

Clearing the Pipelines to Community- Based Care

Vacuum plumbing
systems give healthcare
providers added flexibility
in converting commercial
space for medical uses



Healthcare providers are reaching deeper into their communities, opening clinics and ambulatory care facilities that can provide easy-access care where consumers want and need it the most.

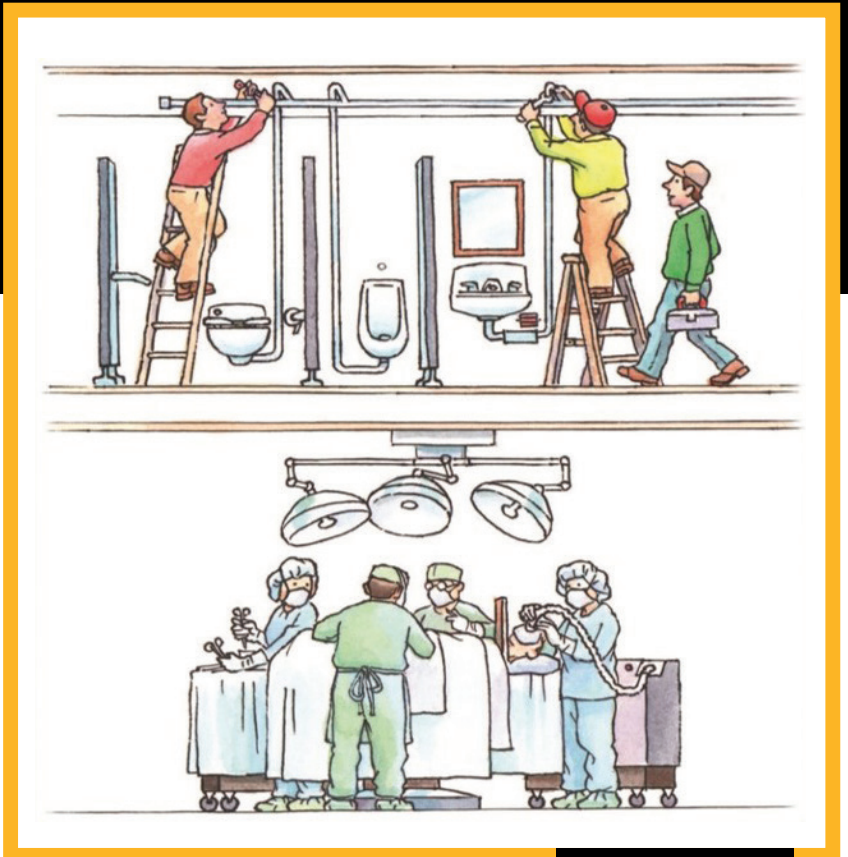
But they face a big challenge right off the bat: Finding (or building) suitable space—in the right place—that will meet healthcare’s stringent requirements and be painlessly adaptable for renovations as community healthcare needs change over time.

One surprising way to speed up the site-selection process?
Vacuum plumbing.

“Unlike waste piping that depends on gravity alone for drainage from fixtures to sanitary sewer, vacuum plumbing uses the combined energies of vacuum pressure and gravity for drainage,” says Laura Marshall, vice president of AcornVac (Chino, Calif.), a major provider of vacuum plumbing systems. AcornVac systems are installed in The Healthcare Partners Plaza medical office building in Long Beach, CA; the DTC Surgical Center in Denver, CO; and The Polyclinic’s Northgate Medical Offices in Seattle, WA, among others.

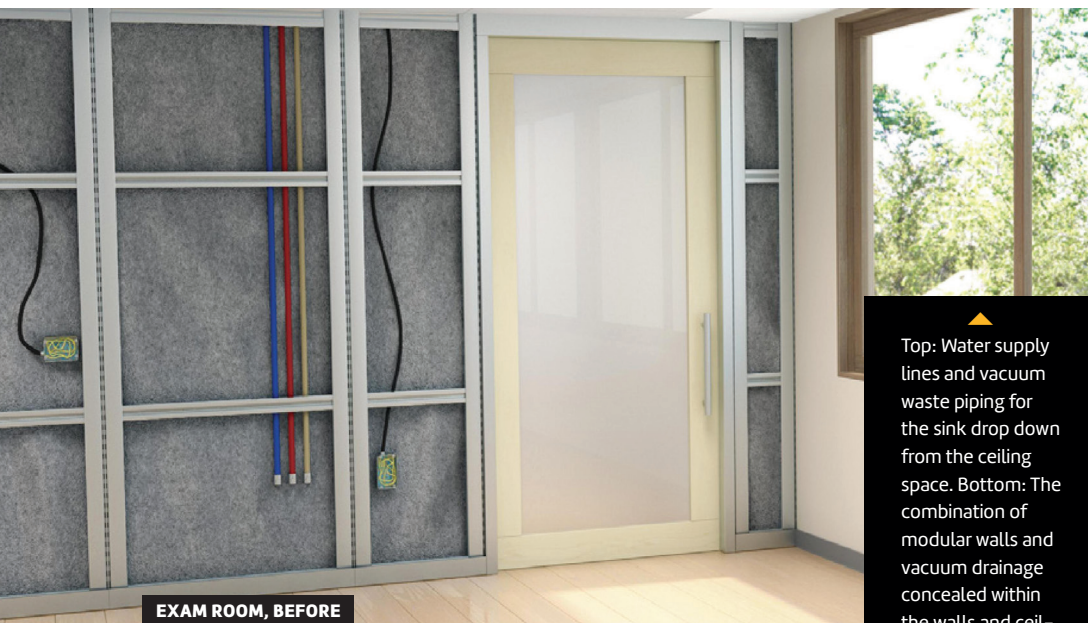
Vacuum plumbing eases the conversion of commercial space for medical use, particularly when compared with gravity plumbing, beginning with installation.

“Gravity waste piping must continuously slope toward the sewer, requiring a commitment to provide an unobstructed pathway for the drainage piping within a structure,” Marshall explains. “When renovation involves plumbing, the floor must often be cut, core drilled, X-rayed, excavated, trenched, and then repaired. Vacuum plumbing, by contrast, allows the drainage piping to remain in or above the finished floor. Vacuum drainage piping routes up through walls to the space above the ceiling in the same level of the building as the plumbing fixture rather than down below the floor or slab. This simple difference makes it possible to retrofit buildings or space lacking plumbing infrastructure without the need to sawcut and trench for drainage.”



Unlike with traditional plumbing installations, vacuum plumbing fixtures can be installed without disturbing those working on the floor below.

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EXAM ROOM, BEFORE

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Top: Water supply lines and vacuum waste piping for the sink drop down from the ceiling space. Bottom: The combination of modular walls and vacuum drainage concealed within the walls and ceiling space provides unlimited flexibility for future space use. Photos: Med-Space Innovations
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EXAM ROOM, AFTER

That, in turn, broadens the range of potential real estate options for ambulatory healthcare facilities, and provides significant reduction in construction timeline. “Typical office buildings and indoor malls provide existing drainage near core bathrooms, but generally not the perimeter or in wings of the building where exam rooms or healthcare services are located,” Marshall says. “Vacuum drainage provides the plumbing infrastructure that allows sinks, toilets or any fixture requiring drainage to be placed throughout the facility as needed without disturbing tenants below or intruding into costly ground level, below-floor hazards.”

This last point—the ability to install fixtures without disturbing current operations or requiring costly (or hazardous) upheaval—pays off down the road, as well, when space needs inevitably change, and the building requires renovation. Adds Marshall, “When there’s no need to cut or trench the slab, changing or adding drainage requires less coordination, less time and can be done with fewer restrictions.” As stated by AcornVac client Randal Brand, formerly of The Polyclinic,

FACT:

Vacuum toilets for healthcare settings look and feel quite similar to their high-efficiency gravity flush counterparts. Despite common misconceptions, these are not like airplane toilets that activate with a deafening roar.



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AcornVac's wall-hung vitreous china toilet has the look and feel of commercial models, but requires less than one half gallon of water per flush and meets or exceeds commercial flush performance criteria.



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AcornVac's durable, floor-mounted stainless-steel vacuum flush toilet with white Enviro-Glaze finish is available with a number of features, including ligature resistant designs and options.

"It truly puts plumbing installations into the same category as electrical outlets. Today you can add electrical outlets with ease to almost any location a customer wants. Now with vacuum plumbing we can do the same thing, even with toilets." Moreover, adds Marshall, "The system can be considered a capital asset, because vacuum drainage equipment can be moved to another location or facility."

There are environmental benefits, too. For one, installing a vacuum plumbing system can gain a project coveted LEED points on water efficiency. "The environmental impact of toilets on a vacuum plumbing system is substantially less compared to high-efficiency low-flow toilets," Marshall says. "With less than a half-gallon of water per flush on the vacuum toilet, there are significant savings on water and sewer use and cost."

Even high-efficiency low-flow gravity flush toilets require a minimum of 1.28 gallons per flush, she explains. "We ran the numbers and calculated that for a large medical clinic with approximately 75 toilet fixtures, the anticipated water and sewer savings are estimated at over 1 million gallons annually."

That adds up to some substantial financial and environmental advantages for the provider and the community.

OTHER ADVANTAGES



In addition to the building retrofit and installation benefits, vacuum plumbing systems also offer a huge infection control advantage in how they minimize the spread of bacteria, by eliminating the flush plume that occurs during a toilets' flush cycle.



"When conventional toilets are flushed, they eject pathogens into the surrounding environment in the form of an aerosolized plume," AcornVac's Marshall explains, citing a study called "Aerosol Generation by Modern Flush Toilets," published by the National Center for Biotechnology Information in 2013. "Vacuum plumbing eliminates that dispersion onto the surfaces surrounding the toilet or into the air within the bathroom and the facility. During a vacuum flush, air is pulled into the toilet bowl, effectively arresting or eliminating any aerosolized droplets that would otherwise create that plume." The latter point is an especially critical consideration for immune-compromised patients in a healthcare setting, she notes.



This same feature assists in reducing maintenance and costs associated with waste line blockage by minimizing the clogging that often occurs in waste piping. Things like sanitary wipes and feminine hygiene products that can block gravity waste piping are propelled or pushed through the vacuum waste piping by the incoming flow of air.



Unlike gravity waste piping, which is open to atmospheric pressure and requires the installation of multiple vent stacks that travel vertically to the roof deck, vacuum plumbing systems use a closed piping network that's maintained under continuous vacuum pressure and functions efficiently without traditional vent networks and roof penetrations.



The diameter of the vacuum waste pipe connection at toilets is typically 1.5 inches, versus gravity waste connections that are 3–4 inches in diameter. That smaller diameter translates to lower material cost in the form of smaller piping, and less space required for installation. In addition, horizontal runs of vacuum drainage piping do not require continuous slope and can be routed around obstacles in the pathway such as ductwork and structural beams, eliminating the costly and time-consuming process of resolving conflicts that can arise during construction.

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