CHEST

Developing an Interventional Pulmonary Service in a Community-Based Private Practice

A Case Study

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Interventional pulmonology (IP) is a field that uses minimally invasive techniques to diagnose, treat, and palliate advanced lung disease. Technology, formal training, and reimbursement for IP procedures have been slow to catch up with other interventional subspecialty areas. A byproduct of this pattern has been limited IP integration in private practice settings. We describe the key aspects and programmatic challenges of building an IP program in a community-based setting. A philosophical and financial buy-in by stakeholders and a regionalization of services, within and external to a larger practice, are crucial to success. Our experience demonstrates that a successful launch of an IP program increases overall visits as well as procedural volume without cannibalizing existing practice volume. We hope this might encourage others to provide this valuable service to their own communities.

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In an era of mounting costs and quality initiatives from clinical integration networks and accountable care organizations, we have seen care models shift from specialty silos to integrated delivery systems.[1] The field of interventional pulmonology (IP) is well positioned to enhance the care and coordination among general pulmonary medicine, critical care, thoracic surgery, and oncologic specialties. This article describes the experience of a large, community-based, single-specialty practice in successfully developing an IP program.

IP encompasses a range of minimally invasive diagnostic and therapeutic thoracic procedures in a specialty that overlays many fields (Table 1). Although the main focus is on the diagnosis, staging and palliation of thoracic malignancies, other thoracic and critical care diagnoses are appropriate for IP evaluation. To date, these procedures have been offered by a small number of

ABBREVIATIONS: APN = advanced practice nurse; CCC = Chicago Chest Center; EBUS = endobronchial ultrasound; E/M = evaluation and management services; IP = interventional pulmonology; SLA = Suburban Lung Associates; TBNA = transbronchial needle aspiration

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IP providers, but are more commonly provided by various specialties in a piecemeal fashion. Many communities have either limited access or no IP service at all. Growth of IP has been somewhat limited to academic medical centers and to narrow geographic regions.[2] With this wide variation of IP service delivery, it is incumbent upon institutions or even geographical regions to assess community need and how best to serve it.

We present a model for developing an IP program in a community setting that balances a desire to provide necessary services against the realities of practice in our medical economic milieu.

Methods

Community-Based Needs Assessment

A comprehensive needs assessment should precede the implementation of a new technology or service.[3] This includes an evaluation of the regional prevalence of lung cancer and related diagnoses. In most communities, there is a structural and functional lack of coordinated thoracic care. IP specialists perform a broad spectrum of procedures and have expertise in thoracic disease. This positions them to coordinate care and to lead thoracic initiatives in clinical quality, volume generation, and efficient throughput.

Market Analysis

Historically many pulmonologists have not prioritized performing procedures. Known barriers include relatively low reimbursement coupled with increased technical effort and physician time compared with other aspects of practice such as critical care, evaluation and management (E/M) services, and sleep medicine.[4] Current reimbursement patterns do not incentivize pulmonary procedures, so they are neither time nor cost efficient. This may limit provision and access to procedures that improve clinical outcomes. A dedicated IP service can proficiently overcome these obstacles. Navigating local politics is a frequent challenge. Practice patterns tend to be entrenched, so one should not minimize the effort required to effect change. The challenge of credentialing pulmonologists in nontraditional advanced procedures that cross specialties may be daunting. Demonstration of appropriate training and acceptance of published guidelines are fundamental.[5] With the implementation of IP, general pulmonologists are freed to grow other aspects of their practice, including E/M volume, while improving access and increasing revenue. The provision of a dedicated procedural service supports long-term practice viability, as well as vertical and horizontal integration.

TABLE 1] Representative Spectrum of Interventional Pulmonary Procedures

Diagnostic bronchoscopy—all aspects
Basic
EBUS
Navigational bronchoscopy
Therapeutic bronchoscopy (flexible and rigid)
Thermal ablative therapies
Airway stents
Endobronchial valves
Bronchial thermoplasty
Pleural procedures
Basic (thoracentesis, chest tubes, pleurodesis)
Medical thoracoscopy
Tunneled pleural catheter placement
Coordinated management
Others
Percutaneous tracheostomy
Percutaneous gastrostomy tube placement
Procedure-based research

EBUS = endobronchial ultrasound.

Economic Buy-In

Introducing IP to the region requires organizational and economic buy-in by key stakeholders. The practice, affiliated hospitals, staff pulmonologists, and associated services need to invest in the concept philosophically and financially with an understanding of the inherent risks and potential benefits. The economic impact of endobronchial ultrasound (EBUS) -guided transbronchial needle aspiration (TBNA) has been well studied. Pastis et al[4] demonstrated that the implementation of EBUS not only attracts new referrals and revenue but also benefits related institutional services such as radiology, surgery, and oncology.

Opportunities for decreasing costs exist. Analyses of EBUS-TBNA show that the cost of staging was reduced by 25% by eliminating the need for many mediastinoscopies in the evaluation of mediastinal and hilar lymph nodes.[6,7] IP impacts not only pulmonary and oncologic specialties, but critical care as well. Procedures such as percutaneous tracheostomy and percutaneous endoscopic gastrostomy are performed safely at the bedside while decreasing cost and length of stay.[8] These are frequently performed IP procedures. Expanding to a broad range of IP procedures serves as a driver of referrals and coordinated thoracic care delivery. These are just some examples of offerings that can impact cost, practice, and hospital revenue. Although these services are often offered piecemeal by multiple practitioners, a wider range of services, from basic to advanced diagnostic and therapeutic bronchoscopy to pleural procedures, in a consolidated program accomplishes greater benefit.

Procedural Gap Analysis

The assessment of key drivers such as demographics, breadth of thoracic service lines, baseline referrals and procedure volume, scope of diagnoses, personnel, equipment, and access to state-of-the-art care is integral to program planning.[3] Each entity must determine the best approach to offering IP services. As many of the procedures are performed in an outpatient setting, the medical community should address the question as to whether patients are best served by local care or by referral to a regional center.[9]

Dedicated IP Team

The decision to recruit fellowship-trained, board-eligible/board-certified IP physician(s) is an important consideration. Evidence suggests that more advanced training leads to better procedural

outcomes. Better outcomes should be rewarded as payment models shift from fee-for-service to value-based.[10,11] EBUS for lung cancer staging provides an instructive example.[8,12-14]

Although EBUS is the cornerstone of diagnosing and staging thoracic malignancies, EBUS training has been offered inconsistently in traditional pulmonary-critical care fellowship programs, and is neither widely nor optimally deployed.[15] Fully trained interventional pulmonologists proficiently offer our patients this much-needed service with the added benefit of a spectrum of minimally invasive procedures of the airways and chest (Table 1).

Our model includes advanced practice nurses (APN), registered nurses, and administrative staff supported in part by our partner hospitals. This is appropriate as these positions encompass hospital-based duties that would otherwise require the hospital to employ staff. Job duties of the team should be delineated for a thorough understanding of expectations (Table 2).

Branding and Marketing

Branding and marketing of any new service is important to a successful launch. Developing an independent brand distinct from the larger pulmonary practice breaks down barriers and encourages referrals. Meeting with providers and offering local and regional lectures increases awareness and establishes brand recognition. Marketing efforts might include print, direct advertising, and web-based materials.

Our Experience

Our community-based IP program was initiated in 2007 through a cooperative effort between Suburban Lung Associates (SLA) and two of the five hospitals that we serve. The two hospitals were chosen based on their interest and their geographic locations within the two largest concentrations of our patients. We later expanded advanced diagnostics to two other hospitals to accommodate community need. The practice sought to expand its position as a quality leader by becoming the first comprehensive IP center in Chicago. The creation

TABLE 2] Representative Job Descriptions of Key Personnel

IP Staffing	Hospital-Based Job Responsibilities
Medical Director	Attends and develops CME programs
	Reviews elements of procedural cases to standardize and/or manage supplies and labor
	Manages business operations/clinical operations of IP
	Creates a programmatic vision
	Creates annual plan for the program indicating goals for the year including quality and economic benchmarks
	Participates in periodic strategy meetings with vice presidents about growth and development, service enhancement, quality assurance, and marketing
	Participates in marketing initiatives including the development of collateral materials, patient education materials, and any advertising media
	Provides in-services to hospitals and physician groups within primary, secondary, and extended service areas
	Establishes ongoing relationships with industry, academia, and other research support organizations to bring research to the institution
	Reviews capital budgets with relevant Directors
	Advises hospital on technology needs
	Publishes
Non-Physician Practitioner (APN or PA)	Evaluates and manages clinical needs of IP patients, including before and after procedure, peer-to-peer authorizations, and medical-surgical clearance
	Facilitates referrals to multidisciplinary lung conference
	Attends thoracic tumor board
	Arranges hospital admissions and transfers
	Collaborates with others to facilitate clinical education on new IP procedures and devices, including ancillary support
	Coordinates hospital-based clinical trials
Administrative support	Schedules and prepares patients for procedures, directions, arrivals, parking, referrals, and prior authorizations
	Obtains and maintains medical records, external and internal
	Manages shared procedure calendars and education events (professional, community events, and meeting schedules)
	Assists in organizing quarterly professional lectures and annual fellows conference
	Maintains office equipment and orders supplies
	Performs general office duties

APN = advanced practice nurse; CME = continuing medical education; IP = interventional pulmonology; PA = physician's assistant.

of an independent, practice-supported, 1-year IP fellowship added academic rigor and credibility to the IP program. SLA's long-standing strategy has been to encourage providers to develop expertise in specific areas of interest such as sleep, interstitial lung disease, pulmonary hypertension, pulmonary rehabilitation, and critical care (Fig 1). The primary goal of the hospitals was to develop strong multidisciplinary lung cancer programs. The hospitals had performed market analyses, which suggested that they were losing patients from their respective catchment areas to academic centers.

Our development efforts were overshadowed by several factors that contributed risk to the required investment. The value of IP procedures had a growing acceptance but was not yet readily available nor perceived as the standard of care in Chicago. Competition among hospitals, pulmonary groups, and overlapping procedural specialties might limit referrals to what we envisioned as a regional center of superior quality.

Low reimbursement represented another barrier as both the professional and technical fee schedule for IP procedures had been limiting. The hospital's potential financial benefit lay in the anticipated "downstream" revenue that would accrue to participating service lines such as radiology, medical and radiation oncology, and thoracic surgery.[4] The hospitals also envisioned that their lung cancer programs would become centers of excellence, which would attract patients from both within and outside of their geographic markets. The hospitals contributed limited support to the IP providers in the form of medical directorships. Most of the provider support continues to be from clinical service within the practice. IP providers began by practicing a blend of IP and pulmonary-critical care. They transitioned to a greater percentage of IP as their volumes built. IP practice included not only procedures but, necessarily, a significant portion of IP-related E/M activity (Table 3).[16] We defined *IP-related* as referral regarding abnormal imaging, lung nodules, adenopathy, lung masses, pleural effusions, anatomic airway abnormalities, and the like. Although not mandated, many of the general pulmonologists internally directed basic procedures (eg, basic bronchoscopy, thoracentesis) to the IP service as they see their time more optimally used in E/M services.[4,12] The choice of whether to keep or refer basic procedures was left to the individual provider. This allowed a level of confidence and satisfaction across providers as the IP service grew and they could see their volumes were not threatened but actually increased while quality was maintained.

To encourage referrals from competitors, the IP service was separately branded as the Chicago Chest Center (CCC) with a distinct telephone number, secure e-mail, and web site, separate from the larger practice. Continuity of care with referring physicians was maintained. The CCC was initially staffed with a fellowship-trained IP physician, an APN, a registered nurse, and an administrative assistant. New providers were recruited from graduates of our freestanding IP fellowship on the basis of growth needs. New referrals are requested by calling or more easily by e-mailing, which transmits to all CCC staff. A CCC provider immediately reviews the medical record and radiographs and replies with a plan, often directing the administrative assistant to schedule a consultation and procedure. The clinical and administrative staff navigate the tasks of insurance preauthorization, preoperative evaluation, results assimilation, and follow-up care. We target 7 days as the time from referral to diagnosis. Several practice attributes contribute to the success of our IP program. SLA manages a significant volume of patients, which creates a critical

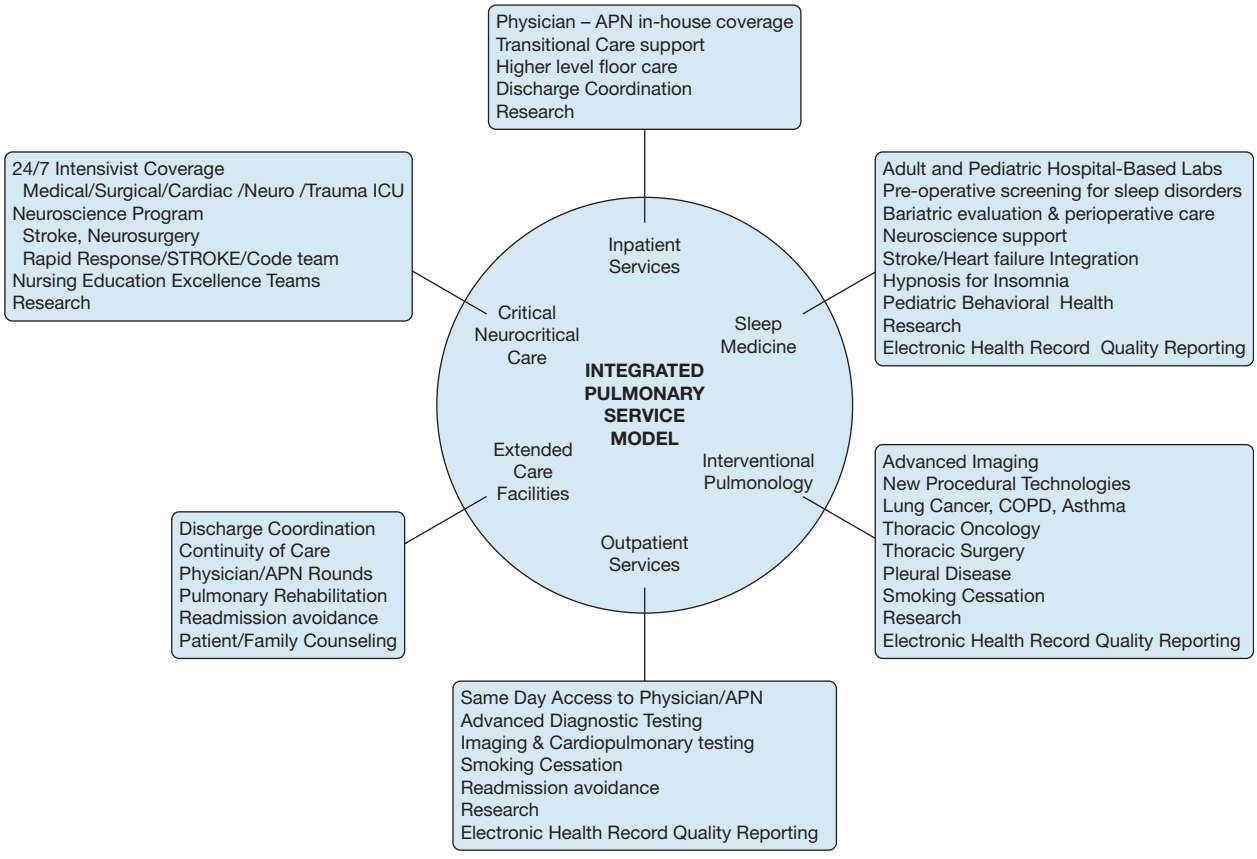

Figure 1 – *Suburban Lung Associates integrated pulmonary service model is shown. APN = advanced practice nurse.*

TABLE 3] Before and After IP Program Implementation Procedure Growth

Description	CPT[16]	Before IP Volume	After IP Volume[a]
Basic bronchoscopy			
Diagnostic bronchoscopy	31622	169	190
Bronchial brushing	31623	102	148
Bronchoalveolar lavage	31624	119	437
Endobronchial biopsy	31625	86	184
Transbronchial biopsy	31628	102	255
Transbronchial biopsy, additional lobe	31632	3	21
Therapeutic aspiration	31645	4	57
Advanced diagnostic bronchoscopy			
Endobronchial ultrasound	31620	14	366
Navigational bronchoscopy	31627	0	56
Bronchoscopy with fiducial markers	31626	0	30
Transbronchial needle aspiration	31629	58	363
Transbronchial needle aspiration, additional	31633	14	210
Therapeutic bronchoscopy			
Tracheal/bronchial dilation	31630	0	19
Tracheal stent	31631	0	16
Balloon occlusion	31634	0	22
Foreign body removal	31635	2	18
Bronchial stent, initial	31636	0	24
Bronchial stent, each additional	31637	0	9
Revision of tracheal or bronchial stent	31638	0	12
Excision of tumor	31640	0	12
Destruction of tumor	31641	0	63
Other bronchial therapy[b]		0	32
Pleural procedure			
Thoracentesis with imaging guidance	32555	286	366
Indwelling pleural catheter placement	32550	0	54
Thoracoscopy with biopsy or pleurodesis	32609, 32650	0	38
Percutaneous tracheostomy	31600	0	68
PEG placement	43246	0	41
E/M			
IP-related diagnosis	99201-99205, 99241-99245, 99211-99215, 99221-99223, 99251-99255	6,755	17,805

CPT = Current Procedural Terminology; E/M = evaluation and management services; PEG = percutaneous endoscopic gastrostomy. See Table 2 for expansion of other abbreviations.

[a]5-year annual average.

[b]CPT codes 31660, 31661, 31647, 31648, 31649, 31651, and 32997.

mass for IP referrals. Our practice compensation model encourages teamwork, as it is not productivity based. Thus, there is no internal competition, and each benefits from the success of the enterprise as a whole. Our culture encourages physicians to make philosophical and financial investments to further distinguish SLA as a regional quality leader.

Results

Key practice indicators including procedure volume, procedure range, complexity, and diagnoses are analyzed for quality and fiscal performance. We compared the procedural and E/M volume of the IP service with the overall practice to assess whether the IP service was

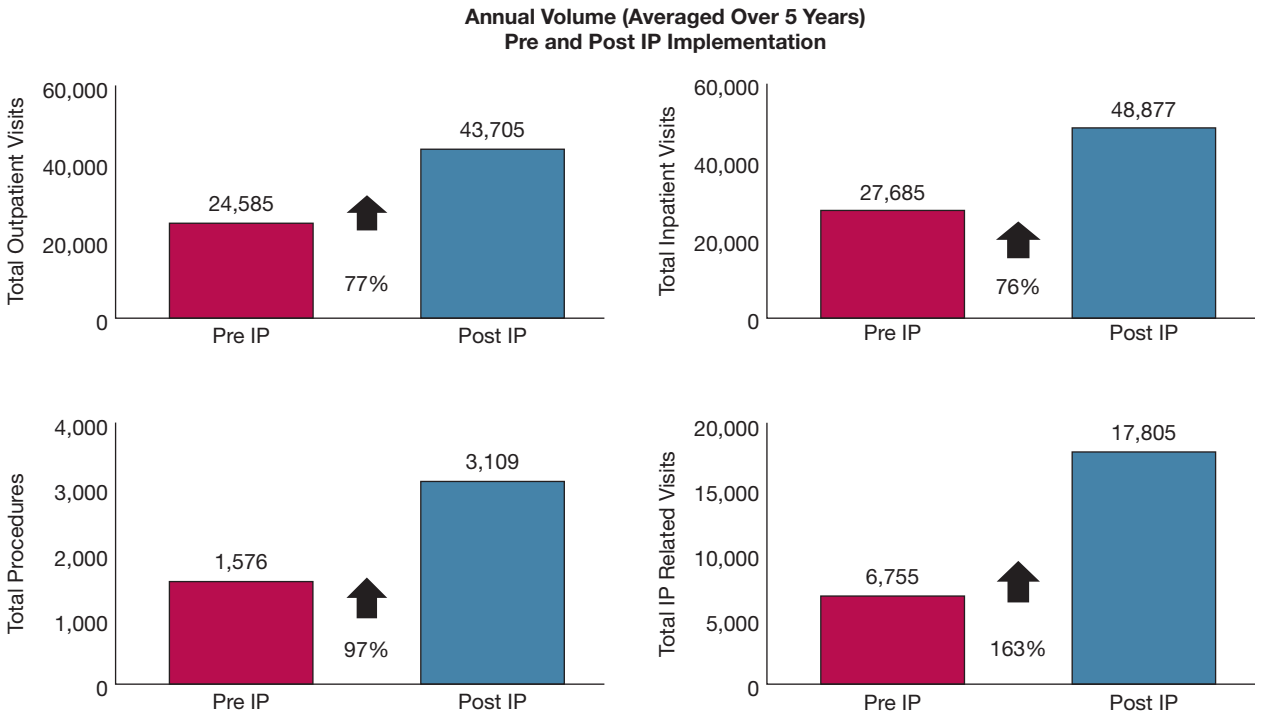

Figure 2 – *Annual volumes (averaged over 5 years) are shown before and after IP implementation. Volumes are grouped by total outpatient visits, total inpatient visits, total procedures, and total IP-related visits, which include abnormal imaging, lung nodules, lung masses, lung cancer, adenopathy, pleural effusion, and related airway disorders. IP = interventional pulmonology.*

cannibalizing the existing volume or contributing to new business. We looked at both intrapractice and more distant referrals.

The overall practice experienced a multiyear increase after the implementation of an IP program (Fig 2). Over 5 years, average annual outpatient visits increased from 24,585 to 43,705 (77%), inpatient visits from 27,685 to 48,877 (76%), and practice procedures from 1,576 to 3,109 (97%). Total IP-related average annual visits increased from 6,755 to 17,805 (163%). Far from cannibalizing existing business, the practice grew significantly in all parameters. Average annual EBUS volume increased from 14 before IP to 366 after IP (2514%). The complexity and range of procedures

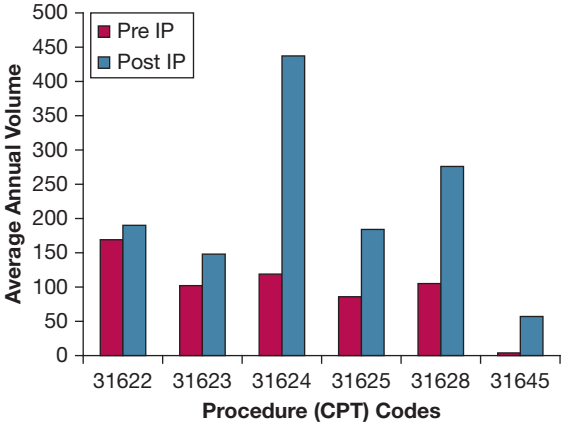

Figure 3 – *Basic bronchoscopy procedure volumes are shown before and after IP implementation. CPT = Current Procedural Terminology. See Figure 2 legend for expansion of other abbreviations.*

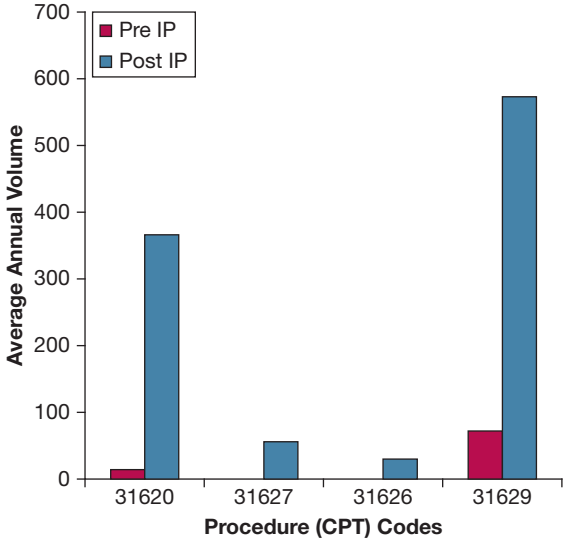

Figure 4 – *Advanced diagnostic bronchoscopy volumes are shown before and after IP implementation. See Figure 2 and 3 legends for expansion of abbreviations.*

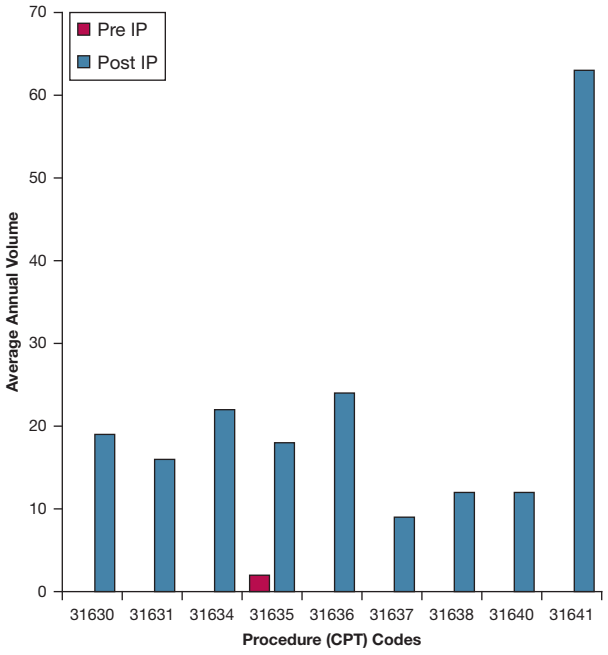

Figure 5 – *Therapeutic bronchoscopy volumes are shown before and after IP implementation. See Figure 2 and 3 legends for expansion of abbreviations.*

across the practice for both IP and non-IP providers, E/M volumes, abnormal imaging referrals, and the myriad of diagnosis encounters before and after IP implementation are represented in Table 3 and Figures 2-7. The full range of IP procedures including basic and advanced diagnostic bronchoscopy, therapeutic bronchoscopy, pleural, and IP-related critical care procedures led to the anticipated growth in volume and complexity of procedures in our population.

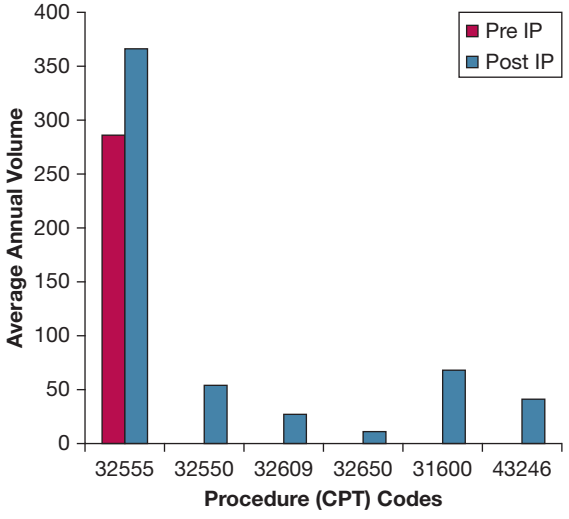

Figure 6 – *Pleural and IP-supported ICU procedure volumes are shown before and after IP implementation. See Figure 2 and 3 legends for expansion of abbreviations.*

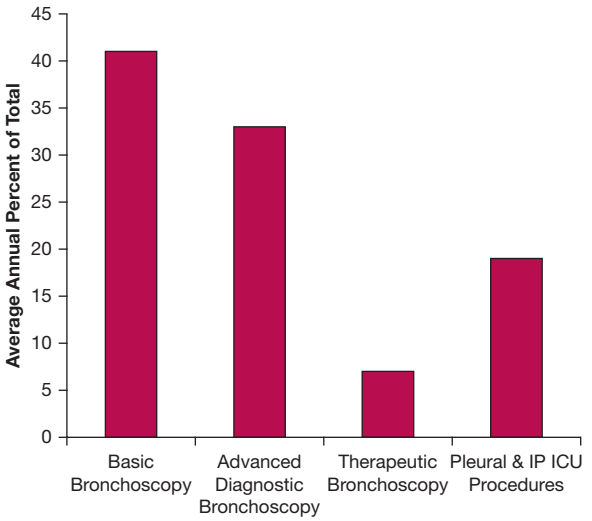

Figure 7 – *IP procedure categories are presented as a percentage of total procedures. Basic, advanced, therapeutic, and pleural/ICU procedures are grouped. See Figure 2 legend for expansion of abbreviations.*

With the expansion of IP services to additional hospitals, we reviewed the frequency of overall procedures and used procedure volume of TBNA at each newly added hospital location as an indicator of growth and impact. TBNA is a procedure that one would expect to be offered regardless of the presence of an IP physician. Taking the latest as an example, there was an overall increase in procedures at the new location from an annual average of 58 to 446 (669%) and TBNA from 9 to 131 (1,355%). The availability of an IP physician increased the appropriate use of EBUS and TBNA as a less invasive alternative to mediastinoscopy and suggested areas for education to impact practice patterns. We have found that developing an IP program at a new hospital location leads to growth in volume without cannibalizing our existing practice and competitively positions the larger practice in each new location. For example, cancer volumes monitored at one of our primary institutions grew by 25% annualized compared with before IP and subsequently plateaued. This experience was reproducible. Practice pattern and increase in referrals were viewed as a proxy for satisfaction of the referring providers within and from outside of the practice, and none were required to use the service.

Discussion

We have developed a successful model for delivery of IP services in a private practice setting. The key requirements are community need and volume, economic and philosophical support by both the practice and hospital(s), and appropriate channeling

of patients to IP services from within and outside the group. Our basic approach is to identify an area of clinical need and deploy the best-suited providers to develop that need. Continuous monitoring and communication regarding satisfaction, efficiency, and impact across the practice allows for timely adjustments. The use of an internal or external IP referral system allows the general pulmonologists in any practice to grow their E/M volume while offering patients basic and advanced procedures. Our model for developing an IP program is adaptable to academic and community-based settings. Buy-in must be achieved by identifying the clinical care gap, deciding on whether to keep volume internal or refer to a regional center, and later deploying a core group of proceduralists to provide the service. Our bias is to use formally trained interventional pulmonologists. The provision of comprehensive IP services addressed a surprisingly large unmet need. The growth of cancer volumes suggests that all service lines, including surgical, were positively impacted. Some may raise a concern that we are simply replacing one service with another, such as EBUS replacing mediastinoscopy. A less invasive procedure that provides the necessary data is better for the patient and complements the evolving standard of care. More so, adequate mediastinal staging is not performed consistently.[17] We believe that we filled a gap more than we replaced procedures. Although we expected each institution to have a gap in available pulmonary procedures, it became evident that our model was successful and reproducible. Collaboration within the practice and across institutions, transparent sharing of data, and minimizing silos all contribute to a successful program.[1]

Conclusions

Our experience demonstrates that a dedicated community-based IP program is financially viable and adds value to a pulmonary practice without cannibalizing existing activity. It requires conceptual acceptance by the practice as a whole. Volume is built from internal and external referrals including pulmonary, oncology, thoracic surgery, radiation oncology, interventional radiology, and internal medicine. Introducing a new service is accompanied by the challenge of changing practice patterns. It strengthens hospital-practice partnerships and brings advanced technology to the community. The effects of IP on patient care, yields, and outcomes appear positive but require further study, as the community-based model is relatively new to this field. The key is collaboration across practices and institutions, elimination of competition among thoracic subspecialties, and a willingness to come to terms with which services are best offered within the practice and which are better outsourced.

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