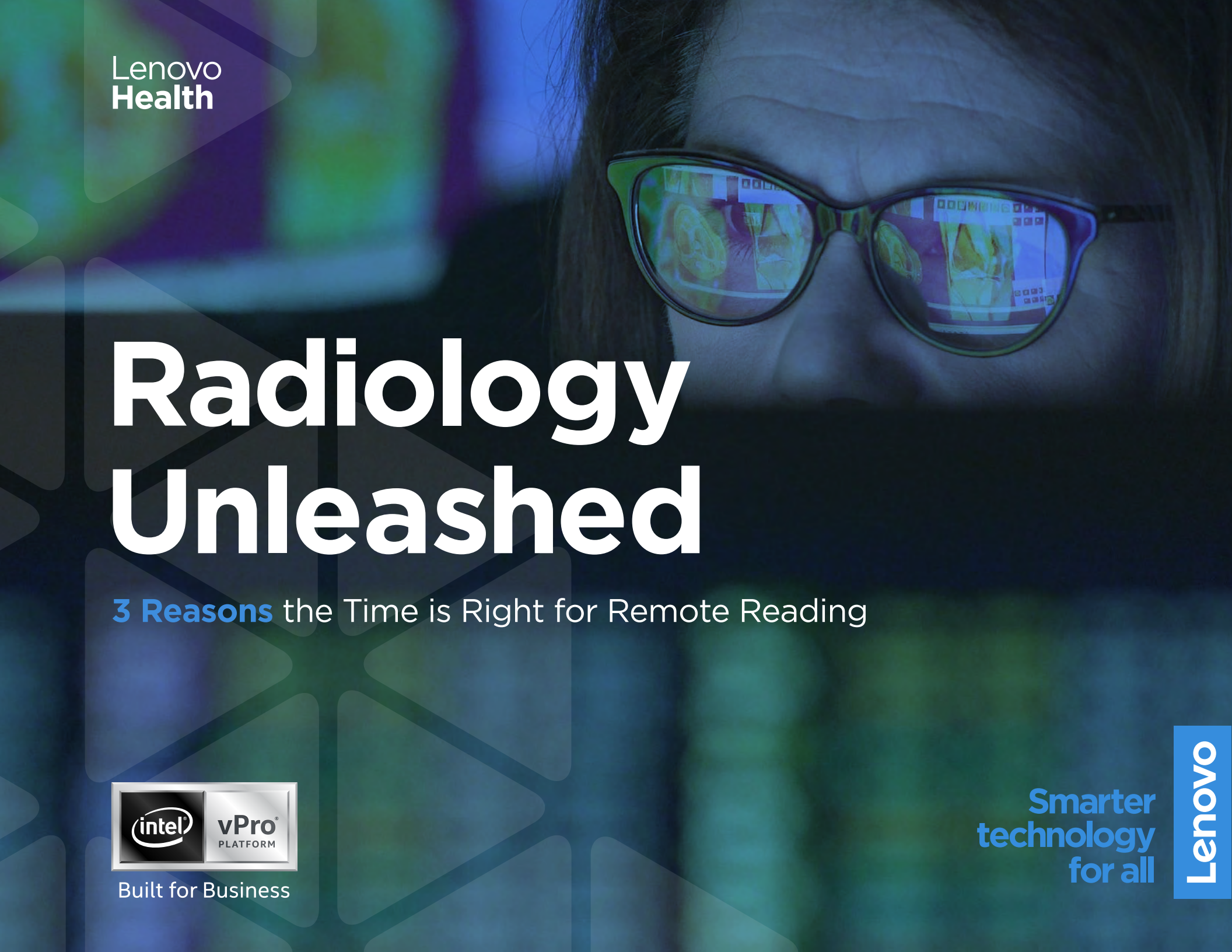

Lenovo Health

Radiology Unleashed

3 Reasons the Time is Right for Remote Reading

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A Major Headache

Teleradiology and its enabling technologies were initially hailed simply for facilitating after-hours emergency consults and allowing radiologists to avoid overnight calls. Nearly three decades later, teleradiology is expected to be an **$8.24 billion business by 2024**, offering flexible work options for radiologists and providing care and expertise to underserved outlying areas.[1]

Teleradiology also managed to deliver **skyrocketing workloads, high rates of clinician burnout,** and a major headache for health system IT leaders.

Radiology burnout hovers around 50%, according to Medscape's 2019 National Physician Burnout and Depression rankings.[2]

A Formula for Burnout

Let's start with clinicians. A 2015 study conducted by researchers at the Mayo Clinic reported that radiologists were interpreting images every three to four seconds, and between 1999 and 2009 — despite increases in staffing — the average number of images requiring interpretation per minute **increased sevenfold** for CT and fourfold for MRI.[3] At the same time, radiologists became increasingly isolated, confined to reading rooms or home setups and removed from direct patient care.[4] Radiology residents face different challenges from their attending physician counterparts and suffer from substantially increased rates of burnout ranging from 40% to 80%.[5]

Quality Control and Compliance

Remote reading has created numerous governance challenges for IT leaders. According to a MarkeTech Group survey, 77% of hospital QA administrators said they **found it challenging to manage the quality of home reading workstations**.[6] The study further revealed that teams of IT specialists were routinely deployed to physicians' homes to service computers.

Offsite equipment also presented significant compliance and security risks, not to mention the hospital networks it accessed. And, if a home reading setup didn't provide the computing power or graphics resolution required for a true diagnostic read, a follow-up on-premise read was required, adding time and expense for the health system.

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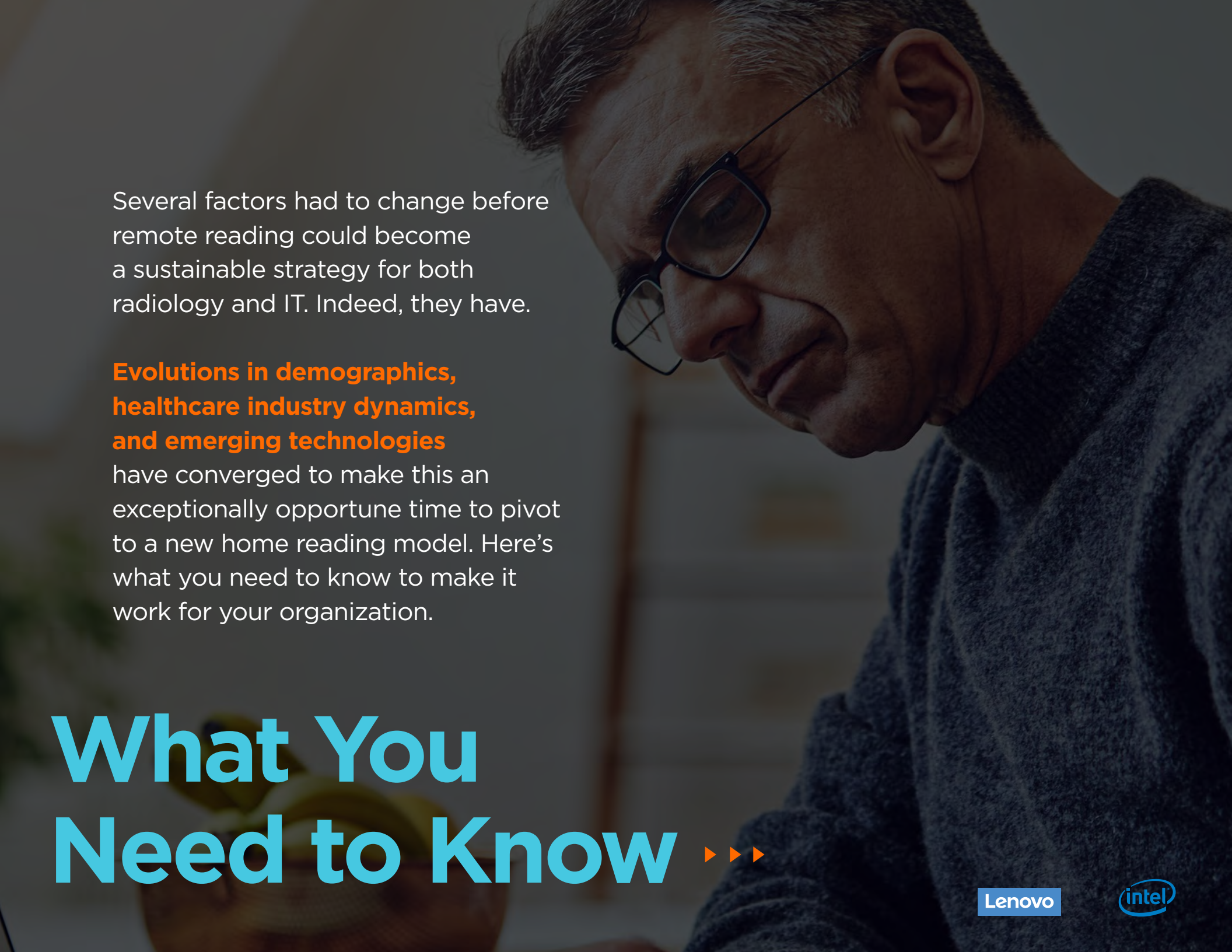

Several factors had to change before remote reading could become a sustainable strategy for both radiology and IT. Indeed, they have.

Evolutions in demographics, healthcare industry dynamics, and emerging technologies have converged to make this an exceptionally opportune time to pivot to a new home reading model. Here's what you need to know to make it work for your organization.

What You Need to Know

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01.

Radiologists are Remote-Ready

Gen Z and Millennial generations will comprise 62% of the U.S. workforce by 2025,[7] and that has enormous implications for a field like radiology.

Workplace Flexibility

Born after 1995 and in the firm grip of digital nation, Gen Z and Millennial generations prize workplace flexibility. 77% of Millennials believe flexible work options increase their productivity[8] and Gen Z employees believe flexible working is a must.[9]

Rather than increasing isolation, **home reading is viewed by Millennials as a significant benefit**, and hospitals are funding home reading workstations as a way to appeal to these younger employees.[10]

Making a Difference

New generations of employees are searching more for a calling than a career, willing to compromise on compensation in exchange for work that offers a sense of purpose.[9] As such, they expect their work and their personal lives to intersect, and they're more comfortable living and working in that intersection than previous generations. These new generations often refer to the term "work-life integration" rather than the previous "work-life balance." **Radiology practices and departments are catering to their passion for work that matters** by finding ways to connect the work to patient care and reminding these young radiologists how many lives they touch each day through the images they interpret.[11]

Women in Radiology

The healthcare future is female, according to research conducted by Athenahealth.

Approximately **27.2% of radiologists in the U.S. today are women**.[12] But ...

... among physicians age 35 or younger, **women outnumber men nearly 2 to 1**.[13]

In radiology specifically, the ACR Commission on Human Resources Workforce Survey found **more women than men among the under-45 demographic**.

Women tend to **value lifestyle above compensation** and increasingly seek employment over owning their own practices in order to **achieve workplace flexibility**.[14]

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02.

Healthcare is Remote-Ready

Along with changes in the radiology workforce and shifts in patient populations, the biggest shift toward remote reading has been spurred by the global pandemic, the effects of which are expected to last well beyond 2025. **Healthcare delivery organizations are signaling that now is the time to prioritize home reading models.**

COVID-19 Spurs Remote Reading

Disruption on a scale previously unthinkable, COVID-19 forced many healthcare delivery organizations to shift clinical faculty to read-from-home study interpretation.

Armed with laptops, radiologists connect diagnostic external monitors and use laptop screens for worklists and patient information. This system offers the same three-screen setup as the hospital reading room, so display protocols work the same.

Like many industries forced to shift employees to work-from-home structures, healthcare is responding and radiologists are finding that technology helps them embrace the new normal successfully with home reading options.[15]

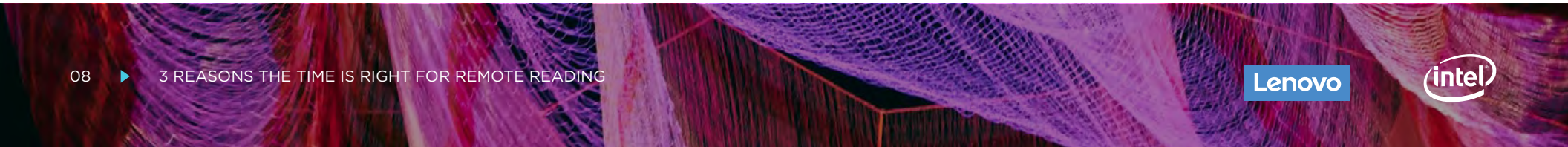
Patients are Older and Sicker

The number of Americans age 65 and older is projected to nearly double by 2060, which will bring their share of the total population to 23%. However, with obesity rates at nearly half for this population and the rate of Alzheimer's disease expected to more than double by 2050,[16] **the need for diagnostics and medical care has never been greater.**

A Shortage of Physicians

Unfortunately, **the increasing need for medical care is expected to correspond with a pervasive physician shortage**. The Association of American Medical Colleges recently confirmed that the U.S. will need up to 122,000 more physicians by 2032 — both as a result of the increase in population and because one-third of currently practicing physicians will themselves be older than 65 in the next decade.[17]

These two realities require health systems to get creative about how to increase their patient care capacities. The efficiencies of home reading can dramatically increase the number of patients that health systems are able to serve, expand health systems' service areas to include rural communities, and significantly reduce the costs associated with in-hospital reading rooms. As an example, one Michigan radiology provider **increased productivity 400% and cut costs more than 70%** by implementing advanced teleradiology technology.[18]



Care Team Collaboration

Solutions like remote reading also help care delivery organizations meet population health and value-based goals by increasing collaboration across reading locations. Health systems are deploying clinical communication technology that connects the entire organization on one secure platform. Within that platform, groups and teams are easily built around patients, making it easy for all members of a patient's care team to collaborate on treatment plans.

Multidisciplinary teams are replacing the traditional assembly line approach to care delivery.[19] Paired with system-wide digital communication tools, this **gives radiologists the opportunity to participate in direct patient care** — regardless of location.

Subspecialization

While most imaging centers prefer their radiologists be generalists, teleradiology provides more opportunity for subspecialization[20] in areas such as breast imaging, cardiac imaging, and neuroradiology.

Subspecialization not only streamlines work for the radiologist; it also improves patient care. Image interpretation performed by highly skilled specialists is more likely to be accurate and less likely to generate false positives or lead to unnecessary follow-up imaging.[21] In fact, a recent study reported in *Clinical Radiology* demonstrated that **neurologists actually value imaging reports more if they come from subspecialized radiologists**.[22]

03.

The Right Technology is Now Available

What to Look for

Whether driven by a global disruption event or demographic and industry shifts, technology has risen to meet the challenge. Technology continues to evolve to improve clinician workflow and improve patient care delivery from anywhere. **For radiology specifically, that means streamlined devices, higher imaging resolution, and tighter security.** The governance and quality control issues that once plagued IT leaders have been resolved with the newest advances in remote reading technology. Home reading has become not just feasible for radiologists, but actually convenient.

If you're ready to optimize remote reading for the radiologists in your organization, **here's what you need to look for.**

Mobility

Small is the new big. Where remote workstations once mirrored reading room setups with bulky towers, now they've gone mobile — just as portable as tablets at the bedside. The tower can now be replaced with a laptop-sized mobile workstation that offers the processing power without the heft. A portable device provides versatility, allowing radiologists to work in multiple settings or within the same workflow setup; there's no longer any need for radiologists to share reading stations. Graphics processors with both internal and external components are easy to add and can enable superior image processing. Further, if maintenance is ever required, the physician can simply (and quickly) drop the laptop off with the hospital's IT department and cross IT house calls off the budget line.

Look for:

- Supercharged processors such as Intel® Xeon® and Core™ to handle PACS software
- High-level memory for faster image processing
- ThinkPad® P1 Gen 3 option of X-Rite Pantone® calibration
- MIL-SPEC testing to ensure reliability and durability
- Thunderbolt™ ports to connect effortlessly to external graphics boxes that house the Barco MXRT cards needed for use with Barco diagnostic monitors
- Workstation docking station capable of driving multiple diagnostic monitors and a ThinkVision® display for worklist tracking
- Add-on accessories, such as advanced keyboards, pointing devices, and dictation microphones, to customize workspaces according to physician preferences

Diagnostic Monitors

Computer monitor resolution has a tremendous impact on the accuracy of a radiology read. A clinical read using a high-resolution consumer display may be fine for emergency consults and second opinions, but true diagnostic remote reads require diagnostic displays.

The American College of Radiology (ACR) has set forth guidelines for standardizing display quality to ensure consistency of care.[23] A diagnostic display should meet the following criteria:[24]

Look for:

- Luminance of at least 350 cd/m^2 (450 cd/m^2 for mammography) to provide more visible shades of gray for easier detection of subtle details
- Pixel pitch of 200 to 210 and display size of 21″ to 33″ to present more data and reduce the need for panning and zooming
- Compliance with the DICOM Part 14 grayscale standard display function (GSDF) to ensure quality

Security

Regardless of its physical location, a remote reading station still falls under the responsibility of the on-premise IT team. While portability adds convenience, it also increases the potential for data breaches due to theft, negligence, or malicious attack. The newest workstations incorporate best-in-class security measures to protect devices, data, identities, and online personas.

Look for:

- Advanced password protection and authentication technologies to prevent unauthorized access in the event a device is lost or stolen
- Remote management capabilities for monitoring and maintenance
- Secure supply chain for safety and quality control during the manufacturing process
- BIOS-based smart USB protection to prevent unauthorized data downloads by blocking unsecured devices from connecting to USB ports
- Next-generation autonomous antivirus like SentinelOne® that uses AI and ActiveEDR to predict, prevent, and stop even zero-day attacks
- Privacy screen filters to protect against visual hacking
- Encryption services like Windows BitLocker and WinMagic that protect data from prying eyes
- Intel vPro® platform. It brings hardware-enhanced security features, modern remote manageability, and PC fleet stability to help end users contribute at the highest level

Barco Nio Color 3MP Displays

eGFX Box or Workstation Docking Station

Lenovo ThinkPad® P1

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About Lenovo Health

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