamental human right. Effective treatments exist to control postsurgical pain. Inadequate postoperative analgesia may prolong the length of hospital stays and may adversely impact outcomes.

**MATERIALS AND METHODS:** The same multiple-choice survey administered at the SIAARTI National Congress in Perugia in 2006 (n=588) was given at the SIAARTI National Congress in Naples, Italy in 2012 (n=635). The 2012 survey was analysed and compared to the 2006 results.

**RESULTS:** Postoperative pain control in Italy was less than optimal in 2006 and showed no substantial improvements in 2012. Geographical distinctions were evident with certain parts of Italy offering better postoperative pain control than other. Fewer than half of hospitals represented had an active Acute Pain Service (APS) and only about 10% of postsurgical patients were managed according to evidence-based guidelines. For example, elastomeric pumps for continuous IV infusion are commonly used in Italy, although patient-controlled analgesia systems are recommended in the guidelines. The biggest obstacles to optimal postoperative pain control reported by respondents could be categorized as organizational, cultural, and economic.

**CONCLUSIONS:** There is considerable room for improvement in postoperative pain control in Italy, specifically in the areas of clinical education, evidence-based treatments, better equipment, and implementation of active APS departments in more hospitals. Two surveys taken six years apart in Italy reveal, with striking similarity, that there are many unmet needs in postopera-

tive pain control and that Italy still falls below European standards for postoperative pain control.

*Key Words:*

Postoperative pain, Acute pain service, Patient controlled analgesia, Opioids, Recommendations.

## Introduction

Globally an estimated 234 million surgical procedures are performed annually<sup>1</sup>, elevating surgical safety and postoperative pain control to a worldwide public health concern. In Italy, about 4 million surgeries are performed annually<sup>2</sup>. Mild to moderate postoperative pain is reported by the majority (> 80%) of Italian surgical patients<sup>3</sup>. In the United States, over 51 million surgeries were performed in 2010<sup>4</sup> and 39% of patients described their postsurgical pain as “severe” or “extreme”<sup>5</sup>. Postoperative pain control has been studied for specific procedures and in certain geographical locations, but the latest comprehensive Italian data come from 2006 (Postoperative Pain Survey in Italy or POPSI)<sup>6</sup> and 2012 (Italian Observational Study of the Management of Mild-to-Moderate Postoperative Pain or ITOSPOP)<sup>3</sup>.

Of the hospitals surveyed in the POPSI 2006 survey, 41.7% had an active Acute Pain Service (APS) and about 10% of postoperative patients were treated with evidence-based recommended analgesic techniques, such as epidural analgesia, intravenous (IV) patient-controlled analgesia (PCA), or continuous peripheral nerve blocks

(CPNBs)<sup>6</sup>. In 2010, the Italian Society of Anaesthesia Analgesia and Intensive Care (SIAARTI) issued updated postoperative pain control guidelines<sup>7</sup>, advocating regular assessment of postsurgical pain, multimodal analgesia, and setting up APS in which the anaesthesiologist plays a primary role as coordinator for the team responsible for postoperative pain management. Conducted in 2012, the ITOSPOP study<sup>3</sup> (n=24 hospitals) reported that postoperative pain control in Italy still remained suboptimal.

The introduction of State Law 38/2010 has substantially reframed the issue of pain control in Italy. This law maintains that Italian citizens have the right to access palliative care and pain therapy and it further addresses how pain should be monitored, facilitates prescription of analgesics, improves educational efforts, and advocates for the wider development of APS in the context of regional projects entitled “Pain-Free Hospital and Territory”<sup>8</sup>.

In light of these recent developments, the authors repeated the 2006 POPSI survey in order to determine what improvements or changes have occurred in the intervening years.

## Materials and Methods

In October 2006, a 16-item multiple-choice questionnaire on the practice and organization of postoperative pain management was given to anaesthesiologists in attendance at the 60<sup>th</sup> SIAARTI National Congress in Perugia, Italy<sup>6</sup>. The survey requested information about hospital patient demographics, whether the hospital had an APS, current practice in postoperative analgesia, level of continuing medical education, limitations to better postoperative pain control, and possible solutions in the field of postoperative pain management. In 2012, the same survey was administered to anaesthesiologists attending the 66<sup>th</sup> SIAARTI National Congress in Naples, Italy. Both surveys were anonymous. The fact that the surveys were identical makes it possible to compare them.

The sample was grouped geographically into three main districts: north, central, and southern (including islands). Hospitals were ranked by size based on the number of surgical wards: small (1-5), medium (6-9), and large ( $\geq 10$ ). Respondents were categorized by their role as defined by the Italian healthcare system, namely:

resident, first-level assistant, Simple Operating Unit manager (UOS, that is, typically an anaesthesiologist responsible for one operating unit or section), Complex Operating Unit manager (an anaesthesiologist overseeing one or more UOS managers).

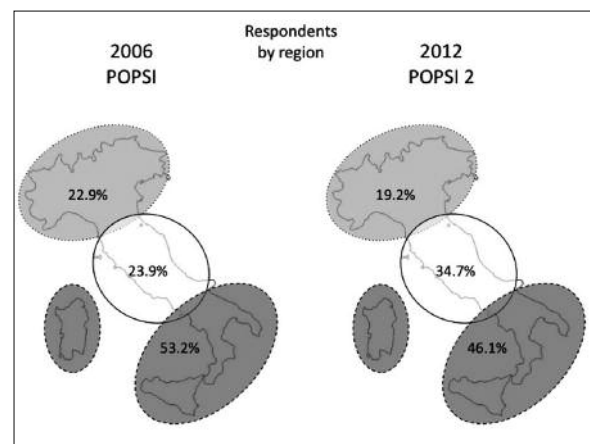
## Statistical Analysis

Data were analysed using descriptive statistics. Values were represented as means, calculated on the basis of total answers. Results were then analysed and compared by dividing the sample into different subcategories (such as geographical area, physician’s role, hospital size, and so on). For every subanalysis, results were compared with the mean data of the whole sample, using the chi-squared test. The *p*-value was calculated versus the national average and differences were considered significant at  $p \leq 0.05$ . Note that some questions permitted respondents to answer yes to more than one choice and thus the sum of percentages in some cases can be  $> 100$ .

## Results

In 2006, 650 questionnaires were distributed of which 588 were returned (90.4% response rate); in 2012, 800 questionnaires were distributed and 635 were returned (79.4% response rate). In the 2012 survey, 50 questionnaires were incomplete and could not be analysed, so the final analysis of the POPSI-2 survey was based on 585 questionnaires.

The regional distribution of respondents corresponded to the geographical categories: 19.2%



**Figure 1.** Geographical regions as defined by the 2006 POPSI and subsequent 2012 POPSI-2 surveys.

came from the north (n=112), 34.7% from the central region (n=203), and 46.1% from the south and islands (n=270) (Figure 1).

In 2012, data were obtained from 289 hospitals in total, representing 43.3% of the Italian public hospitals (compared to 24.4% in the 2006 survey). Hospital distribution by region showed 26.3% in the north (n=76), 35.3% central (n=102), and 38.4% in the south and islands (n=111). Most hospitals described in the survey were of medium size (55.4%, n=160), with 30.8% small (n=89) and 13.8% large (n=40). The range of surgical wards per hospital ranged from 1 to 30 per hospital with a mean value of 8 wards per hospital.

**Respondent Demographics**

In the 2012 reprise of the survey, 585 respondents could be categorized as residents (44.3%, n=259), first-level assistants (38.3%, n=224), UOS managers (9%, n=53), or UOC managers (8.4%, n=49). This distribution did not differ from the 2006 survey (see Figure 1). The most frequently represented specialties were abdominal (42.4%), orthopaedic (17.4%), and urological-gynaecological (15.2%), similar to the 2006 survey (Figure 2).

**Continuing Medical Education**

A change was noted with respect to continuing medical education. In 2006, 57% of respondents had attended at least one educational activity on postoperative pain management that year and 14% participated in such an activity the prior year. In 2012, only 37% had attended a continuing medical education activity that year and 12% had attended the year before. In both 2006 and 2012 surveys, UOC managers were most involved in continuing educational activities (92.5% and 71.4% for 2006 and 2012, respectively). In 2006, 14.7% of respondents reported

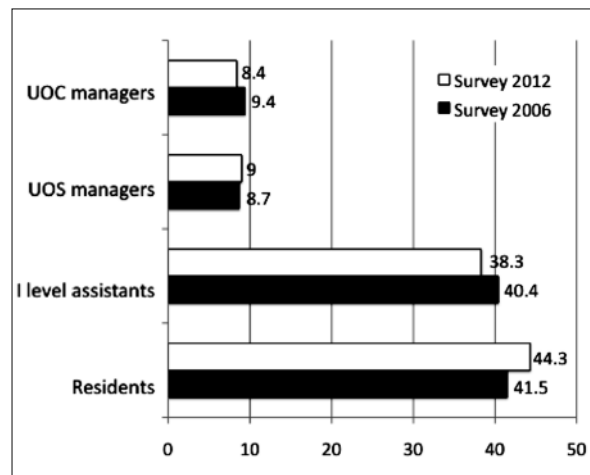


Figure 2. Respondent demographics from 2006 versus 2012 show a similar distribution.

that they had not participated in any continuing medical education activities related to postoperative pain management in the previous two years, but by 2012, this number had increased significantly to 51% ( $p < 0.05$ ) (Table I).

The number of respondents who requested further training in postoperative pain management was similar in both surveys (92.5% vs. 91.5% for 2006 and 2012 surveys, respectively). The most frequently suggested topics for continuing education were the same in both surveys: invasive techniques (36.8% both years) and operative protocols (27.7% both years).

Significantly more respondents reported that their hospital had organized educational activities related to postoperative pain control in the past year in 2006 than in 2012 (70% vs. 54.5%,  $p < 0.05$ ). Hospital-organized postoperative pain training was reported significantly more frequently in the north and central regions of Italy than in the south and islands ( $p < 0.05$ ).

Table I. Continuous Medical Education of respondents on POP according to their roles.

Have you attended any educational program on POP in the last 2 years?					
	Yes		No		
	2006	2012	2006	2012	
Residents	67.2%	41.3%	32.8%	58.7%	
First level assistants	70.9%	48.2%	29.1%	51.8%	
UOS managers	74.0%	66.0%	26.0%	34.0%	
UOC managers	92.5%	71.4%	7.5%	28.6%	
<b>Total</b>	<b>85.3%</b>	<b>48.7%</b>	<b>14.7%</b>	<b>51.3%</b>	

### Acute Pain Service (APS)

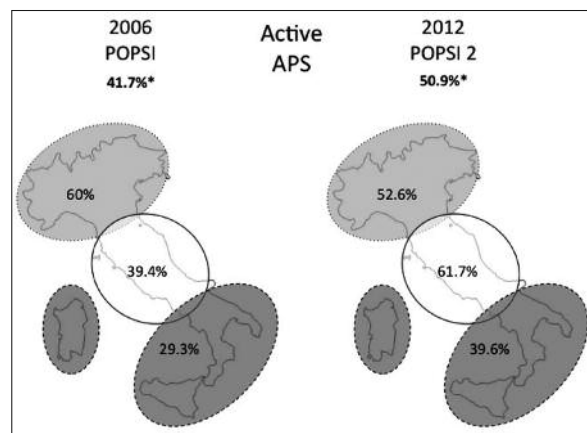
The number of respondents who worked in a hospital with an active APS increased from 46% in 2006 to 58.5% in 2012. It should be noted that in 2012, 12.3% of respondents said that their hospital had an APS that was not active. In 2006, 37% of respondents worked in a hospital without any APS; this number decreased to 29.2% in 2012.

Based on the 2012 surveys, 147/289 hospitals (50.9%) had an active APS in place. Hospitals in the central region of Italy were significantly more likely to have an active APS (61.7%) versus hospitals in the northern region (52.6%) or the southern region and islands (39.6%),  $p < 0.05$ . The national average of Italian hospitals with an active APS was 50.9%. This contrasts with results from 2006, in which the national average was 41.7% and hospitals in the north (60%) were most likely to have an active APS in place (Figure 3).

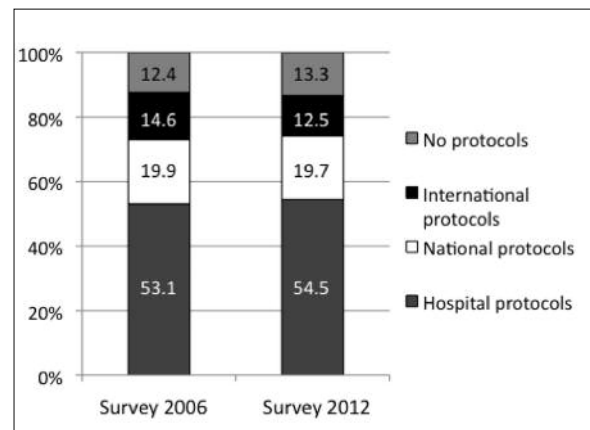
### Operative Protocols

Operative protocols provide guidance as to the administration of postoperative pain management. In 2006 and 2012, 87.6% and 86.7% of respondents, respectively, stated that they used operative protocols. The most frequently used protocols in both surveys were hospital protocols, derived from medical literature and adapted to local needs (53.1% and 54.5% for 2006 and 2012, respectively). A minority said they did not use any protocols (12.4% and 13.3% for 2006 and 2012, respectively) (Figure 4).

In 2012, among those respondents who said they used operative protocols for postoperative



**Figure 3.** The presence of active Acute Pain Services (APS) at hospitals in Italy by geography as reflected in 2006 and 2012 POPSI surveys.



**Figure 4.** The use of protocols in the POPSI surveys from 2006 to 2012.

pain, a quarter (25%) said they shared these protocols liberally with their colleagues, 68.5% said they shared protocols only with selected colleagues, and 6.5% did not share protocols at all. This distribution is similar to what was found in 2006, where 23.2% shared operative protocols freely and 70% limited sharing of protocols to certain specific colleagues.

In 2012, respondents in the north region were significantly more likely to use protocols approved by all staff (38.4%) compared to the national average (25%),  $p < 0.05$ . The same pattern occurred in 2006, with 35.5% in the northern region using protocols approved by all staff versus the national average (23.2%),  $p < 0.05$ . The majority of respondents (60% in 2006 and 68% in 2012) used protocols of some sort for postoperative pain assessment and this use was significantly more likely to occur in the north of Italy (84.8% in 2012,  $p < 0.05$ ).

Protocols to recognize and manage analgesic-related adverse events (AEs) were used by 37% in 2006 and 43% in 2012.

### Limits to Optimal Postoperative Pain Management

In 2006, respondents reported that the major obstacles to optimal postoperative pain management were: inadequate training of caregivers (44.3%), lack of time (29.9%), and lack of equipment (21.5%). Little had changed in 2012 when the corresponding percentages were: inadequate training of caregivers (34.9%), lack of time and organization (26.7%), and lack of equipment (16.7%). These answers were similar for all geographical regions and no statistically significant

differences were observed from 2006 to 2012 for the different respondent groups, their roles, and their regional distribution.

The most frequently advocated solution to improve postoperative pain management was assigning a dedicated anaesthesiologist on a daily rotating basis to oversee postoperative pain control (suggested by 51.2% in 2006 and 48.2% in 2012). Other solutions offered in the survey were to dedicate part of the workload of each anaesthesiologist to postoperative pain management (33.5%), increase the use of protocols (37.6%), and improve the training and preparation of the nursing staff (29.2%).

### Titration and Rescue Dosing

Most respondents said they used early titration of IV opioid analgesics in the recovery room to achieve adequate pain control before discharging patients to the surgical wards (77.6% in 2006 vs. 80.2% in 2012). In 2012, respondents from the central region were more likely to use titration of IV opioids than the national average (85.2% vs. 80.2%) and compared to the other geographical regions (78.6% in the north and 77% in the south and islands).

Most respondents said that they prescribed a rescue analgesic dose for inadequate pain control (84.2% in 2006 and 84.4% in 2012), but only 62.1% in 2006 and 68.5% in 2012 documented the dosing and timing on the patient's chart. A minority of respondents did not prescribe any rescue dose (15.8% in 2006 and 15.6% in 2012).

### Analgesic Techniques for Postoperative Pain

In 2006, the most commonly reported analgesic technique was continuous IV analgesia with an elastomeric infusion system (44%) followed by analgesic administered on an as-needed basis (22%). Epidural elastomeric infusion systems were used in 11% of cases and 8% of patients received continuous IV infusion of an analgesic with no flow-rate-control system. Analgesic techniques described by the guidelines (IV-PCA, epidural PCA, CPNBs) were only used by a small minority of respondents (10% in total). The survey data from 2012 were similar. As shown in Figure 5, continuous IV analgesia with an elastomeric infusion system was the most frequently used technique (50%), followed by as-needed analgesia (19%), and 8% of analgesia relied on IV infusion systems that lacked flow control. Epidural analgesia was used by 12% of pa-

tients and only 9% had PCA (7% received IV-PCA and 2% epidural PCA). CPNBs were used in 2% of cases.

While no regional differences emerged in 2006 in terms of analgesic techniques, the 2012 survey revealed significant differences by geography. Elastomeric pumps are more likely to be used in the southern region and islands than in the north or central regions (54.6% vs. 46.1% vs. 45.3%, respectively,  $p < 0.05$ ). Epidural analgesia in 2012 was reported to be used more frequently in the north than central or southern regions (20.1% vs. 9.1% vs. 10.5%, respectively). In 2012, PCA pumps were more likely to be used in the central region (10.6%) than the north (9.8%) or south (5.3%).

In both 2006 and 2012, the main reason for preference of elastomeric infusion systems over PCA pumps was their simplicity and ease of use (50.9% made this statement in 2006 vs. 56.7% in 2012). Other reasons stated included the inadequate supply of PCA pumps at their hospital (23% said supply was lacking in 2006 vs. 17.7% in 2012) or economic considerations (12.2% in 2006 and 6.8% in 2012 said elastomeric systems cost less).

Access to PCA pump equipment and the inadequate number of systems available to anaesthesia departments emerged in 2006 and 2012 as main impediments to their broader use (59.7% in 2006 and 60.6% in 2012). Only 21% of respondents in 2012 vs. 14.3% in 2006 said their hospital had enough PCA equipment to manage postoperative pain. About a third of respondents (35% in 2006 and 29.2% in 2012) worked in a facility in which no PCA pumps were available.

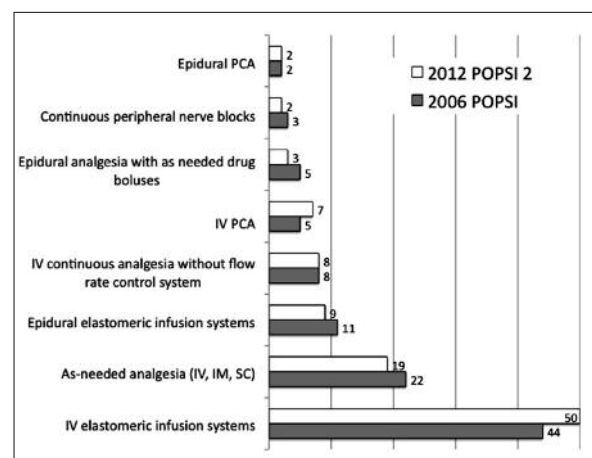


Figure 5. Analgesic techniques in 2006 vs. 2012 in Italy.

Other reasons stated in 2012 that limited the use of PCA pump equipment for postoperative pain control were resistance by the staff (13%), lack of adequate training (8.5%), the amount of time it took to inform and train patients about the system (10.4%), and the belief that similar analgesic results could be obtained with other techniques (7.5%).

In 2006, 65% of respondents stated they would like to see the use of IV-PCA increased for postoperative pain control; this number increased to 80.2% in 2012. In 2006, 72.4% of respondents said they wanted to improve their practice by using epidural techniques for postoperative pain control and this number likewise increased to 83.1% in 2012.

## Discussion

This paper describes a unique exercise in which the same survey on postoperative pain control was administered to similar healthcare professionals six years apart. Both surveys were predicated on the assumption that obtaining answers directly from anaesthesiologists rather than the department or institution would provide a more realistic picture of current analgesic practices. The main limitations to both surveys were that they relied on a convenience sample and that attendance at a specialty society meeting could not be taken to offer a representative look at the practices of an entire country.

The original POPSI survey in 2006 included 163 hospitals; this was increased to 289 hospitals in 2012. Response rates to both surveys were high (90.4% in 2006 and 79.4% in 2012). As anaesthesiologists on the frontlines of surgical care, these respondents were able to provide insight into how postoperative pain is managed in Italy.

Of interest in our survey was the fact that there has been a significant decrease in continuing medical education on the topic of postoperative pain control. This is particularly surprising in view of Law 38/2010 and the growing global appreciation of the importance of pain management. The reasons for this lack of continuing medical education in postoperative pain control are unclear. Many scientific sessions and continuing medical education activities require financial support from pharmaceutical and medical device companies and it is possible that these entities are not as interested in postoperative pain

control as in other topics. The lack of interesting continuing medical education events in postoperative pain control may have fuelled a vicious circle in which anaesthesiologists are not as interested in this topic. Nevertheless, more continuing medical education activities are needed to advance postoperative pain control.

The surveys in 2006 and 2012 found much postoperative pain control practice to be relatively unchanged. In Italy, the number of APSs falls well below the European average. This is regrettable as APS is increasingly recognized even in developing nations such as India as playing a key role in improving postsurgical pain control<sup>9</sup>. From our survey, it appears that only 50% of Italian hospitals have an active APS, increased only slightly from 40% in 2006. Survey respondents preferred the American anaesthesiologist-based model for an APS rather than the Swedish nurse-based model.

There are barriers to improving postoperative pain control in Italy and these may be described as both organizational and cultural in nature. The first limitation is a broad downgrading and downsizing of the healthcare system, a phenomenon occurring all over Europe and other nations as well<sup>10</sup>. With this change, there is a concomitant lack of human and technological resources. About half of respondents (45%) reported that lacks of time, organization, and equipment were the main impediments to achieving optimal postoperative pain management. Some of this may be due to the ingrained misconception that postoperative pain control is needed for only a few days – at most – so costly interventions, a complicated APS system, or sophisticated equipment are not justified for such short use. When hospitals review their overall spending patterns, it is easy and traditional to dismiss more than nominal expenses for postoperative pain care. Further, some surgeons may place obstacles in the way of advanced postoperative pain control because they may fear that advanced analgesic techniques, such as epidural patient controlled analgesia (PCA), may result in complications and that the use of opioid analgesics may result in difficult-to-manage adverse events such as postoperative ileus. Despite these concerns, the importance of effective pain control following surgery is well known.

The literature contains surveys on postoperative pain control management, many of which are based on retrospective review of medical records or patient surveys taken in the first days after

surgery. An international acute pain registry, PAIN OUT, funded by the European Commission, was established in Europe and Israel. For one year, PAIN OUT collected data at 11 clinical sites from more than 6000 patients undergoing orthopaedic or general surgery. Patients in the PAIN OUT survey were treated in accordance with evidence-based recommendations. The mean “worst pain” reported in the postoperative period in PAIN OUT was 5.2 on an eleven-point rating scale. In PAIN OUT, the most commonly prescribed opioid analgesics were tramadol and morphine and the most commonly prescribed non-opioid pain reliever prescribed was paracetamol (acetaminophen)<sup>11</sup>.

A French survey<sup>12</sup> conducted at 76 surgical centres found similar results, with the average pain during movement in the first 24 hours after surgery 4.9 on an eleven-point scale. In the ITOSPOP study<sup>3</sup> (n=24 hospitals) over 30% of patients reported moderate pain the first six hours after surgery, with 50% reporting mild pain over the entire 48-hour study period.

These reports strongly suggest that postoperative pain in Italy and other countries remains under-treated. Postoperative pain control strategies in Italy do not necessarily rely on evidence of national or international guidelines. For example, continuous IV infusion by elastomeric infusion pumps is not recommended in the guidelines, but according to our survey, persists as the most commonly used postoperative pain control technique in Italy. Based on the literature<sup>13,14</sup>, elastomeric infusion pumps in the postoperative setting would be mainly used to continuously infuse local anesthetics in regional anaesthesia. Yet in Italian hospitals, they are used after surgery to infuse analgesics, such as weak and strong opioids and nonsteroidal anti-inflammatory drugs (NSAIDs). Their widespread use in Italy is difficult to explain. For one thing, there is no scientific literature supporting these pumps for this specific application for postoperative analgesia and, for another, SIAARTI recommendations clearly advocate IV-PCA instead<sup>7</sup>. Yet about 50% of all postoperative patients in Italy, regardless of the type of surgery, will receive postoperative analgesic drugs via elastomeric infusion systems. These elastomeric infusion systems are cheap and easy to use.

Still, it is worth exploring why many Italian hospitals may be so reticent to use IV-PCA systems, while evidence shows that active involvement of the patient can improve postoperative

acute pain management<sup>15</sup>. According to our surveys, many hospitals lack a sufficient supply of these devices to treat all postsurgical patients. There can be resistance among the staff to using these devices, which are more complicated than elastomeric infusion pumps and require a degree of patient education. Furthermore, PCA pumps are electronic devices, which require regular maintenance and may require training to calibrate and set up. Technical errors can occur with these devices, and improper programming of the PCA pump may in some cases have serious consequences (inadequate drug dilution, improper bolus setting, and inadequate programming of the lockout timer). PCA pumps have safety alarms which can be harassing to staff, particularly when a safety alarm sounds when the ratio of nurse-to-patients is low or when the nursing staff is busy doing other important tasks. Compared to lightweight, disposable, easy-to-use elastomeric pumps, PCA systems can seem daunting to healthcare teams already challenged in terms of time and resources<sup>16</sup>. The main drawbacks to elastomeric infusion pumps are serious. They do not provide tailored postoperative analgesia and must be set to provide a continuous infusion based on the anaesthesiologist’s prescription. The use of opioids in an elastomeric infusion pump may be dangerous because these pumps lack a safety alarm. Underdosing of opioids may occur with an elastomeric pump, resulting in inadequate pain control. Moreover, elastomeric pumps typically have a fixed reservoir and provide continuous dosing over 48 hours. However, patients need more analgesia in the first 24 hours after surgery than the next day. Thus, an elastomeric infusion system may provide the patient inadequate pain control on postoperative day one and too much analgesia on day two. Newer elastomeric infusion pumps offer a mechanical PCA system or flow-rate controls, but these devices cost more than the conventional elastomeric infusion pump, even to the point that their costs may be similar to a PCA system.

Cost plays an increasingly important role in healthcare decisions but the cost of treating postoperative pain cannot be reduced to the cost of one device or drug therapy. Pain relief has been advocated as a fundamental human right<sup>17,18</sup> and inadequate pain control following surgery may adversely affect outcomes and decrease patient satisfaction. Innovative new drug delivery systems may play a role in the future of postopera-

tive pain control, such as transdermal analgesics or noninvasive IV-PCA using a sublingual table system. Technology may help to find alternatives to elastomeric infusion pumps that are not as complex as conventional IV-PCA systems.

The recent emergence of “fast-track surgery” requires enhanced recovery programs and standardized postoperative pain management approaches specific to the type of procedure. Our survey reported that about 90% of anaesthesiologists used protocols for postoperative pain control but only 40% relied on protocols for analgesic-related adverse events. In fact, updating operative protocols may be considered one of the major unmet needs in terms of improving postoperative pain control. International guidelines may be useful but they often have to be adapted to meet local needs, which we suspect is the case for their use in Italian hospitals. This “context-sensitive” approach to postoperative pain management may well emerge as a valuable alternative when protocols are shared freely among all members of the surgical team (anaesthesiologists, surgeons, and nurses)<sup>19</sup>.

## Conclusions

Postoperative pain remains a significant global healthcare need and pain following surgery is often suboptimally managed even in developed nations. In Italy, two surveys taken six years apart show that there are many unmet needs in postoperative pain control. In fact the results of our 2006 and 2012 surveys were surprisingly similar. While an overall trend of gradual improvement may be discerned, Italy still falls below European standards for postoperative pain control and in some areas has made little advancement in the past six years. The biggest obstacles reported by survey respondents to optimal postoperative pain control remain organizational, cultural, and economic. Much needs to be undertaken to improve postoperative pain control in Italy.

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## Conflict of Interest

The Authors declare that there are no conflicts of interest.

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