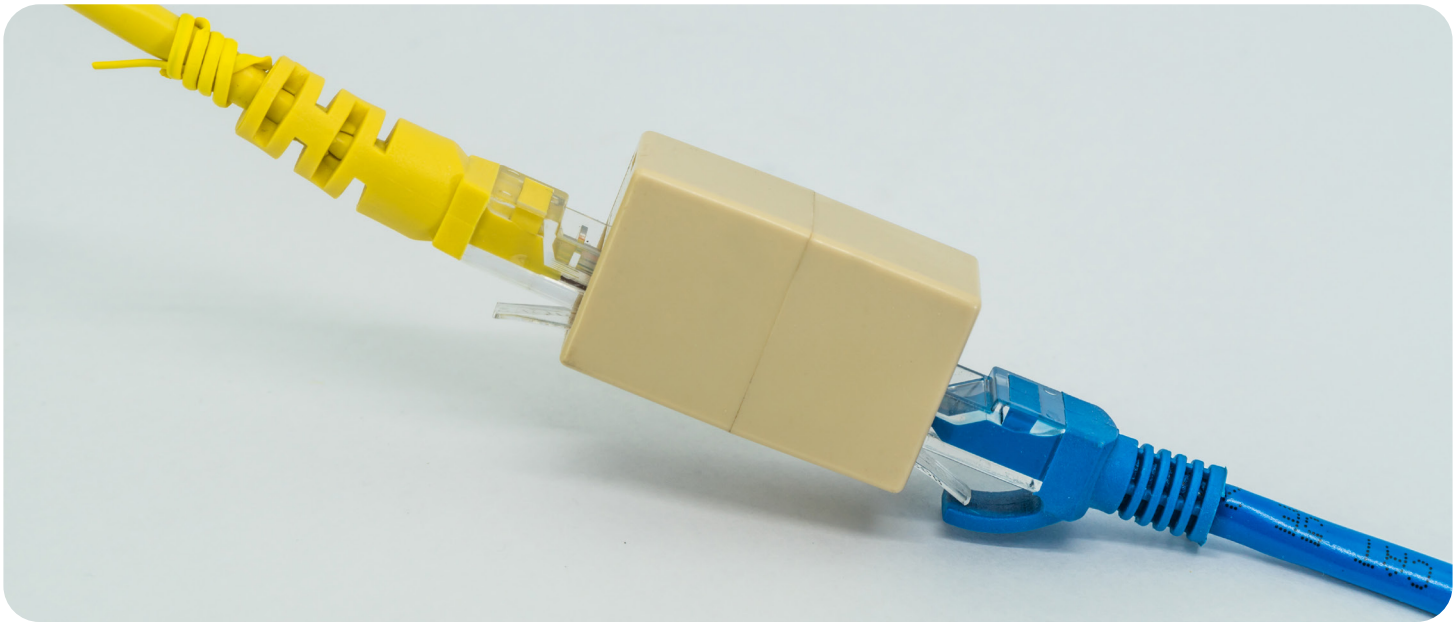
mobile healthcare association

MOBILE HEALTHCARE LEARNING LAB

Internet Connectivity

In This Module:

- [ ] Connectivity Basics
- [ ] Ideal Set-Up
- [ ] Best Practices
- [ ] Troubleshooting
- [ ] Review Quiz



There are few gaps in mobile healthcare wider than the one between the initial thought operators give to Internet connectivity and the seriousness of the problems most will eventually encounter with it.

After all, there are few things more crucial to mobile healthcare success than a strong connection in the field, affecting, as it does, everything from patient intake to data storage to equipment operations. So there is really no better time to think about digital access than while you're designing your vehicle.

Whether you're in start-up mode or already on the road, though, these basics and best practices will help your program reach and maintain optimal connectivity.

Connectivity Basics

Trustworthy vehicle vendors (see "Mobile Healthcare Learning Lab: Choosing a Manufacturer") will have strong opinions about digital equipment, based on your program's specific functions, geography, and the like. Generally, though, the must-haves include:

Router

4G/5G broadband routers receive a signal from one or more cellular providers via SIM card(s), creating a network that allows multiple devices to simultaneously access the Internet.

SIM card(s)

Small, transferable cards that store information, most notably your network plan. This allows carriers to verify your account status so you can log onto their network.

Internet bonding (or Bonding)

Sometimes known as a multi-SIM router, this sort of device combines multiple network connections, strengthening reception.

Mobile hotspot

A device that converts mobile broadband signals into a WiFi connection for laptops, tablets, phones, and other wireless devices, minimizing the number of SIM cards needed.

Rooftop antennas

One for each SIM card, mounted professionally — that is, securely and weatherproofed to protect all wires, connections and access points to the inside.

IDEAL SET-UP

1. All cable should be shielded CAT6 or better — not the standard unshielded twisted pair cabling commonly referred to as UTP — and ideally connected to a grounded patch panel. This will protect connected devices against electrical surges and other hazards.
2. Power should be filtered or regulated (via a line conditioner, APC Smart-UPS, etc.) to safeguard against disruptions and damage (fluctuations, brownouts, "noise," etc.) not prevented by a surge protector.

PRO TIP

If you want help sorting out your connectivity challenges, the Mobile Healthcare Association can recommend vetted consultants. Email info@mobilehca.org

3. Equipment should be kept in a well-ventilated storage area with quiet, efficient fans (i.e. ball-bearing fans).
4. Wiring should be organized on a rack-mounted Ethernet network patch panel — and each wire labeled.
5. At least one network jack should be installed in the ceiling, either at the vehicle's midpoint or nearest to where most staff will work.

BEST PRACTICES

1. Test Internet access in potential set-up spots before initiating clinic operations. Certain structures—e.g., tall buildings, billboards, water towers—can block cellular signals. Sometimes, simply moving across a parking lot or down the block will improve the connection.
2. All staff should be trained on connectivity equipment and in troubleshooting protocols.

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BEST PRACTICES (cont.)

PRO TIP

Even the strongest IT department of a parent organization can't be expected to solve mobile-related connectivity issues with which they have no prior experience. Ask about support rather than assume it—and plan your on-board troubleshooting accordingly.

3. Bond multiple Internet connections (via cellular modem or hotspot) from different carriers to create a more powerful single connection. This is especially necessary for clinics offering telehealth, mammography, or X-rays.
4. To reserve bandwidth for clinic operations and to wall off your data, use a password-protected WiFi network and don't offer a public guest WiFi.
5. Use Virtual Private Networks (VPNs) to secure data transmitted to servers and specialists located elsewhere.

PRO TIP

If you plan to balance your load by using more than one cellular data plan, be sure your VPN technology supports bonding.

6. Maintain multiple layers of security, e.g., encrypting data and backing up everything on the cloud. If you are in a rural area where connectivity is not an option, use a secure server and download the data when you return to your base at the end of the day.

PRO TIP

Consider using satellite Internet to boost your connection in locales where reception is known to be unreliable.

7. Keep software programs updated. Likewise, budget permitting, replace computers every three years or so to sustain speed (and memory capabilities).

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BEST PRACTICES (cont.)

8. Prepare backup plans in the event of service outages.

   Example A: Imaging machines should have an offline mode, so you can capture X-rays and the like in the moment then upload them once you're reconnected.

   Example B: Always keep a stash of vital paper forms (intake, consent, etc.) that can be filled out by hand then entered into the system later.

   Example C: If you're parked beside a partner's facility when Internet access disappears, ask if you can use their Internet.

TROUBLESHOOTING

Use websites such as speedtest.net to determine if a connectivity issue is related to the speed of your network.

If it is ...

- If practical, consider working offline and transmitting during off-peak hours when the network will be less congested. Or consider limiting peak-hours use of especially bandwidth-heavy applications, such as mammography or X-ray.
- Consider employing a signal booster or mobile hotspot or adding more carriers. Having multiple carriers operating at the same time reduces end user headaches because, for example, in your location AT&T's signal might be weak whereas T-Mobile's strong.
- Contact your service provider to see if an outage or issue has been reported in your area, and, if so, ask if they can offer a temporary solution. (You may also be able to search online for the answer.)

If it isn't ...

- Make sure all software is updated.
- Inspect your equipment — especially after a bumpy trip. Ensure that the router, modem,

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TROUBLESHOOTING (cont.)

and other network devices are firmly connected.

- Change the channel of the WiFi router or otherwise adjust network settings. (Check the router's manual for guidance.)
- Scan for interference with a WiFi or spectrum analyzer tool. Other electronic devices and WiFi networks may be hindering your connection. If so:
    - Move the router
    - Turn off or disconnect any non-essential devices, e.g., microwaves, cell phones, tablets, etc.
    - If possible, connect essential devices with Ethernet cables.
- If yours is a larger mobile unit, consider WiFi extenders to ensure coverage throughout the space.
- Reboot. Because sometimes it's just that simple.

Review Quiz

1. When is the best time to think about your digital network?

   a) When designing your vehicle

   b) Once in the field

   c) If and when connectivity problems arise

2. Roof-mounted antennas are...

   a) Unnecessary

   b) Nice to have

   c) Must-haves

3. Equipment used for data input, diagnosis, and treatment are best connected to routers or hotspots via...

   a) WiFi

   b) Cables

   c) Bolts

4. Shielded CAT6 Ethernet cable is the minimum standard for connectivity-related wiring.

   a) True

   b) False

5. Ideally, computers should be replaced every...

   a) Year

   b) Three years

   c) Five years

   d) 10 years

Answers:

1. a; 2. c 3. a; 4. True; 5. b.