Background:
Compartment syndrome is an infrequent, yet devastating complication of extremity traumas in children. Supracondylar fractures of the upper extremity are thought to carry an increased risk of compartment syndrome [1]. Increasing anagistic requirement is shown to be an early indicator of compartment syndrome [2]. This presents a challenge in treatment, as many surgeons are hesitant to allow regional anesthesia for fear of masking early stages. While there are case reports attributing a delay in compartment syndrome diagnosis to regional anesthesia, there is a lack of published data on incidence. The purpose of this study is to identify the incidence of compartment syndrome after regional anesthesia is performed in pediatric upper extremity injuries.

Methods:
With IRB approval, all of our blocks are prospectively entered into the Pediatric Regional Anesthesia Network database. From our PRAN data we evaluated 209 upper extremity blocks performed in pediatric patients from May 2010 to September 2012 at Memorial Hermann Children’s Hospital. Patients were followed by the pain service for complications. Data was reviewed to determine incidence of compartment syndrome.

Results:
Of 209 upper extremity blocks performed, 98 were in patients with supracondylar fractures of the humerus. The most common cause of supracondylar fracture was a fall. The majority of blocks placed were axillary single shot with ropivacaine, but also included infraclavicular and supraclavicular blocks. All blocks were ultrasound guided. There was zero incidence of compartment syndrome or block complication noted.

Discussion:
Possible delay in diagnosis of compartment syndrome makes the treatment of pain in pediatric patients very challenging. Often, the presence of inappropriate pain is the most reliable indicator of developing compartment syndrome [3]. There is a lack of surgical guidelines or protocols for following patients at risk for compartment syndrome. In addition, the invasive nature of compartment pressure measurement is not a feasible method to follow pediatric patients. As a result, regional anesthesia is often avoided for fear of masking the initial signs of compartment syndrome.

However, there is a paucity of data on the actual incidence of compartment syndrome in the setting of regional anesthesia. In an audit of 1400 continuous epidurals in pediatric patients, 4 patients developed compartment syndrome in which fasciotomies were performed [4]. The epidural did not delay diagnosis of compartment syndrome or treatment. The supracondylar fracture of the humerus is a common elbow injury in children, and has historically been associated with the development of compartment syndrome. The incidence of compartment syndrome after regional anesthesia for postoperative pain control in upper extremity fractures in our case series is zero. There are several limitations of this study including lack of a common denominator, possible avoidance of regional anesthesia for more severe trauma, surgical bias against regional anesthesia, and insufficient power. Still, the review of 209 upper extremity blocks yielded no instances of compartment syndrome.

Regional anesthesia should not be avoided, but instead practiced in a safe manner that allows for both control of pain while monitoring for complications. Motor block in regional anesthesia should be avoided with the use of diluted local anesthetic if necessary [5]. In addition, there have been reports of delayed compartment syndrome diagnosis secondary to PCA use further affirming the importance of vigilance and monitoring in patients [3]. Regional anesthesia should not delay the diagnosis of compartment syndrome provided close follow-up [5]. More data is needed so that fear is not the reason to deny appropriate pain control to children.