

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

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|-------------------------------------|-------------------------------------|--|
| ☐ | ☒ | The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement |
| ☐ | ☒ | A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly |
| ☐ | ☒ | The statistical test(s) used AND whether they are one- or two-sided
<i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i> |
| ☐ | ☒ | A description of all covariates tested |
| ☐ | ☒ | A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons |
| ☐ | ☒ | A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals) |
| ☐ | ☒ | For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
<i>Give P values as exact values whenever suitable.</i> |
| ☒ | ☐ | For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings |
| ☒ | ☐ | For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes |
| ☒ | ☐ | Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated |

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection Python, QGIS, Stata

Data analysis Python, QGIS, Stata

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The datasets generated and analysed during the current study are not publicly available due to the risk of identification of the participants but are available from the corresponding author on reasonable request.

Human research participants

Policy information about [studies involving human research participants and Sex and Gender in Research](#).

Reporting on sex and gender	This information has not been collected.
Population characteristics	Each record included the location within the emergency department (i.e., coordinates) and a timestamp. Although tag users were anonymized, a label describing the type of medical staff, classified into eight subcategories, was associated with each tag. Among the 27 tags, six were associated with assistant nurses, two with triage nurses, two with intensive care unit (ICU) nurses, three with waiting room nurses, three with short-stay unit (SSU) nurses, two with managers, and nine with doctors and on duty doctors.
Recruitment	Consent for participation in the study was done via personal invitation to health care professionals in the emergency department of Le Corbusier hospital, Firminy, France.
Ethics oversight	The study received approval in France from ethical committee of Le Corbusier Hospital, Firminy.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☒ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	In this study, we implemented an indoor positioning system to track the activities of healthcare professionals during their shifts in an emergency department, aiming to gain a better understanding of the emergency care production process. We analyzed a substantial amount of quantitative data to objectively assess physicians' time allocation and movement patterns and their correlation with the emergency department's occupancy.
Research sample	Healthcare professionals, including assistant nurses, nurses, doctors, and managers, wore a sensor to record their location within the emergency department of Le Corbusier Hospital (Firminy, France).
Sampling strategy	In this study, participants are not associated to a treatment and control group. Instead, we included all healthcare professionals working in the emergency department.
Data collection	An indoor positioning system based on Ultra-Wide Band using multiple anchors and 27 tags (i.e., sensors) was tested at the emergency department of Le Corbusier Hospital in Firminy, France. During the study period, each volunteer medical staff member wore a tag during their shifts to collect timestamped data on their location within the ED. The data were collected in quasi-real time, as records were collected 5 times per second. Each record included the location within the ED (i.e., coordinates) and a timestamp. Although tag users were anonymized, a label describing the type of medical staff, classified into eight subcategories, was associated with each tag. Among the 27 tags, six were associated with assistant nurses, two with triage nurses, two with intensive care unit (ICU) nurses, three with waiting room nurses, three with short-stay unit (SSU) nurses, two with managers, and nine with doctors and on duty doctors.
Timing	The experiment took place from March 7th to April 21st 2022.
Data exclusions	No data were excluded from the analysis.
Non-participation	A total of 50 healthcare professionals were working in the emergency department during the study period, including 35 nurses or assistant nurses and 15 doctors. Among them, only 3 refused to participate to the experiment and were excluded from the study.
Randomization	Not applicable. Participants were not allocated into experimental groups.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging