Optos (Marlborough, MA) has built an ophthalmic technology around widefield diagnostic imaging of the fundus. With over 3,800 units installed worldwide, the Company’s devices have been used to capture over 15 million patient images to date. With the recent introduction of advanced risk based imaging, the Company has begun commercializing its technology to ophthalmology to complement its strong presence in optometry.

SM2 Strategic was asked to conduct interviews with a group of ophthalmic surgeons who have incorporated the technology in their practices to better understand the utility of Optos in an MD practice. Further, the purpose of these interviews is to help ophthalmologists understand how this imaging technology differs from traditional methods of capturing data about the fundus. Finally, we wish to describe how the Optos device is influencing physician and patient behavior.

The following pages contain profiles from interviews with five surgeons who represent an array of ophthalmic practice types — solo vs. group, comprehensive vs. specialty — as well as diversity in geography around the US. The profiles describe how the technology fits into the unique setting of each practice.

A framework for defining the experience of Optos ownership is shown in the figure above; six common attributes collectively described by these physicians underscore the success this technology has achieved in market adoption.

Patient-centric design
The Optos platform was developed with the patient in mind and has succeeded in capturing high-quality ultra widefield fundus images without the need for dilation. The data output has also been designed to facilitate the discussion between doctor and patient, both in form and content.

Consistent and reliable data capture
Digitizing and recording the fundus image has shifted the burden of collecting and recording the image away from the physician and/or photographer, allowing the physician to focus energy on interpreting data rather than collecting it. The image quality is described as being more than sufficient to meet the needs of a busy ophthalmology practice.

New and better information
These physicians are clear that the Optos device is allowing them to detect pathology that they would otherwise miss using an indirect during the exam or taking a standard fundus image out to 30 degrees. This has led to earlier diagnosis and treatment of eye disease and greater preservation of vision.

Interaction with patients
Patients are better able to understand their eye conditions because they can visualize what is happening by looking at their optomap® alongside their doctor. The optomap serves to help validate their complaint. This has significantly impacted the quality of the discussion and the ability to gain compliance with recommendations.

Better business model
Because the company charges on a per-use basis rather than the traditional capital equipment sale, customers know the company will never abandon them or their interests. If the device is down, the company and the practice suffer, which aligns the interests of both parties.

Patient acceptance of the fee
When used with general exams, physicians are charging a fee directly to the patient for the optomap retinal exam. Doctors are finding they don’t have to “hard sell” patients but simply explain the benefits of the procedure. A very low percentage of patients decline; those who have the test find high value in knowing what the data mean for their eye health.
While **Dr. John Kitchens** had heard about Optos during his residency and fellowship, it was only when a colleague showed him the device firsthand that he felt its potential. “Up until then, my impression had been that the technology was an OD screening device; I was amazed to see fundus images just like traditional fluorescein angiography.”

Having joined an already busy group of 3 retina specialists, Dr. Kitchens acquired the Optos device and says it has fundamentally changed the way he practices medicine both diagnostically and therapeutically.

As a diagnostic, the P200MA provided images that were not distorted and could be accurately obtained. “It would take a novice photographer six months or more of training to begin to acquire the quality of images that are available immediately from the Optos system” noted Dr. Kitchens. His practice has adopted the Optos as their primary fundus camera, achieving much greater consistency than the traditional method of relying on the skill of fundus photographers. “With photographer variability taken out of the equation, the practice is achieving consistently better images, leading to more effective and efficient treatment of patients.

Second, Dr. Kitchens realized that what he was seeing in clinic (via indirect ophthalmoscopy and 90 diopter fundus examination) was “grossly underestimating” what was happening inside the eye. “As a retina specialist, I am highly sensitive to changes such as macular edema in diabetic retinopathy patients. The Optos device is allowing me to pick up subtle peripheral changes much earlier than before.” Noting that most disease starts in the mid-periphery, having a single simultaneous photo out to 200 degrees (as compared with the 30 or 50 degree view given by traditional fluorescein angiography) has given him a jump-start in developing a therapeutic plan. “I’m learning a lot more about what happens in peoples’ eyes than I did previously.” He also added that from an image capture standpoint, the single simultaneous photo provided by Optos is far superior and more reliable than attempting to gain a wide field view by performing “click, move camera, click, move camera” with a traditional fundus imaging device.

As a result, Dr. Kitchens is able to treat earlier, not only with the primary eye but in the fellow eye as well, which “looks good upon examination but then I discover issues revealed by Optos that can also be treated in a targeted manner.” For example, when imaging for Uveitis, he says he commonly finds peripheral vascular leakage, an indication of underlying inflammation that is persistently active but not clinically apparent on exam or with standard angiography. This may result in progressive damage and eventual vision loss if not properly addressed early and in its entirety.

“Optos has really educated me about disease and the impact of my treatment because I can see it, especially with laser therapy,” noted Dr. Kitchens. With the optomap images, he can use the laser “in the same manner a chef adds salt to a recipe,” allowing for optimal dosage without over-treating the patient. His usage of the device has created a complete feedback loop to patients. “This is where Optos really shines, as my patients can literally ‘see’ the results of their treatment.”

From an economic standpoint, Dr. Kitchens says the additional information he gets from Optos is worth the extra cost relative to standard fundus photography. He’s taking more images now than with FA because they help him more. “Where OCT tells me what is happening, Optos tells me why it’s happening,” commented Dr. Kitchens in describing how these two technologies work together. With OCT helping explain the story, Dr. Kitchens says he has the data to start acting pre-emptively, which has helped him treat his patients more effectively.

**Complementary Technologies for Retinal Imaging**

<table>
<thead>
<tr>
<th>OCT (Ocular Coherence Tomography)</th>
<th>Optos (Wide Field Imaging)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• View of Macula</td>
<td>• View of entire Retina &amp; Vasculature</td>
</tr>
<tr>
<td>• Presence of a clinical finding (what is occurring)</td>
<td>• Reasons for the finding (why it’s occurring)</td>
</tr>
<tr>
<td>• Centrally-based disease – AMD – Retinal Holes/epiretinal membrane</td>
<td>• Macular &amp; mid-peripheral disease – Diabetic Retinopathy – Uveitis</td>
</tr>
<tr>
<td>• Anatomical understanding</td>
<td>• Physiological understanding</td>
</tr>
</tbody>
</table>

Source: John Kitchens, MD

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**John Kitchens, MD**
**Retina Associates of Kentucky**
**Lexington, KY**
**Years in Practice: 4**
**Focus: Retina**
**Drs on Staff: 4 MDs**
**Experience with Optos: 1 year**
Don Serafano, MD has been a fixture in the south bay section of Los Angeles, serving the community both as a cataract surgeon and with a laser center to perform LASIK. Having used Optos P200 in his practice for 6 years, Dr. Serafano believes it has created a new level of trust in the doctor-patient relationship. “The patient feels validated when they come to see me,” explained Dr. Serafano. “This device authenticates their complaint.” Indeed, what began as an optional screening tool that was offered to patients has now become a mainstay in the practice.

For years, he examined the fundus using indirect ophthalmoscopy and then drew a picture he could refer to in future exams. The digital capture by the Optos device gives him a landmark for comparison which he believes is far superior to his drawings and elevates the level of clinical care and diagnosis he is providing. As important is the response he is getting: “Patients love it and are fascinated by seeing their retina and the changes I can point out that have occurred between office visits.” There is a ripple effect that also occurs once the patient leaves. “I get to send them out with a ‘story’ about their visual complaint that they now have and can use when their family asks, ‘what did the doctor say?’”

Dr. Serafano firmly believes that Optos technology has helped with patient retention, a vital component of the general ophthalmology practice. Once patients have experienced the ease of the Optos exam and the digital image up on the viewing screen in the exam room, they have a greater sense of connection to the practice and greater likelihood to schedule and come in for their annual exam. “Patients traditionally return to their same doctor because he has the records on file. This is that same concept to a much higher degree,” added Dr. Serafano. With a fee of $45 billed directly to the patient, the revenue from the Optos fundus exam has improved cash flow, especially in periods when medicare payments are delayed. And the revenue contributed significantly to 2008 being a higher revenue year than 2007.

Dr. Serafano first became aware of the Optos device as a result of mentions by patients coming from referring optometrists and his in-house Optometrist suggesting they add it to the practice. He decided to involve the entire staff in developing the process of offering this to patients since it would require an out-of-pocket expenditure. While his technicians became fluent in describing the benefits of a non-dilated fundus exam, they don’t try to “sell” the test to patients but rather announce it using a “matter-of-fact” tone. This training has paid off in other ways for the practice. “Our success in offering Optos to all patients who come in really made it easy for us once premium IOLs became available,” noted Dr. Serafano, whose practice enjoys a 35% conversion rate of patients choosing to pay more for premium IOL technology.

As good as the technology is, Dr. Serafano cautions his colleagues to be careful and not let Optos substitute for the exam. Nor does he see it as a replacement for other high technology devices such as HRT or OCT, which he believes are better suited to foveal analysis including assessing cup to disc ratio for glaucoma suspects.

The Optos device fits in well with his practice and his personality: “Because I enjoy people, Optos affords me a great conversation with the patient,” concluded Dr. Serafano, who recognizes the value of putting patients ‘on stage.’ “By giving them data and explaining it in ways that make sense to them that they can now visualize, my patients take their eye care more seriously and feel as if I’m their advocate. I really like that role.”

### Summary of Experiential Benefits

**Patient**

- Dilation neutral
- Can view image
- Can see results of treatment
- Validation of complaint(s)
- Greater understanding of eye health

**Physician**

- Less skill required (vs. retinal photographer)
- Focus on interpreting data vs. collecting data
- Conversation starter
- Practice builder
- Patient retention
Dr. George Waring has been a pioneer in refractive surgery, helping establish the science for re-shaping the cornea as a primary investigator for the PERK study as well as clinical studies on excimer lasers. His practice is equally divided between refractive surgery on the lens and on the cornea. As a surgeon who has prided himself on utilizing advanced technology with patients, the Optos P200 has become highly valuable clinically as well as from a business perspective.

Using the optomap as a pre-surgical screening tool, Dr. Waring makes the digital fundus image a cornerstone of the refractive consultation, noting that it brings a “wow” factor to the pre-operative experience. Prior to Optos, he would routinely dilate the pupil and then perform binocular (BIO) indirect ophthalmoscopy. “This requires the physician’s brain to record the image and then translate that to paper; the Optos P200 lets the computer record digitally, allowing the physician to concentrate his effort on interpreting (rather than recording) what he sees. This is a big advance,” said Dr. Waring.

Optos has also allowed Dr. Waring to challenge long-held assumptions about dilating the pupil for a refractive exam. He notes that surgeons do this habitually, both to get a look at the fundus and then to perform a cycloplegic refraction as a double-check on their manifest. “Nobody operates on a cycloplegic refraction unless we’re dealing with a young hyperope,” he remarked. “We triple check our manifest and use the Optos to give us the fundus image we need.” As a result, he feels the Optos device allows the physician to responsibly examine the fundus with less time and effort.

From a business perspective, Dr. Waring has made the Optos test part of his refractive surgery global fee. When patients have been to several other laser centers and then come in for a consultation, they indicate a strong appreciation for both the technology as well as the single fee approach. “Optos helps us convert patient interest as part of the whole experience,” added Dr. Waring.

In addition, Dr. Waring performs regular eye exams and bundles the charge for Optos into the overall exam fee, with little resistance from patients. The optomap, which patients get to keep a copy of, serves as a form of “brand extension” for Dr. Waring back into the community.

Indeed, Dr. Waring’s experience demonstrates that the Optos device serves multiple purposes, both as an effective screening tool as well a tool that enhances the overall patient experience. These elements meld well together and have become essential as part of the “medical retail” environment that has emerged with the development of refractive surgery.

**Revenue Impact of Optos**

<table>
<thead>
<tr>
<th>Physician</th>
<th>Average Number of Optomaps per Month</th>
<th>Fee Per Patient</th>
<th>Estimated Annual Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serafano</td>
<td>141</td>
<td>$45</td>
<td>$76,000</td>
</tr>
<tr>
<td>Henderson</td>
<td>158 86</td>
<td>$37</td>
<td>$109,000</td>
</tr>
<tr>
<td>Kitchens</td>
<td>27 47</td>
<td>$58-208*</td>
<td>$130,000</td>
</tr>
<tr>
<td>Waring</td>
<td>171 Bundled</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Neatrour</td>
<td>239 177</td>
<td>$49</td>
<td>$244,000</td>
</tr>
</tbody>
</table>

*Reimbursed by third party insurance/medicare

**Practice Economics**

Different Optos models allow for increasing imaging capabilities

- Basic Screening
- Advanced Imaging
- Fluorescein Angiography

- Each model is offered with a monthly lease plan that includes service, upgrades and a specified number of images (minimum per month)
- Images above the minimum are billed to the practice
- The cost per image decreases as the monthly volume commitment increases
- Gross margin (revenue less cost to perform) ranges from 40-70%, depending on patient fee charged and number of tests performed
Dr. Tom Henderson has a busy solo ophthalmology practice in Austin, Texas and typically sees 40-50 patients per day, something he considers a real privilege. His outlook was put to the test several decades into his career; the practice was nearly decimated as a result of joining a physician practice management group, leaving him looking for ways to provide better service and income to the practice. The Optos P200C filled that bill, and today he uses the device primarily to follow known pathology (80%) and secondarily as a screening tool during the regular eye exam (20%).

“There was no good way to document the inside of the eye until Optos,” claims Dr. Henderson. The ability to document pathology without having to dilate the eye has been key to (re)building his practice. “I’m able to explain to patients what I’m seeing,” which has enhanced both his credibility as well as the patient’s understanding. “The Optos images have immensely improved patient education and compliance,” he added. “This breaks the ‘disbelief barrier,’ where patients think, ‘the doctor is just telling me something that’s not important.’” Indeed, he believes there is much higher compliance with his recommendations, especially with glaucoma patients.

Of concern with any imaging technology is the ability to accurately distinguish pathological change from artifact. “I see things on the optomap that I don’t see on indirect (ophthalmoscopy), which gives this device a lot of value.” Referrals to retina specialists have rarely come back as a false alarm. To the contrary, Dr. Henderson related a case example of a patient he diagnosed with melanoma along the superior arcade and sent to the retina specialist, who then sent the patient to a university setting for removal of a tumor. Following treatment and return, Dr. Henderson was able to re-photograph and document that approximately one-quarter of that tumor had not been removed during TPTT (transpupillary thermotherapy).

Another case study underscores how the Optos device helps solve patient complaints, this time of a 10 year old twin complaining of headaches for several weeks. A quick Optos photo taken of the child revealed an elevated optic nerve head as a result of an impinging tumor. Taking the same photos of the twin’s sibling (who was normal) helped reinforce the gravity of their remarkably stoic child’s situation to the parents. This lead to an immediate trip to the emergency room. The child had surgery and a full recovery following complete resection of a benign cystic astrocytoma.

When it comes to revenue and profitability, Dr. Henderson acknowledges that Optos is profitable, yet he views this as a bonus rather than a requirement. “There is a misconception that this is simply a ‘money making device,’” he noted. “Its real benefit is in enabling me to document pathology better and find things I might otherwise have missed.”

As illustrated in the two case examples, the Optos device has significantly impacted how he interacts with patients. “By showing, not telling, them what I see, I can involve my patients deeper in the therapeutic options before we decide a course of action.”

As a result, Dr. Henderson uses this 5-10 times per day and instructs staff never to push this on those coming in for their regular exam. “It’s a convenience, and not everyone needs it every year.” But for those who do, it’s proven to be a true asset in the clinical practice.

### Summary of Clinical Benefits

- Dilation neutral
- 200˚ wide field-of-view
- Digital documentation of retina and ability to have objective reference points
- Earlier detection of pathology
- Education about disease progression
- Improved patient compliance with recommendations
With a group practice that involves multiple doctors and staff, incorporating any new technology can be a daunting task. Dr. Peyton Neatrour and his team have a long history of taking on new technologies and making them successful within their practice.

Initially attracted by the non-dilation aspect of fundus imaging, the Optos P200C serves three distinct needs within the practice: For the optometrists, it has become part of the screening regimen. For both ODs and MDs, it is used to document pathology and associated changes. And for refractive and cataract surgery, it is used to screen for any abnormalities that would exclude candidates. As a result, they find they are using the device on several hundred patients each month at their main location and have recently added additional Optos units at two satellite offices.

“Optos makes the annual exam more interactive,” commented Dr. Neatrour. “Patients really like not having a day of blurry vision as part of their eye exam.” Those with defined pathology will get dilated, but there are many patients who don’t need it and are grateful for the convenience offered by the Optos portion of their exam.

Key to integration was preparation and training with the entire staff on both use of the device and how to describe the image to patients. Dr. Neatrour describes the learning curve for technicians as shallow (rather than steep) and that they were very quick to pick up how to get good images. As important in the training was the communication with patients, working to help them understand the benefits of a wide view of their fundus, and the ability to digitally document and monitor changes over the years.

This diligence on the front end has helped overcome any concern about patient resistance. “We don’t have to sell the test, we simply tell them about it,” added Dr. Neatrour, who also indicated that about 95% of patients in for their annual exam accept the test. The data from the test are used in the exam, including the 3D Wrap™ “virtual tour” of the eye that is part of the software package and makes for superior patient education. From there, the images get stored in the practice EMR (electronic medical records) system, for future recall.

The Optos has been a win-win on multiple fronts for the practice. Patients enjoy the convenience as well as a richer understanding of their eyes. Staff and doctors benefit from a better solution to fundus imaging than the traditional fundus camera. And the practice benefits from revenue that comes from patients directly for screening and from reimbursement for known pathology. “We believe that Optos provides a 3-to-1 return on investment to the practice,” commented Dr. Neatrour. “But more importantly, we are picking up previously unseen pathology, which translates to a higher level of care for our patients.”

**SUMMARY**

Medical technology’s purpose is to improve the quality of health care. Optos’ technology has gone a step further in creating a new paradigm and breakthrough by combining a diagnostic technology with a pay-per-use model that was popularized by surgical devices such as the excimer and femtosecond lasers.

More importantly, Optos has proven that you can design a device that offers both greater convenience for the patient and better quality of information for the doctor. In other words, there isn’t a trade-off or compromise of one objective to achieve the other.

Finally, the device meets the criteria of an elective procedure, simply defined as having benefits sufficient that patients are willing to pay out of pocket to receive them. This is a significant shift from traditional diagnostic devices, which were commercialized mainly on the basis of third-party reimbursement (e.g., automated perimetry) or greater in-office efficiency (e.g., automated lensometry). In addition to these two, Optos brings to the practice a consumer-friendly device that is proving its worth in ophthalmology as well as optometry.

SM2 Strategic works with leading device manufacturers and physicians to enhance the patient experience while increasing demand for innovative technologies and procedures. More information:

[www.sm2strategic.com](http://www.sm2strategic.com) and [www.premiumeyesite.com](http://www.premiumeyesite.com)

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