Material **Presence** *at a Distance*

Could a clinician rehearse the next step from afar and use a physical response to reconsider it?

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A research proposal. No experiment has been run and no results are reported. Nothing here is medical advice. Full notices appear at the end.

The next step

I keep coming back to the moment before a surgeon takes the next step. Imagine a surgeon in Atlanta studying two possible repairs to a blood vessel. A physical model of the vessel sits in a laboratory across the country. From Atlanta, she selects one configuration. A valve on the model turns. Fluid takes a different path. Could she see that response in time to reconsider the second repair?

That is what I mean by materially present. Something she does here has a physical consequence there, and what happens there can change what she does here. I began with the idea of nonlocal presence. What I wanted to understand was whether an exchange across great distance could feel immediate enough to guide the next action. On the bench, we can put a clock to that ambition. When did the valve turn? When did the fresh measurement reach her? No faster-than-light link is assumed. Signals travel by ordinary means, and the delay is something to measure.

What the surgeon could see, try, and learn

At Global Reach Management Consultants, three ideas guide our Advanced Innovation Research (AIR) initiative. DigiView™ would let the surgeon see something otherwise hidden from view, such as how fluid divides inside the model after a bend. InterPresence™ would let her change the physical setup from her location and receive a measurement of what followed. DeepView™ would let her preview a possible next step, keep that prediction in view, and compare it with the response.

The distinction matters in predictive medicine. A surgeon might ask, “If I choose this repair, where will the blood go?” Researchers studying Fontan heart surgery have compared forecasts of blood-flow distribution with postoperative imaging (Trusty et al., 2019). That work gives us a real clinical question for rehearsal. An answer from tubing on a bench, however carefully measured, still belongs to that model. Whether it says something dependable about a particular patient is a further study.

Where the patient enters the question

My deeper interest is what a patient’s own body might contribute when the patient cannot speak. During a procedure under general anesthesia, for example, blood pressure can change after a procedural step. Could a clinician compare that physical response with an earlier forecast and recognize that something deserves a closer

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look before the next step? A pressure change alone cannot tell us whether a person felt pain, was conscious, or consented. Pain and nociception, the nervous system's detection of potential harm, are distinct (Raja et al., 2020). The change can give a clinician a reason to look again. A first study could replay existing records, with the necessary approvals, and ask which signal a clinician would check next.

Why the first experiment uses water

Picture the same exchange on a simpler bench. A pump sends water down two branches. The model predicts that 60% of the water will reach the left outlet. A second researcher quietly changes the resistance in one branch. A separate observer collects and weighs the water from both outlets. The left vessel holds 420 grams and the right holds 580. The left share is 42%. Those numbers are illustrative. The water supplies an answer the model could never give by replaying its own forecast.

That gives us two tests:

1. Can we trace a remote action, such as selecting a valve setting from another location, all the way to a verified physical response, and measure the delay?
2. When two operator displays show the same readings and forecast, does also showing the gap between them, with its uncertainty, help people detect a real change by an agreed deadline? Both groups would be held to the same false-alarm rate.

We would count correct detections, false alarms, and missed changes. In a discovery lab, the same discrepancy might help a researcher decide where to place the next sensor. A bench result would not show clinical safety, patient benefit, or anything about what a patient experiences. A clear negative result would also be worth reporting.

How to take part

We're looking for an Atlanta-area laboratory, researchers, and a founding partner.

- **Host the Study:** supervised bench time, a pump and flow instruments, calibration help, and a cost estimate.
- **Join the Research Team:** instrumentation engineering, modeling, or human-factors research. Clinicians and patient advisers can help identify the questions a later medical study should address.
- **Sponsor the Work:** lend measuring equipment, fund engineering hours, or underwrite independent analysis.

Partners would receive a written protocol, an equipment inventory and budget, synchronized trial records, and an independent report. Start with a 30-minute conversation. Bring one resource you could contribute and one result that would persuade you to continue.

Request a conversation (globalreachmc.com/contact) · Research page

References

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