

Implementing Digital Health Solutions in Hospital Ecosystems

A Case Study from Medipol Hospitals

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SENSE
CONNECT
ACT

A momentary snapshot is becoming a continuous film.

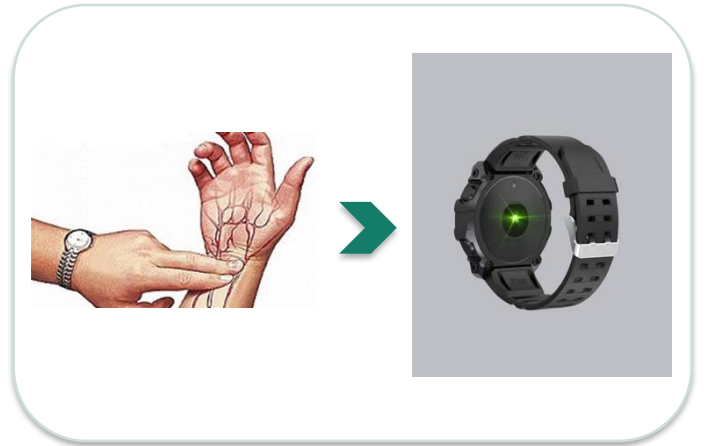
Momentary snapshot

A clinic blood pressure, a fasting glucose, an annual ECG — decisions made from isolated instants.



Continuous film

24/7 passive capture of sleep, HRV, temperature and activity — a running, high-resolution record.



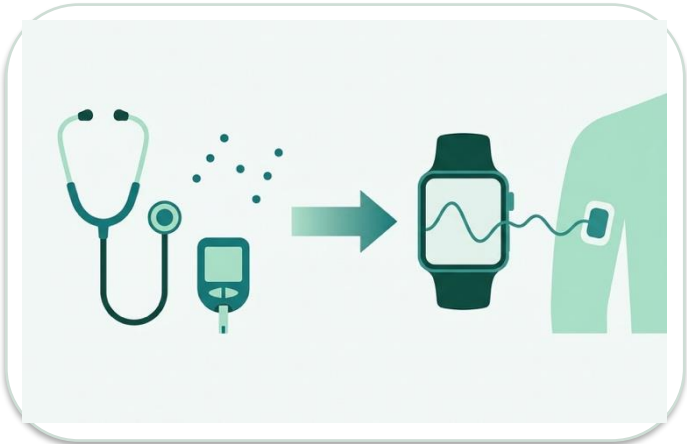
The shift

From isolated snapshots to continuous context — a framing, not a validation claim.

Measurements move from discrete readings to continuous streams.

Measurement	Classical — discrete	Wearable — continuous
Heart rate	Manual pulse count	Optical PPG, every beat
Blood glucose	Fingerprick, a few / day	CGM, every minute
Blood pressure	Clinic cuff, one reading	Cuffless estimate (emerging)
Temperature	Spot thermometer	Continuous skin / core

CGM is a regulated device class; cuffless blood pressure is still an emerging direction, not a standard monitor.



Sources: [T1] [W2] | Full references in notes / appendix

A connected device is not yet a connected care pathway.

- | | | |
|----|-------------------|---------------------|
| 01 | Sense | A measurement |
| 02 | Connect | A delivered record |
| 03 | Understand | Patient + context |
| 04 | Act | An accountable team |



The missing link Who reviews the data, when, and what happens if it never arrives?

Medipol Mega shows the scale of the integration challenge.

810

beds

25

operating theatres

358

outpatient rooms

215

intensive care units

7

hospitals in the complex



The case study combines operations, current use and research.

Evidence level	What we can say	What we should not infer
Documented hospital use	Wireless medication confirmation	Measured error reduction
Current use: speaker report	Rings record health data	Scale, sensor set or EHR integration
Proposed next steps	Ring integration	Completed hospital-wide rollout



Wireless already has a concrete role in medication work.

01 Identify Barcode-supported selection

02 Verify Medication, quantity and dose

03 Confirm Wireless confirmation



We currently use rings to record health data.

Potential data domains

Pulse-related signals and trends

Sleep / activity summaries

Temperature-related trends



Device-dependent examples, not a verified inventory of our ring's capabilities.
Clinical use needs validation.

No device model implied; recording is the current use, not a diagnostic claim.

Six form factors span the body, from wrist to skin.

Smartwatch

Wrist command centre
ECG · SpO2 · fall alerts

Smart ring

Finger physiology
Sleep · HRV · temperature

Smart textile

Second skin
EMG · ECG · respiration

Smart band

Screenless recovery
HRV · strain · recovery

Hearable

Ear and core heat
Heart rate · core heat

Biosensor patch

Biochemistry
Glucose · sweat · lactate



Watches and bands anchor continuous physiology.

Device	What it adds	Careful reading
Apple Watch	ECG, AFib history, SpO2, temperature	Some features regionally regulated
Samsung Galaxy Watch	Body composition; cuffless BP estimate	BP needs calibration, not a cuff
Garmin	HRV, sleep, stress, Body Battery model	Performance physiology, not diagnosis
WHOOP	Screenless Strain / Recovery from HRV	Software depth via subscription
Fitbit	cEDA stress; activity tracking	Mass-market wellness metrics



Rings trade display for comfort and continuous capture.

Market examples

Oura — sleep stages, HRV, temperature, cycle tracking

Ultrahuman — no subscription; pairs with a separate CGM

RingConn — budget-friendly, long battery, deep dashboard



Market examples only — our ring's model and sensors remain unspecified.

The ear and the fabric are the next sensor surfaces.

Hearables — the ear

Sennheiser — heart rate, core temperature

Smart earrings — temperature, SpO2, stress

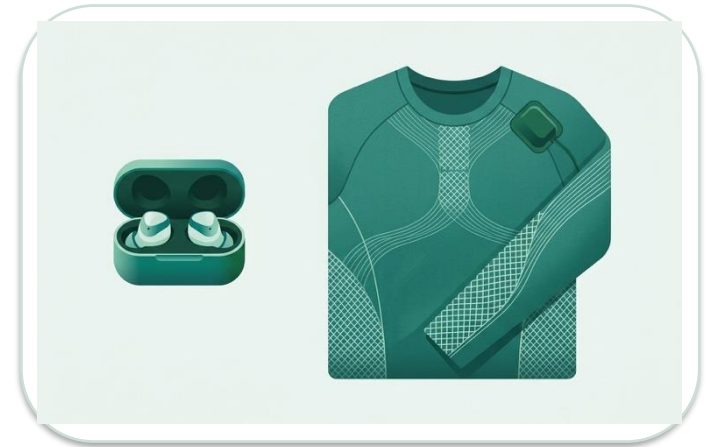
In-ear EEG — sleep-stage brainwaves

Smart textiles — the fabric

Athos — EMG muscle load and symmetry

Hexoskin — ECG, lung volume, respiration

Komodo Sleeve — ECG, autonomic balance



Early-stage and research devices — form factors, not an endorsement of clinical accuracy.

Patches move from optics to biochemistry.

Continuous glucose monitors

Abbott FreeStyle Libre —
interstitial glucose

Dexcom G7 — interstitial
glucose, diabetes care

Sweat and metabolic patches

Gatorade Gx — sweat rate,
sodium loss

Abbott Lingo — glucose and
metabolic signals



Boundary

CGM is a regulated device class; rings and watches do not measure glucose.

Four physiological layers sit under the form factors.

Cardiovascular

Heart rate, PPG, ECG, arterial stiffness, HRV

Respiratory / thermal

Breathing rate, SpO2, skin and core temperature

Neuro / autonomic

Electrodermal activity (cEDA), stress response

Biochemical signals

Glucose, electrolytes, lactate, pH from fluid



The 2035 horizon is invisible and predictive.

Direction	What it would enable
Non-invasive blood chemistry	Raman, OCT and infrared scanning for glucose, urea, lactate
Molecular hormone monitoring	Microneedle and saliva sensors for cortisol, melatonin
Smart contact lenses	Tear glucose and 24/7 intraocular-pressure sensing
Cuffless arterial blood pressure	Pulse-transit time + AI, measured every heartbeat
Electronic tattoos / graphene	Micron-thin, RF- or body-heat-powered skin patches
Predictive AI agents	From 'you slept badly' to a forecast and a plan



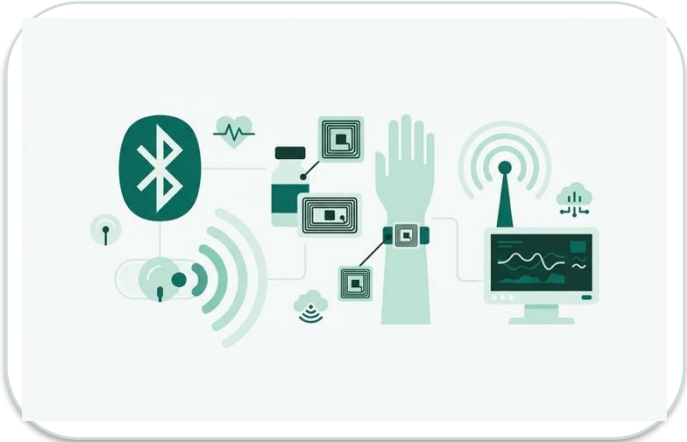
Evaluate signal quality, workflow burden and patient value together.

Question	Measure	Evaluation approach
Can we trust the signal?	Agreement with a reference	Device-specific validation
Does data arrive usefully?	Completeness; data age	Expected windows + timestamps
Can staff manage it?	Review time and alerts / day	Logs + workflow observation
Will patients keep using it?	Wear time and withdrawal	Adherence + patient feedback
Does it improve care?	Prespecified clinical endpoint	Appropriate comparator study



Choose wireless technology by task, not by generation.

Technology	Hospital application	Design trade-off
Bluetooth LE	Wearables to a nearby gateway	Battery, pairing, sync interval
Managed Wi-Fi	Mobile workflows; device backhaul	Coverage, roaming, congestion
RFID / NFC	Identity and inventory workflows	Read zone, tag / reader design
UWB / RTLS	Equipment location and wayfinding	Anchors, accuracy, obstruction
Private / public cellular	Mobility, IoT, hospital-at-home	Coverage, governance, cost



Thanks

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