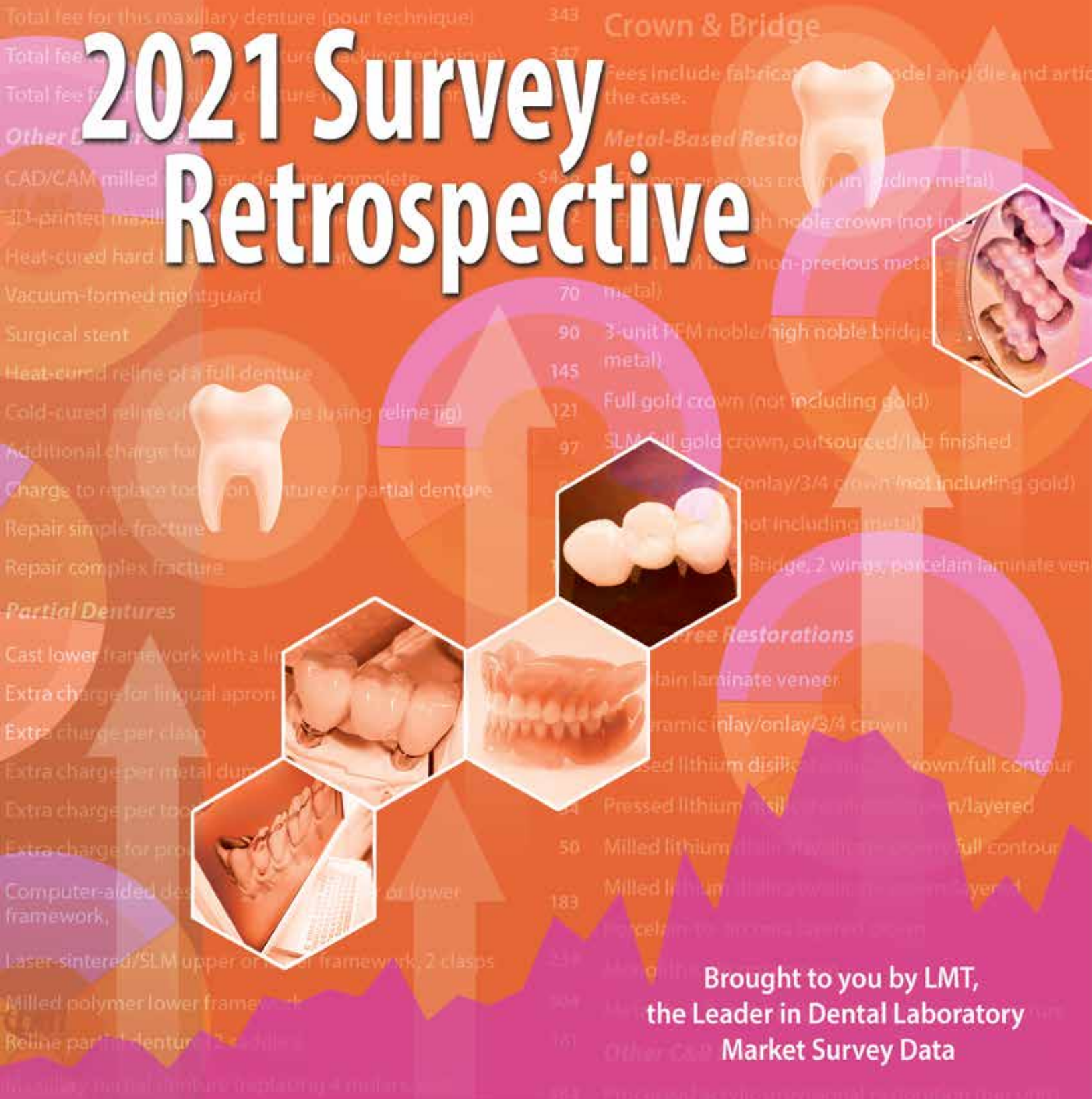


LAB MANAGEMENT TODAY

LMT

BUSINESS STRATEGIES FOR DENTAL LABORATORY DECISION MAKERS

2021 Survey Retrospective



Brought to you by LMT,
the Leader in Dental Laboratory
Market Survey Data

Your Go-To Source for Industry Data

At LMT, we pride ourselves on staying very much in sync with the pulse of our community, in part through our invaluable original research and data analysis.

This year's Survey Retrospective—a compilation of our 2021 survey reports and provided annually as a value-added service to the manufacturer/supplier community—features data on everything from rebounding workloads to profitability trends to 3D printing's growing foothold in laboratories around the country.



You're welcome to share these industry statistics with your staff members and in presentations. All we ask is that you include the following credit line, "Reprinted courtesy of LMT Research Department ©2021."

Our 2021 Survey Retrospective includes:

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Kelly Fessel Carr
Associate Publisher/Editor, LMT
Kelly@LMTmag.com



Laboratory Operators Manage Uncertainty While (Mostly) Maintaining Optimism

Given the current state of our world, LMT's *How's Business* survey results reflect more good news and positive thinking than one might think. | **By Maribeth Marsico, Senior Editor**

Respondents to LMT's *How's Business* survey conducted in November offer mixed reviews of their laboratory profitability: while just over half acknowledge profits in 2020 would be lower than 2019, 27% say they would be higher (see chart on page 4 for details).

While a lack of consensus on business performance is par for the course in the 30-plus-year history of LMT's surveys, it's interesting to note that—in

the midst of a global pandemic—there is still a decent percentage of laboratories reporting growing profits.

On top of that, more than half of laboratories participating in our survey shared positive reviews of their overall economic health, with 30% saying it's "excellent" and 26% rating it as "good" (see chart on page 5).

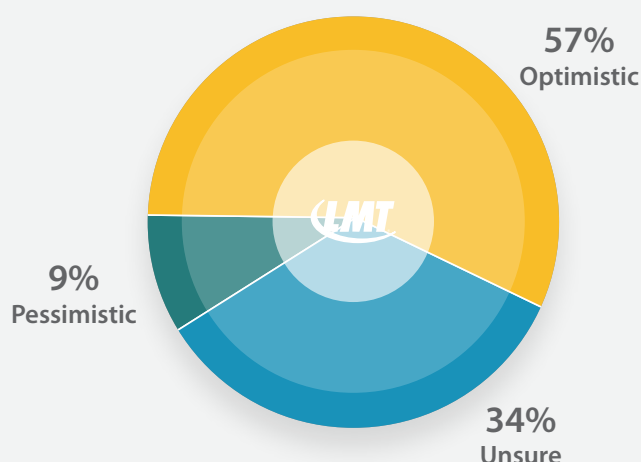
Since early 2020 was so busy, many of these labs were in a good economic standing when COVID hit and the Fed-

eral government's Paycheck Protection Program was instrumental in helping cover overhead during the shutdown (see Lab Owners Laud Payroll Protection Program on page 5). Some laboratories that saw a surge of cases coming in the door when the shutdown was lifted haven't yet seen that workload relent.

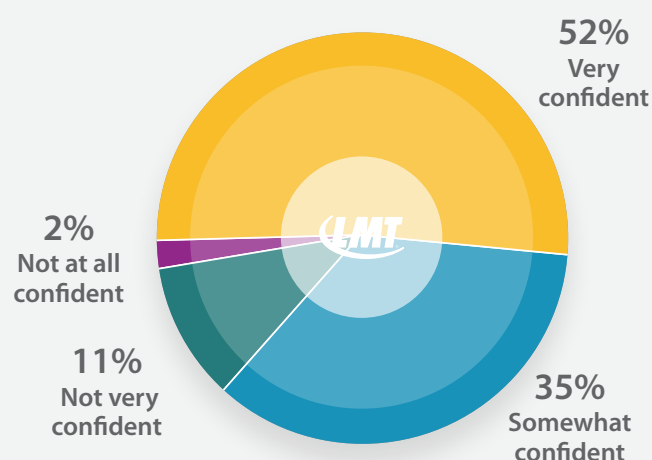
In addition, many used the downtime to regroup and streamline processes and have begun reaping the benefits. For example, after analyzing produc-

More than Half of Laboratories Optimistic about Short- and Long-Term Success

Outlook for First Quarter 2021



Confidence Level in Full Recovery



A majority of lab owners and managers are thinking positively about both the near future, specifically Q1 next year (left), and the long term, expressing confidence their businesses will fully recover from the repercussions of the pandemic (right).

tion metrics and bottlenecks, volume at Russellville Dental Lab, Russellville, KY, was up 44% compared to last Fall.

"We have hired more people and have made or are currently starting production overhauls in every department. Total case volume for the year will exceed 2019 despite six weeks of shutdown," says Lee Coursey, Managing Partner. *(To read details on the production changes Coursey made, visit bit.ly/5LessonsPandemic.)*

Similarly, Cindy and Kevin Kelly, Owners of 5280creations, a C&B laboratory in Thornton, CO, used the time to research opportunities for growth. They added occlusal splints to their services, partnered with two local removable labs to collaborate on combination cases, devised marketing and education programs with a few of their manufacturer sales reps and researched 3D printers.

They also hired a ceramist and a digital implant specialist. "We met two

talented technicians on the same day and decided it was a rare opportunity we couldn't pass up so we took a leap," says Cindy. "We're determined to stay positive about not only surviving the effects of the pandemic, but to grow in spite of it."

Those lab owners who are finding things more challenging include 18% who say their current economic health is "below average" and the 6% who say it's "poor." Many of them point to retiring clients and decreased patient volume. "COVID has hit hard. Although offices have reopened, the amount of work from my client list is markedly down," says a Texas lab owner.

2021 and Beyond


Though all of us were eager to say "good riddance" to 2020, 2021 is not without trepidations: one-third of survey respondents are unsure what to expect during

the first quarter of next year. How will unemployment impact dental benefits and discretionary income? What will be the impact of a new presidential administration? And, most of all, will the spike in coronavirus cases lead to another shutdown?

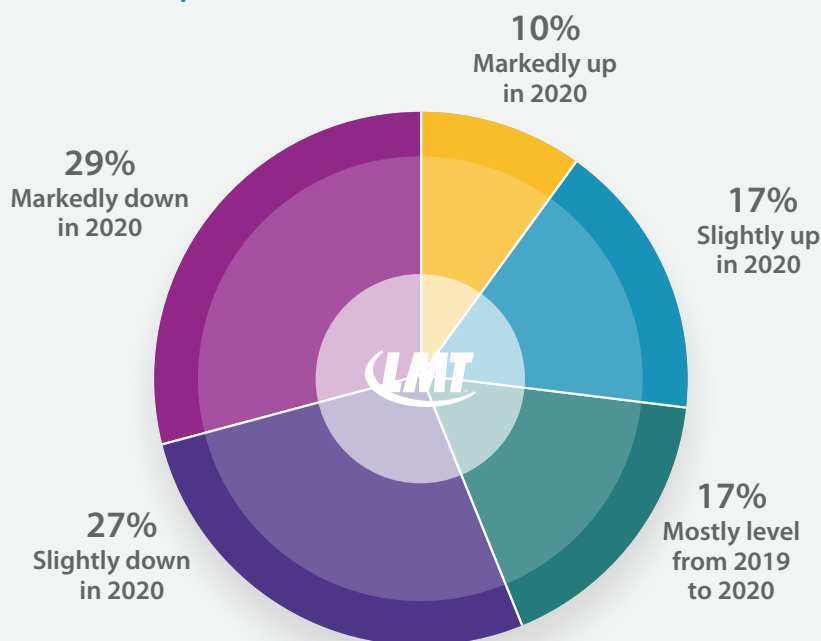
"Since we don't know what lies ahead with COVID-19, we have to anticipate a variety of scenarios. For example, if there's an outbreak at the lab, we have a plan to switch technicians to different areas so production can continue even with fewer people. If our workload slows significantly again, we may need to reduce hours or furlough some technicians, expand our marketing, shorten our turnaround times to attract more clients, etc.," says Rick Peebles, CDT, President, Peebles Prosthetics, Lakewood, CO. "Depending on what happens, our approach may be a combination of ideas but the goal is to stay agile."

It's heartening that more than half (56%) of survey participants are optimistic about early 2021, especially given the two promising vaccines. "Unlike a lot of businesses, the dental industry did not lose business. Like employees, it was put on furlough and will still be there when the economy opens up fully. A vaccine is key," says Tim Lane, CDT, Owner, Cynosure Dental Laboratory, Bartlett, TN.

This sense of optimism is even more widespread when it comes to their own survival: 52% of laboratory owners and managers are "very confident" and 35% are "somewhat confident" their businesses will fully recover from the repercussions of the pandemic (*see chart on page 3*). Whether they've seen growth or not in 2020, these lab owners are grateful they've been able to ride out the storm.

"I think we are closer to the end of this than we are to the beginning," says Mike Farago, CEO, Concord Dental Laboratory, Westford, MA. "Any lab or practice that has managed to maintain a profitable business model up to this point is on a very solid path into the future." 

Profitability Reports Mixed: 2020 Compared to 2019



Though last year's profitability reports are all over the board, it's interesting to note that more than a quarter of labs reported increased profits, even in the midst of a pandemic.

SOURCE: LMT Research Dept. ©2021

Laboratory Owners Laud Paycheck Protection Program

Sixty-five percent of laboratories received funding from the Paycheck Protection Program (PPP), the CARES Act program aimed at helping businesses keep employees on their payroll during the COVID-19 pandemic. Three quarters of those laboratories expect their PPP loans to be forgiven, although overall only 40% had applied for forgiveness by late November.

Laboratory-respondents to LMT's *How's Business* survey commented repeatedly that the PPP was essential in allowing them to keep as many employees on the payroll as possible during the shutdown. However, many also said the application process and the fact that the government made intermittent changes to the program complicated matters.

"Filing was stressful as the rules kept changing early on. Then the rumors started flowing that the PPP was almost out of money. But we eventually got our loan which helped keep employees fully paid while we waited for the work to pick back up again," says James Dobson, Vice President, Dobson Ortho Laboratory, Gainesville, GA. **LMT**

SURVEY DEMOGRAPHICS

The demographics of the 169 respondents to LMT's *How's Business* survey are consistent with our circulation data, which is an accurate representation of the industry. Here's a closer look:

Lab Size (including the respondent):
1-5 employees, 62%; 6-20 employees, 23%; Over 20 employees, 15%

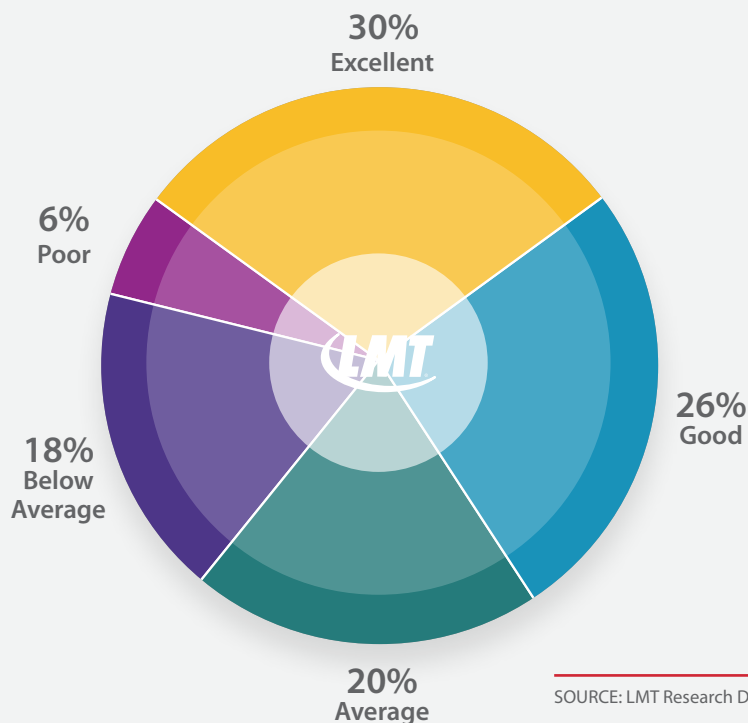
Lab Type: C&B, 43%; Full Service, 31%; Denture/Partial, 20%; Orthodontic, 6%

Region:

New England 4%
Middle Atlantic 12%
East North Central 13%
West North Central 10%
South Atlantic 18%
East South Central 6%
West South Central 7%
Mountain 12%
Pacific 18%



Owners and Managers Rate their Lab's Current Economic Health



Overall, more than half of laboratories say their economic health is either "excellent" or "good." When analyzed by size, it's clear the bigger the lab, the healthier the rating. For example, while 45% of labs with six or more employees say their economic health is "excellent," only 19% of one- to five-person labs say the same.

Respondents' comments reflect the mixed reports illustrated in the chart above and truly run the gamut; here's a look at what some of them told us:

"Since we have gotten going again after lockdown, we've had a few record months and gotten a few new dentists sending work."

"November's production was way down but October's production was the best since February 2020. Profitability is also down because our costs have increased but our prices haven't."

"Our lab's economic health is excellent considering the hit we all took this past spring. It's nice to finally have our work-flow back and running full blast."

"With the help of the PPP we are doing well cash flow-wise but work is definitely slowing and it's not just because of the holidays."

"Versus 2019, we are down about 45% in net profits."

"Since May, our business has been exceptional and we are experiencing a tremendous increase in high esthetic cases."

"July through October was the busiest four-month stretch I ever had in 19 years."

"Our debt level has increased to the point where we may have to file for bankruptcy."

"We are optimistic because we plan for the future and anticipate changing markets. The political and pandemic chaos are all distractions that we view with common sense rather than emotion."

"Business is booming. Since consumers can't really travel and are limited with how they can spend discretionary income, they're spending more money on elective procedures than ever before." **LMT**

Emerging from the Pandemic: Optimism, Workloads and (Some) Fees are Up

By Maribeth Marsico, Senior Editor

Despite a tumultuous 2020, 70% of laboratory operators are optimistic about the future and two-thirds report increased sales and profitability during the first half of this year, according to results of LMT's 2021 Fee Survey.

Specifically, 41% say sales were markedly up and another 27% say they were slightly up. Reported profitability for the first half of the year is also encouraging: 30% say profits were markedly up and 36% say slightly up. (See graph below.)

While the industry as a whole held its breath during the COVID-19 shutdown in spring 2020, business seemed

to bounce back for many laboratories almost immediately. Although it was initially attributed to a backlog of cases, 57% of respondents say they've remained consistently busier than usual since the lockdowns were lifted.

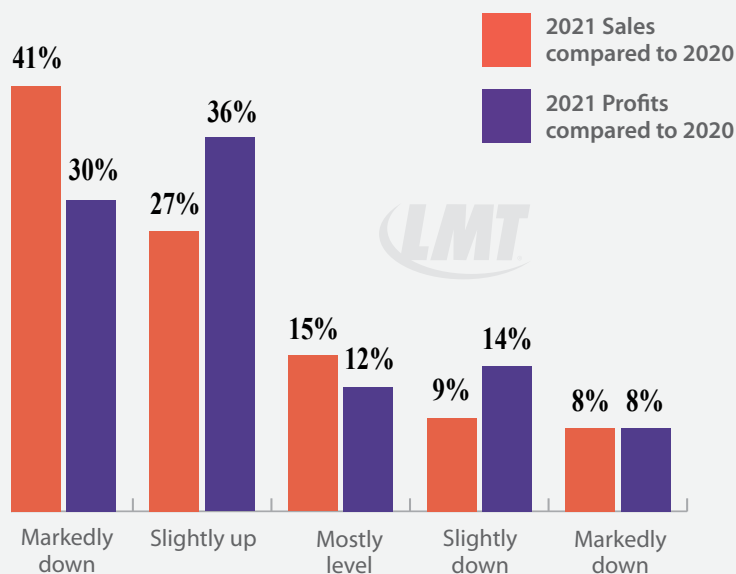
Some attribute the increased volume to patients having more disposable income due to stimulus funds or because they were spending less due to restrictions on entertainment and travel.

"We've seen a high demand among patients who haven't been economically affected by the pandemic, creating an enormous surge of cases since most den-

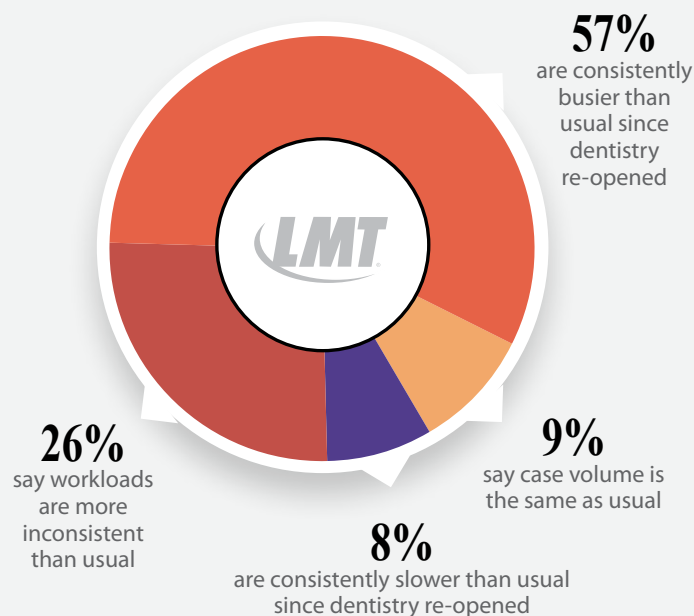
tists resumed work in May 2020," says Jim Thacker, Vice President, Utah Valley Dental Lab, Lindon, UT. "The number of elective procedures has spiked and shows no signs of slowing anytime soon; most of our key customers are busier than at any point in their careers."

On the other hand, a small percentage of laboratories aren't having this same experience. One quarter say business has been up and down since spring 2020 and profits are lower so far this year than last. At the same time, half of our respondents have also been delaying fee increases in light of the pandemic.

Majority Report Improved Sales and Profits During First Half of 2021



More Than Half of Labs Remain Busy Post Lockdown



“Our workflow varies and our expenses have increased; suppliers have raised their fees and, given the recent shipping issues, our expenses have doubled due to the need to ship cases priority express,” says a small laboratory owner in California. “We are just playing it by ear for now. We may have a slight fee increase later this year.”

Some labs have raised prices more recently, with 37% doing so since the COVID lockdowns were lifted last spring (see graph on page 9). Buoyed by heavier workloads and pointing to rising material costs and the need to retain valuable technicians, these labs raised prices by an average of 6%.

“We thankfully have been very busy since returning from the COVID shutdown. We’ll continue to raise fees as the demand continues in order to give our employees the wages and benefits they deserve as skilled technicians,” says a New Jersey laboratory owner.

Fees by Specialty

First the good news: demand for removable and implant restorations has propelled some fees up by double-digit percentage points since LMT’s 2018 Fee Survey. For example:

- In the removable arena, where the shortage of skilled technicians continues to be a challenge, national average fees for maxillary dentures (regardless of processing technique) are up more than 20% in the last three years and flexible partial dentures increased 14% in the same time frame. (For national average removable fees, see page 10.)

- Similar gains are seen with some implant restorations. For example, national average fees for cement-retained crowns (regardless of material) increased 25%. (For national average implant restoration fees, see page 9.)

“Implants have become a more mainstream restorative option. Large corpo-

rations advertising ‘teeth in a day’-type services have brought massive awareness to the public and most patients are not very excited to eat with a denture,” says Conrad Rensburg, CEO, Absolute Dental Services, Durham, NC. “This uptick we’ve seen in implant popularity is definitely also driven by more expendable income here in the U.S.”

It’s a different scenario in the fixed market, where C&B laboratories are the least likely to have raised prices in the last year and also have the highest percentage of respondents—25%—who have actually *decreased* at least some fees in the last few years. As a result, C&B fees remain relatively flat since 2018; this is especially true among some metal-free restorations. (See C&B fees on page 9.)

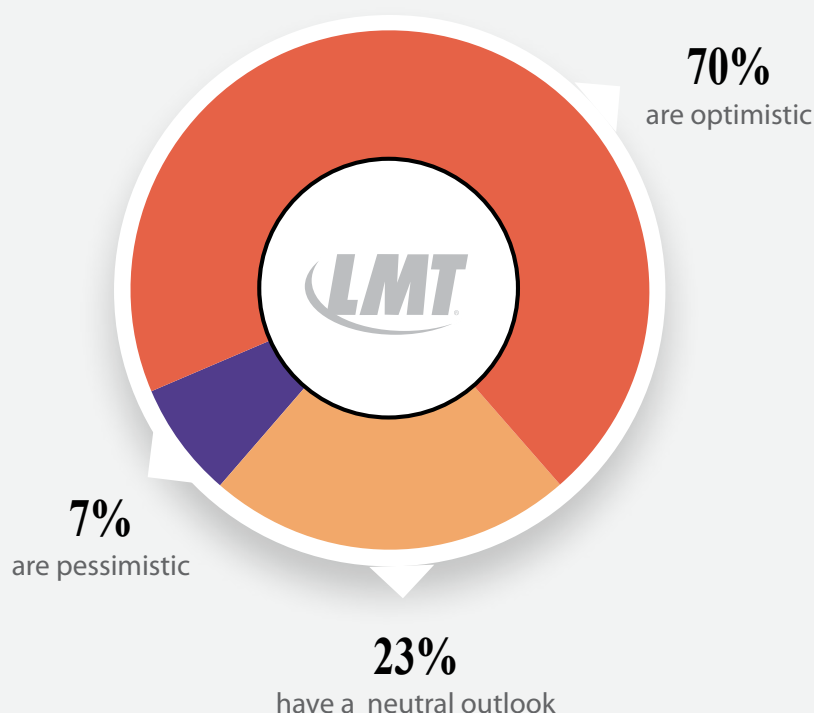
Take, for example, the full contour zirconia crown, which has practically become the poster child for the pricing wars: the national average fee is \$150, virtually the same as it was in 2018. This year’s survey participants reported FCZ prices as low as \$80 and, anecdotally, some mentioned having to compete with fees even lower.

However, it’s important to note that flat pricing for FCZ—and digitally fabricated restorations in general—does not always equate to lower profits. Some survey respondents say technology has increased their efficiency to the point where they’ve been able to hold the same fees while achieving higher returns.

“New machines and improved zirco-

Lab Operators Say the Future Looks Bright

Based on business performance during the first half of 2021, here’s how survey participants feel about the next few years:



SOURCE: LMT Research Dept. ©2021

I’m unaware of any other industry that has gone backwards while implementing such progressive technology. Doctors don’t lower their prices but pressure labs to do so, while we maintain our high standards for them.

~ Mark Siegel, CDT, TE
MDS/Modern Dental
Service Lab

nia materials and coloring systems have made our profits on metal-free products skyrocket over the last year or two. Our profit on a full contour zirconia is three times what it was four years ago and I haven't needed to raise my prices as a result," says Mike Farago, CEO, Concord Dental Laboratories, Westford, MA. "My team can produce these products in massive volume while maintaining quality and consistency; other labs that have reached large production volumes are likely all enjoying this same benefit."

Because of this increased efficiency experienced by those laboratories fabricating the majority of their work digitally, some are trying to drive clients to the more profitable, digitally fabricated alternatives by raising prices on traditional

metal-based restorations. For example, a non-precious PFM is up from \$132 to \$151 in three years and a noble or high noble PFM increased from \$147 to \$165 (not including metal) in that same time frame.

"Raising prices on PFMs over the last several years has been an effective way to steer clients to the products we prefer them to use; 99% of our restorations are now metal-free," says Jim Thacker.

In the orthodontic specialty, fees also show little growth since 2018 (*see orthodontic fees on page 10*). In fact, the average fees for some appliances are virtually identical to what they were three years ago; for example:

- Standard Hawley, \$68 (\$66 in 2018)
- Invisible full arch retainer, \$44 (\$43 in 2018)
- Clear aligner, \$52 (also \$52 in 2018)

Several survey participants specifically commented on clear aligners, saying their popularity has ignited price competition in much the same way that FCZ has in the C&B arena. "Clear aligners are all about price right now; if you can't fabricate them faster and cheaper than the competition then it's not a scalable product line," says Christian Saurman, Vice President, NEOLab, Wilmington, MA. "Our lab is FDA-registered to produce aligners but it's low on my list of priorities because other products bring greater profit margins."

The Price-Cutting Plague

It's not news that our industry continues to be beset by aggressive price competition and, as is always the case in the 35-year history of our *Fee Surveys*, it was the dominant theme in respondents' comments. Laboratory owners and managers point to the commoditization of our market, DSOs and the ease of sending digital files around the globe as adding fuel to the long-existing price wars. In fact, 42% of laboratory operators say it's worse than ever.

"I'm unaware of any other industry that has gone backwards while implementing such progressive technology. Doctors don't lower their prices but pressure labs to do so, while we maintain our high standards for them," says Mark Siegel, CDT, TE, President/Owner, MDS/Modern Dental Service Lab, Buffalo Grove, IL. "We provide custom work for the human body and should be charging for our skill, knowledge, continuing education and artistic ability." **LMT**

Survey Demographics

LMT emailed the 2021 *Fee Survey* to 2,117 readers and received 264 responses, a 12% response rate; 86% are owners and 14% are managers or department heads. Based on LMT's circulation list, respondents are an accurate representation of the industry except for a slightly lower response from the Pacific region and a higher response from orthodontic labs.

Region

New England (ME, NH, VT, MA, RI, CT).....	4%
Middle Atlantic (NY, NJ, PA)	14%
East North Central (OH, IN, IL, MI, WI)	17%
West North Central (MN, IA, MO, ND, SD, NE, KS)	9%
So. Atlantic (DE, MD, DC, VA, WV, NC, SC, GA, FL)	15%
East South Central (KY, TN, AL, MS)	2%
West South Central (AR, LA, OK, TX)	9%
Mountain (MT, ID, WY, CO, NM, AZ, UT, NV)	12%
Pacific (AK, WA, OR, CA, HI)	18%

Size of Lab

1-person	25%
2-person	17%
3- to 5-person	30%
6- to 10- person	12%
11- to 20-person	5%
21- to 50-person	5%
More than 50 people	6%

Type of Lab

Full Service	26%
C&B	42%
Denture/Partial	20%
Orthodontic	12%

2020 Gross Sales

Under \$100K	25%
\$101K to \$300K	30%
\$301K to \$500K	15%
\$501K to \$1 million	14%
\$1-3 million	8%
Over \$3 million	8%

Owners' 2020 Gross Income (before taxes)

Under \$40K	16%
\$41K to \$60K	18%
\$61K to \$80K	19%
\$81K to \$100K	12%
\$101K to \$150K	17%
\$151K to \$200K	8%
More than \$200K	10%

In the removable arena, where the shortage of skilled technicians continues to be a challenge, national average fees for maxillary dentures (regardless of processing technique) are up more than 20% in the last three years.

National Average Fees

All fees are based on receipt of a conventional impression. For Removable Prosthetics and Orthodontic Fees, see page 10.

Crown & Bridge

Fees include fabricating the model and die and articulating the case.

Metal-Based Restorations

PFM/non-precious crown (including metal)	\$151
PFM/noble or high noble crown (not including metal)	165
3-unit PFM base/non-precious metal bridge (including metal)	460
3-unit PFM noble/high noble bridge (not including metal)	487
Full gold crown (not including gold)	132
SLM full gold crown, outsourced/lab finished	152
Cast gold inlay/onlay/3/4 crown (not including gold)	131
Post and core (not including metal)	83
3-unit Maryland Bridge, 2 wings, porcelain laminate veneer on pontic	274

Metal-Free Restorations

Porcelain laminate veneer	\$200
All-ceramic inlay/onlay/3/4 crown	173
Pressed lithium disilicate/silicate crown/full contour	179
Pressed lithium disilicate/silicate crown/layered	205
Milled lithium disilicate/silicate crown/full contour	162
Milled lithium disilicate/silicate crown/layered	191
Porcelain-to-zirconia layered crown	197
Monolithic zirconia crown	150
Metal-free 3-unit bridge w/zirconia understructure	508

Other C&B Services

Processed acrylic provisional restoration (per unit)	\$63
Milled provisional restoration (per unit)	60
3D-printed provisional restoration (per unit)	65
3D-printed model generated from an intraoral scan (per arch)	40

Precision Attachments

Labor charge for fixed portion of precision attachment	\$86
Labor charge for removable portion of precision attachment	65

SOURCE: LMT Research Dept. ©2021

It's important to note that flat pricing for FCZ—and digitally fabricated restorations in general—does not always equate to lower profits. Some survey respondents say technology has increased efficiency to the point where they've been able to hold their fees while achieving even higher returns.

Implant Prosthetics

Single-Unit Implant Crowns

Fees exclude parts, soft tissue models and alloy.

Cement-retained PFM crown	\$268
Cement-retained zirconia crown	264
Cement-retained lithium disilicate/silicate crown	279
Screw-retained PFM crown	317
Screw-retained zirconia crown	298
Screw-retained lithium disilicate/silicate crown	305

Abutments

Titanium CAD/CAM abutment (OEM)	\$281
Titanium CAD/CAM abutment (Aftermarket)	258
Zirconia CAD/CAM abutment (OEM)	304
Zirconia CAD/CAM abutment (Aftermarket)	284
High noble cast custom abutment	308
Labor charge to modify pre-fabricated abutment	78
Ti Base abutment (OEM)	212
Ti Base abutment (Aftermarket)	225

Other Restorations

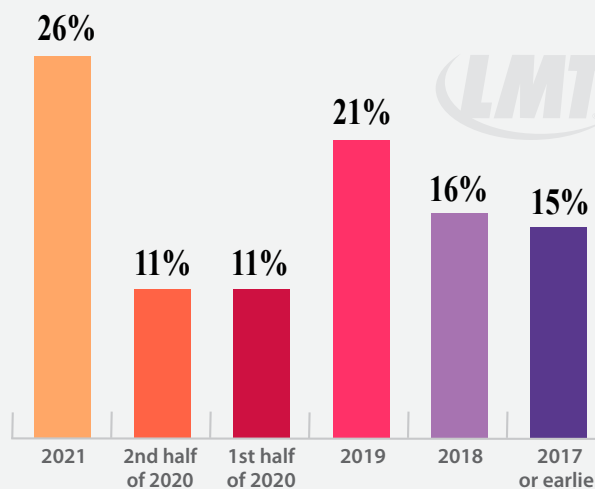
Each with 4 implants; flat fee, include parts

All on 4, fixed hybrid denture	\$3,499
Full arch removable overdenture, titanium bar with locators	2,715

SOURCE: LMT Research Dept. ©2021

37% of Labs Have Raised Prices Since Dentistry Reopened

Here's the last time survey respondents increased their fees:



SOURCE: LMT Research Dept. ©2021

National Average Fees

All fees are based on receipt of a conventional impression. For C&B, Implant Prosthetic and Attachment fees, see page 9.

Orthodontics

All bands provided by doctor where applicable.

Standard Hawley retainer with ball clasps	\$68
Acrylic TMJ splint, flat plane/no clasps	114
Basic soft mouthguard	62
Wraparound retainer	75
Full or modified Spring retainer with Adams Clasps	84
Per tooth cost to reset teeth	7
Clear aligner	52
Custom color design (average fee for design only)	13
Lower bonded lingual retainer without transfer tray	42
Invisible full arch retainer	44
Schwarz appliance w/occlusal coverage	103
Fixed tongue crib or habit appliance	70
Band and loop space maintainer	46
Fixed expander, all-metal RPE	87
Lingual arch space maintainer, no adjustment loops	51
Nance Holding Arch	55
Haas RPE	90
Quad-Helix	68
3D-printed model generated from intraoral scan (per arch)	19

SOURCE: LMT Research Dept. ©2021

2 Survey Findings on Laboratory Billing Practices

- In response to the challenges presented by the pandemic, 20% of labs made changes to their billing practices, including adjusting their credit policy or making an effort to switch clients to paying by credit cards kept on file.

- To maintain cash flow, 45% of all laboratories use the practice of progress billing. Instead of waiting for a multi-stage case to be completed, they bill at specific intervals during the restorative process, an especially important strategy when there are other costs—metal, parts or subcontracting fees—associated with a complex case.

Removable Prosthetics

Maxillary Complete Denture

Fees based on dentist sending a maxillary impression and opposing cast; lab pours the cast, articulates, sets teeth on a simple articulator for try-in and processes and finishes in acrylic. Teeth costs not included.

Model	\$18
Custom Tray	36
Bite Block	36
Articulation	18
Setup	102
Immediate denture (extra charge per tooth)	12
Reset	52
Process and finish using the pour technique	148
Process and finish using compression packing	144
Process and finish using the injection technique	165
Total fee for this maxillary denture (pour technique)	343
Total fee for this maxillary denture (packing technique)	347
Total fee for this maxillary denture (injection technique)	417

Other Denture Services

CAD/CAM milled maxillary denture, complete	\$456
3D-printed maxillary denture, complete	292
Heat-cured hard bite splint/nightguard	145
Vacuum-formed nightguard	70
Surgical stent	90
Heat-cured relines of a full denture	145
Cold-cured relines of a full denture (using relines jig)	121
Additional charge for softliner	97
Charge to replace tooth on denture or partial denture	84
Repair simple fracture	78
Repair complex fracture	100

Partial Dentures

Cast lower framework with a lingual bar, 2 clasps, 2 retention saddles	\$212
Extra charge for lingual apron	40
Extra charge per clasp	28
Extra charge per metal dummy	38
Extra charge per tooth-colored clasp	54
Extra charge for process facing	50
Computer-aided design/hand-cast upper or lower framework, 2 clasps and 2 saddles	183
Laser-sintered/SLM upper or lower framework, 2 clasps and 2 saddles	233
Milled polymer lower framework	304
Reline partial denture (2 saddles)	161
Maxillary partial denture (replacing 4 molars, cast chrome alloy, horseshoe design, 2 clasps finished)	384
Acrylic temporary partial to replace 2 anterior teeth with 2 wrought wire buccal arm clasps	176
Flexible partial denture replacing 4 teeth and clasping 3 teeth	283
Charge to replace tooth and saddle on existing partial	105
Add wrought wire clasp to partial denture	69

SOURCE: LMT Research Dept. ©2021

Digital Impressions Gaining Traction

By Kim Molinaro, Managing Editor

LMT's latest survey data reveals good news for laboratories looking to reap the benefits of a more digitized workflow. While the growth rate of digital impressions over the last decade has been steady but slow, the technology gained some noticeable traction since the start of the pandemic. COVID-19 heightened concerns about infection control in the dental office and, due to the shutdown, dentists had more time to research IO scanners or better utilize the unit they already had.

Some encouraging statistics based on the 70% of respondents to our *2021 Impression Survey* who accept digital impressions:

- Since the pandemic began, two-thirds of those respondents say clients are either using their existing IOS more and/or have purchased an IOS.
- In just the past year, the number of dentist-clients sending IO scans increased 12 percentage points, from 18% to 30%, according to a comparison of LMT's *2020 State of the Industry Survey* and this survey. This growth is markedly faster than the 12-percentage-point growth we saw over the five years from 2015 to 2020 (see charts on page 12).
- Also in the past year, these laboratory operators have seen a 33% increase in the number of digital impressions they're receiving. Overall, digital impressions now make up 29% of their caseload.

"In 2019, we only had about 40% of our clients on board with digital impressions, but today we're over 70%," says Tim Moore, Co-Owner of Creation Dental Ceramics, Red Wing, MN. "The increase in digital scanning has been life changing in a very positive way; in addition to being able to work remotely on files, the technology is faster, more streamlined and more accurate."

Seventy percent of labs currently accept digital impressions; among those that don't, 15% are actively researching the technology and/or expect to get involved within the next year.

In fact, when it comes to accuracy, 65% of respondents who accept digital impressions say they see fewer remakes for cases that start with a digital impression compared to cases that start with a traditional one.

Despite the advantages of the technology, the majority of impressions are still conventional and lab respondents are using a variety of strategies to entice more dentists to adopt digital impressions—like touting the benefits of digital cases on social media and during in-person visits, updating websites for easy file uploads and offering discounts when clients send IO scans.

However, once clients are on board with the workflow, digital impressions aren't necessarily a panacea. The biggest problem by far with files from the dental office? Tissue management/retraction issues followed by gingiva or other visualization challenges. "If the doctor or office staff struggles with traditional impressions and capturing an accurate impression, digital isn't going to fix it," says Rick Cutforth, Owner, Northern Lights Dental Lab, Idaho Falls, ID. "They still have to follow the same procedures—like packing the retraction cord and keeping the margins free of blood and saliva—to get a good digital impression."

Consequently, many laboratory operators have jumped into the role of educator once again, providing troubleshooting assistance to their clients, and those who have successfully transitioned their accounts say the key is to make the shift

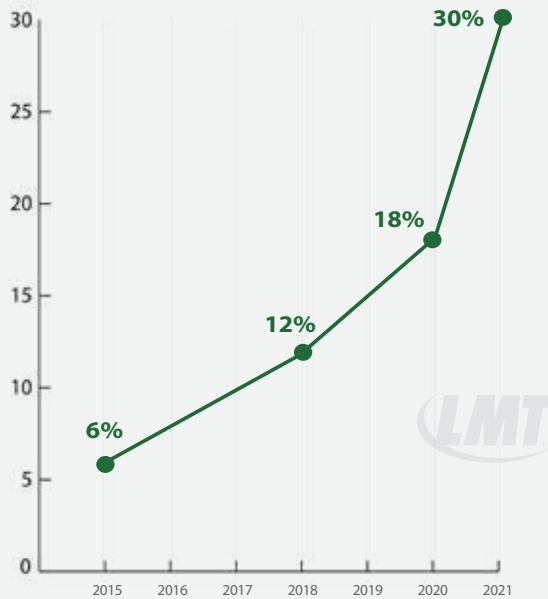
as easy as possible. "When marketing our program, we let our doctors know we'll be there for them every step of the way. We provide the scanner, set up and attend the in-office training with a TRIOS technician and help the office with any post-training troubleshooting or follow-up questions," says Moore.

A higher influx in IO scans is also exacerbating some existing challenges in the laboratory, most notably, file management, working with all the different intraoral scanning systems and importing files from multiple portals.

To streamline the importing process at Jesse & Frichtel Dental Labs, Pittsburgh, PA, Co-Owner Mark Frichtel is working with his software company to create a dedicated lab portal so all IO scans come into one central place. In the meantime, staff members are assigned to oversee IO scans depending on how they're sent. For instance, one technician is in charge of downloading iTero files from the online portal, while the files that come directly into the lab's software system are handled by customer service.

But despite the challenges of the workflow, Frichtel says it's all worth it. "The scanners provide doctors with immediate feedback on their preps and, in the lab, the software continues to improve which helps reduce the time it takes to train a technician," he says. "As the price of IO scanners comes down, more dentists will get on board and, at that point, labs will have no choice: embrace it or let those cases go to a digital lab." **LMT**

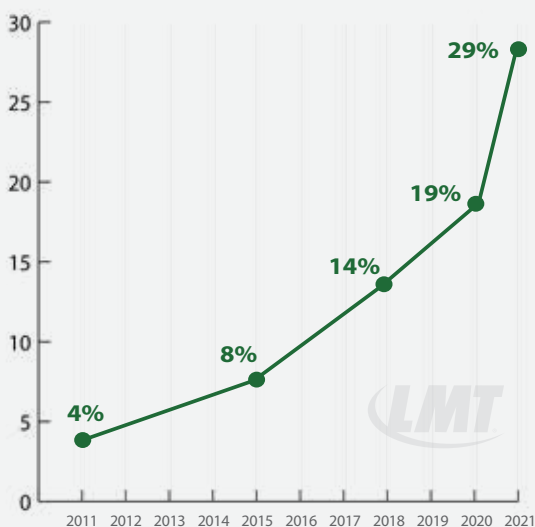
The Percentage of Clients Sending Digital Impressions Increased Five-Fold Since 2015*



While the number of dentists sending digital impressions has shown slow-but-steady growth since 2015, the technology gained some noticeable traction since the start of the pandemic. In just the past year, the percentage of dentist-clients sending IO scans has increased by 12 percentage points.

SOURCE: LMT Research Dept. ©2021

29% of Lab Workflows Now Start with a Digital Impression*



A decade ago, laboratories received an average of 4% of their impressions digitally; today that percentage has increased to 29% and much of that growth occurred in just the last year.

*Among labs that accept digital impressions

SOURCE: LMT Research Dept. ©2021

Market Stats

Digital Models: When it comes to producing models from a digital file, 79% of respondents do so, a number that has increased by 20 percentage points since 2020. And now that the cost of printing has come down, printed models have almost completely replaced milled models because the process is faster, uses less materials and can fabricate multiple models simultaneously.

The Model-less Workflow: Overall, 50% of our respondents are doing some work model-less and these cases now represent more than a quarter of their total caseload. Here's a closer look at the model-less workflow:

- The majority of these cases are single units followed by short-span bridges; however, a handful of respondents are also having success with more complex restorations like large bridges and full dentures.
- 41% of respondents have been involved with model-less workflows for at least three years.
- In the last three years, the number of C&B and full service laboratories doing model-less cases has more than doubled from 22% to 53%. These cases now make up an average of 26% of their overall workload.
- Just 13% of our denture/partial labs respondents are using a model-less workflow.
- Labs with 20 or more employees are twice as likely to be doing model-less cases than a laboratory with five or fewer staff members.

For more information on model-less workflows, visit LMTmag.com/modelless.

SOURCE: LMT Research Dept. ©2021

LMT's Impression Survey Demographics

We received 211 surveys from U.S. laboratory owners, managers and department heads. According to a comparison to LMT's circulation data, the respondents represent an accurate cross section of the industry by lab type and size. However, we received a slightly higher response in the Mountain region and slightly lower responses in the South Atlantic and Pacific regions.

3D Printing: Bringing the All-Digital Workflow Closer to Fruition

By Kelly Fessel Carr, Associate Publisher/Editor

In their quest to achieve an all-digital production and incorporate IO scans into their workflow, labs are embracing 3D printing technology like never before. Sixty-three percent of the respondents to LMT's 2021 3D Printing Survey use 3D printing in their operations, either via in-house equipment or outsourcing; that percentage is mainly

made up of larger operations and full service, C&B and ortho labs. C&B and study models, nightguards, splints, surgical guides and waxups are the most popular applications.

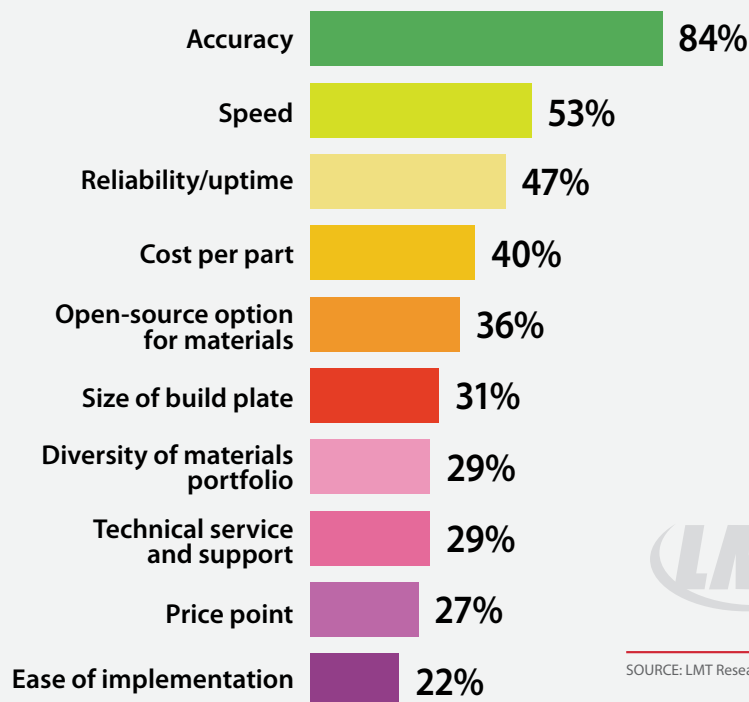
Users praise 3D printing for its accuracy—one third of our respondents say their remake percentage has decreased as a result of the technology—as well

as efficiency and savings on time, labor and manual work. "Printing models from IO scans is super-efficient. Our C&B production is streamlined because we're bypassing the model and die room. Our pick-up and delivery service for local clients has been cut in half, if not reduced 75%, and that has shaved off at least one to two days in our turnaround time," says an owner of a small lab in Virginia.

While the adoption rate of 3D printing among removable labs has been appreciably slower, some are realizing the advantages. For example, Bertram Dental Lab, Menasha, WI, has been SLM printing RPDs for about six years and has reduced its material costs and inventory headaches as a result. "Supply chain issues have been a big problem lately for us with companies discontinuing products, making investment and wax patterns very hard to get. With SLM printing, we only need the powdered alloy to fabricate RPDs so there's considerably less risk of not being able to get the materials we need—and we're reducing our material costs," says Tim Bertram, Co-Owner.

Others are finding 3D printing to be a valuable door opener to offering new services. For instance, for Vulcan Custom Dental, a milling center focused on implants in Birmingham, AL, the ability to print surgical guides has been a boon to its business. "By offering surgical guides to our laboratory customers, we're helping them with their workflows and making the implant restorative process easier. We're registered with the FDA to print them—which is required—and thus alleviating

Top 10 Features Lab Operators Look for When Shopping for a Printer



SOURCE: LMT Research Dept. ©2021

Among the survey participants who have printer(s) in-house, 57% plan on buying or leasing another printer within the next year.

that headache for others. It's the fastest growing part of our business," says Mark Ferguson, General Manager.

However, as with many new technologies, implementing 3D printing into the production cycle is not without its challenges. Similar to scanning and milling, users are frustrated by the capital investment and achieving ROI, merging analog and digital workflows, limited material options, understanding how to troubleshoot technical issues and maintain the machines properly as well as the overall learning curve. "After committing to the upfront costs and venturing into the unknown, it took about five months of testing and trial and error before I began to reap

the benefits," says Jeffrey Jones Jr., Owner, Jones Dental Lab, a denture lab in Augusta, GA.

On the Horizon

As 3D printing technology continues to evolve, users are excited about its potential and eager for more product developments including more resin options for permanent C&B and denture bases and teeth, a cost-effective printable ceramic, resins with improved shrinkage factor and greater accuracy, and a material to print aligners. "I think we'll see new materials becoming more commonplace. I also think hybrid manufacturing during which we print a part in metal and then mill it to fine tune the accuracy will also

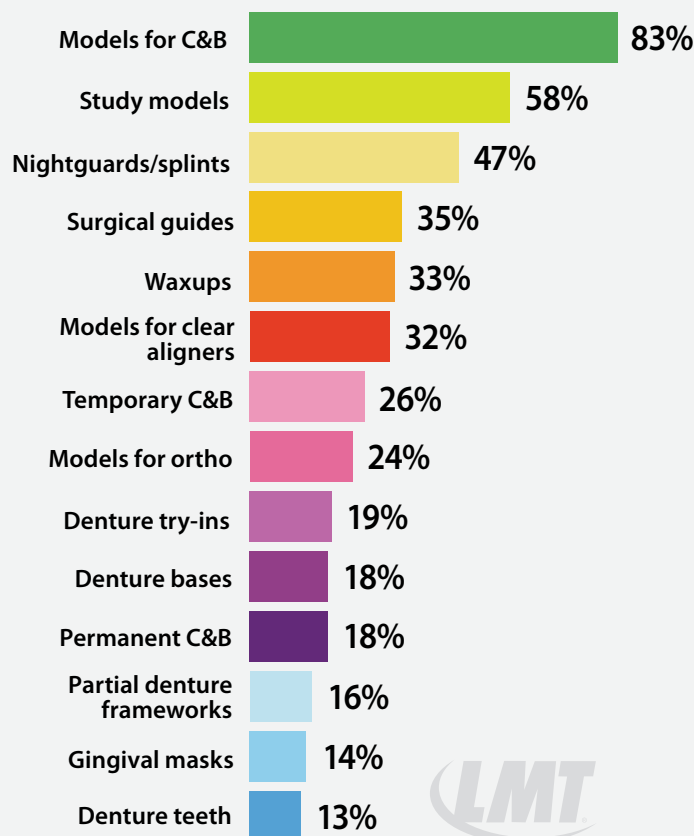
be part of our future," says Ferguson.

Here are a few of the latest developments in the marketplace:

- At Dentsply Sirona World in September, the company introduced the Lucitone Digital Value 3D Economy Tooth and Trial Placement resin for printing try-in appliances and economy tooth arches and segments. The resin is available in six shades and suitable for all clinical classifications of full-arch denture cases.

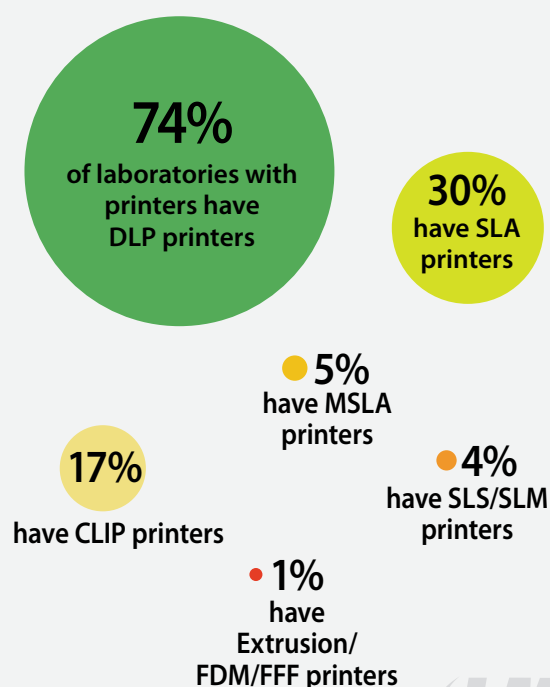
Later this year, Dentsply Sirona will announce the validation of Asiga and SprintRay printers for the Lucitone Digital Print Denture System, further expanding labs' access to printing digital dentures. In 2022, the company plans

Most Common Applications for Printing



Percentages indicate how many respondents are printing each application

DLP Printers By Far the Most Popular in the Laboratory



Percentages are based on respondents who have printers in their labs (they could check all that apply so percentages don't total 100). For more information on the features of each printer, read *SLA, DLP, CLIP: What's the Difference?* at [LMTmag.com/3dprintingtech](https://lmtmag.com/3dprintingtech).

to introduce its first premium printed denture tooth resin: Lucitone Digital IPN that will be available in 16 shades plus bleach options.


■ In the metal printing arena, Desktop Health—which recently acquired EnvisionTEC—launched the Shop System™, a metal binding jetting system for printing chrome cobalt appliances and surgical guides.

■ BEGO's printing materials—including VarseoSmile Crown^{plus}, a resin for permanent crowns, inlays, onlays and veneers; VarseoSmile Temp; and VarseoWax Model—are validated for Ackuretta's printers.

■ Another permanent C&B resin has hit the market: At the IDS in Cologne, Detax launched its Freeprint® crown, a highly filled resin for permanent crowns and long-term bridges, veneers, inlays and onlays in eight shades. The material is in the final stages of European MDR certification and the company

is preparing to apply to the FDA. In the removable arena, Detax has added a second shade of Freeprint denture material—pink—which has recently received FDA approval and is available in the U.S., as well as the original Freeprint denture pink-transparent.

■ Also at the IDS, Formlabs introduced the new Fuse 1 benchtop SLS printer validated for orthodontic model production; showcased its reformulated Model Resin that doubles the speed of model production on its Form 3B and Form 3BL printers; and announced that 3Shape has validated the Form 3B, Form 3BL, and Fuse 1 for its Clear Aligner Enterprise Solution.

■ Lithoz is now working with Metoxit AG and Dr. Jens Tartsch, a specialist in ceramic implantology, to develop high-strength, biocompatible 3D-printed ceramic dental implants using Lithoz's Lithography-based Ceramic Manufacturing (LCM) technology. 

Top 10 Advantages of 3D Printing

(in order, according to survey respondents)

1. Achieve an all-digital workflow
2. Introduce new services
3. Increase efficiency
4. Use of cutting-edge technology
5. Increase accuracy
6. Eliminate waxing and model pouring 
7. Meet dentist-customer demand for printed units/models
8. Implement a cost-effective production process
9. Reduce production and turnaround times
10. Reduce material usage

SOURCE: LMT Research Dept. ©2021

Number of Printers In-House by Lab Size

Small Labs (One to Five Employees)

45% of small labs use 3D printing technology. Of that percentage, **59%** have printers in-house and use them an average of **six hours** per day; here's how many units they have:

- 45%** have one printer
- 29%** have 2 printers
- 16%** have 3 printers
- 6%** have four printers
- 3%** have five printers
- 0%** have more than 5 printers

Larger Labs (More than Five People)

89% of large labs use 3D printing technology. Of that percentage, **92%** have printers in-house and use them an average of **20 hours** per day; here's how many units they have:

- 24%** have one printer
- 20%** have 2 printers
- 17%** have 3 printers
- 9%** have four printers
- 4%** have five printers
- 26%** have more than 5 printers



SOURCE: LMT Research Dept. ©2021

Survey Demographics

LMT received 202 responses; 86% of the respondents are owners and 14% are managers and department heads. Based on a comparison to LMT's circulation list, respondents are an accurate representation of the industry except for a slightly higher response from denture and partial labs and a slightly lower response from the Pacific region.

Region

New England4%	
(ME, NH, VT, MA, RI, CT)	
Middle Atlantic.....9%	
(NY, NJ, PA)	
East North Central 16%	
(OH, IN, IL, MI, WI)	
West North Central7%	
(MN, IA, MO, ND, SD, NE, KS)	
So. Atlantic..... 18%	
(DE, MD, DC, VA, WV, NC, SC, GA, FL)	
East South Central8%	
(KY, TN, AL, MS)	
West South Central..... 10%	
(AR, LA, OK, TX)	
Mountain) 12%	
(MT, ID, WY, CO, NM, AZ, UT, NV)	
Pacific..... 16%	
(AK, WA, OR, CA, HI)	

Size of Lab: 1-person, 23%; 2-person, 16%; 3- to 5-person, 29%; 6- to 10- person, 9%; 11- to 20-person, 9%; 21- to 50-person, 11%; and more than 50 people, 3%.

Laboratory Type: Full Service, 29%; C&B, 45%; Removable Prosthetics, 20%; Orthodontic, 6%.

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94% read the print advertisements in LMT.

93% of readers prefer to read LMT magazine in print rather than online.

85% find print ads in LMT helpful when making purchasing decisions.

82% have been reading LMT for over 10 years; 50% for over 20 years.

81% have purchased a product or service as a result of reading a print ad in LMT.

78% of readers keep back issues of LMT as a resource.



Contact Jessica Fila to start planning your advertising for 2022:
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LMT's 2021 Readership/Print Advertising Survey data is based on 284 U.S. respondents to an esurvey.