



### DATA COLLECTION METHODS IN THE SPHERE OF HEALTHCARE

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#### Abstract

The research paper explains about the necessity of machines for data collection in the area of healthcare. The theory introduces the uses of several data collection devices. Survey of medical workers was conducted as an experiment. About all of the surveyed individuals selected, computerized data collection is important. The achieved results show that usage of mechanization for data collection in medical science is crucial.

*Keywords -data collection, pandemic, clinical measurements, data scientist, virtual treatment*

#### INTRODUCTION

Data science plays a vital role in the field of healthcare. It allows professionals to perform medical imaging, predictive analysis to prevent from potential disease complications/epidemic/pandemic and providing virtual assistance for patients. Collecting reliable and relevant data is a core step in the field of data science. Data scientists spend 60% of their time on cleaning and organizing data. Collecting data consumes around 19% of their time, meaning data scientists spend around 80% of their time on preparing and managing data for analysis. However, several interventions have brought an elementary procedure for data collection in the sphere of healthcare.

#### Theory

The following are a few examples of techniques and devices that simplify data collection in healthcare:

- Digital contact tracing - Contact tracking method that relies on tracking system, examples of apps include TraceTogether (Singapore), HaMagen (Israel) and Aarogya Setu (India); this technology which has come into prominence during COVID -19 pandemic.
- Radio Frequency Identification (RFID) Tags - These contain microprocessors track a large amount of data wirelessly. It is broadly used in hospitals for patient tracking, medical equipment management and also for identification of drug supplies.
- Medical Artificial Intelligence (AI) - These machines are a stimulation of human intelligence, they can help process a diagnosis, monitor patients, provide personalized medicines, and moreover with the help of electronic medical records they can also interpret bulk data and prevent disease..



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- Automated data collection system - This technology captures data of paper documents into electronic files. It is useful for updating patient details.
- Remote health monitoring system - The following is used to monitor patients out of clinical services, a monitoring device is provided to the patient that collects vitals and shares it to the physician and software that provides alerts based upon patient's health.
- Real Time locating system (RTLS) - This is used to contact a person in case of an emergency. A tag that has a button, as soon as the user presses the button an alert rings, providing the location of the individual that has pressed the button.

Devices emerging in future:

Smart beds - New smart beds measures up to 35 various readings that includes patient's weight, body temperature, heartbeat, blood pressure and also the number of times the patient has left or turned in bed. The beds electronically update patient's data. Some smart beds also have the ability to give verbal alerts and provide usb ports for charging.

Unique Device Identification (UDI)- It's a unique alphabetical or numerical code that can be read by both humans and machines, it contains information such as expiry, manufacture date. This will help improve patient safety and facilitate more production of medical equipment.

Oura ring- Wearable fitness tracker that keeps a track on physical activity and provides daily reports.

### Experiment

Survey of medical workers on data collection devices for their views and experience. Table 1.0 shows the questions and response options the survey consisted of. The link of the survey:

[https://docs.google.com/forms/d/1S1ILH3EuGRU\\_q4OXvLcduR6Tr2rJ\\_77dIBSRm-RLjc/edit](https://docs.google.com/forms/d/1S1ILH3EuGRU_q4OXvLcduR6Tr2rJ_77dIBSRm-RLjc/edit)

**Table 1.0 (The questions and the answers options that the survey contained)**

Question number	Question	Answer options
1	Name	-
2	Gender	-
3	Occupation	-
4	Select, the data collection method you think is better	Normal survey/ Online survey
5	Has data collection through the use of technology saved your time	Yes/No/Maybe
6	Which method is more likely to PRODUCE ERRORS while collecting clinical measurements of the patient	Smart beds/ Manual readings with the help of several devices
7	Data collection methods - Digital contact tracing RFID Tags  Artificial Intelligence (AI) Automated data collection system  Remote health monitoring system  Real Time locating system (RTLS)	Yes/No



	If these data collection methods are fully implemented world-wide, then can times of pandemic and epidemic be EASILY CONTROLLED	
8	From your experience, rate the IMPORTANCE OF TECHNOLOGY FOR DATA COLLECTION -	Not at all important/ Slightly important/Important/ Fairly important/ Very important

### RESULTS

The results are displayed in table 1.1 moreover for authentication the link of the results:

[https://docs.google.com/forms/d/1S1ILH3EuGRU\\_q4OXvLcduR6Ttr2rJ\\_77dIBSRm-RLjc/edit#responses](https://docs.google.com/forms/d/1S1ILH3EuGRU_q4OXvLcduR6Ttr2rJ_77dIBSRm-RLjc/edit#responses)

**Table 1.1 (The responses by the healthcare workers)**

Response	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8
1	Rahul rathod	Male	BAMS	Online Survey	Maybe	Manual readings	Yes	Important
2	Shweta Saini	Female	Floor Executive	Normal Survey	Yes	Smart beds	Yes	Very important
3	Anuradha Raut	Female	Service	Online Survey	Yes	Manual readings	Yes	Very important
4	Kinnari kanade	Female	Service	Online Survey	Yes	Smart beds	Yes	Fairly important
5	Kalpna Acharya	Female	Hospital employee	Online Survey	Yes	Manual readings	Yes	Very important
6	Nikita Mahindrakar	Female	Executive assistant	Online Survey	Yes	Manual readings	Yes	Very important
7	Dr sabiha syed	Female	Family physician	Online Survey	Yes	Manual readings	Yes	Very important
8	Sanika kadam	Female	Cardiac sonographer	Online Survey	Yes	Manual readings	Yes	Important
9	Namrata Channal	Female	Salaried	Online Survey	Yes	Manual readings	Yes	Fairly important
10	Smita Nair	Female	Service	Online Survey	Maybe	Smart beds	Yes	Important
11	S Nalawade	Female	Service	Online Survey	Maybe	Smart beds	Yes	Important
12	Mayank Singh	Male	Employee	Normal Survey	Maybe	Manual readings	Yes	Important

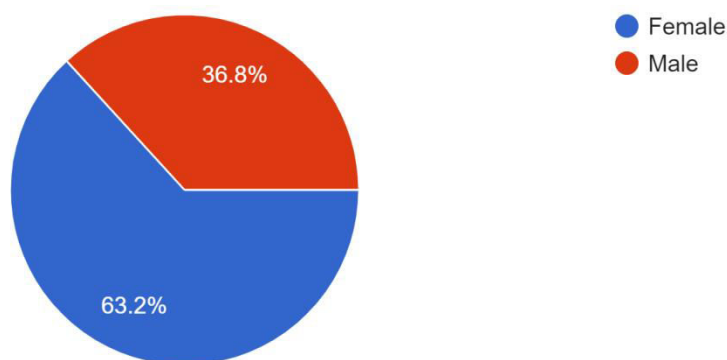


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13	Deepak Singh	Male	Healthcare professionals	Online Survey	Yes	Smart beds	Yes	Fairly important
14	Pratik Parekh	Male	Administration	Online Survey	Yes	Smart beds	Yes	Important
15	Amal	Male	Service	Online Survey	Yes	Manual readings	No	Fairly important
16	Charuta	Female	Service	Online Survey	Yes	Manual readings	Yes	Very important
17	Dr Jeetendra Bardolia	Male	Doctor	Normal Survey	Yes	Smart beds	Yes	Important
18	Arti Jadhav	Female	Service	Online Survey	Yes	Smart beds	Yes	Important
19	Pratik sharma	Male	Floor executive	Normal Survey	Yes	Smart beds	Yes	Important

### DISCUSSION

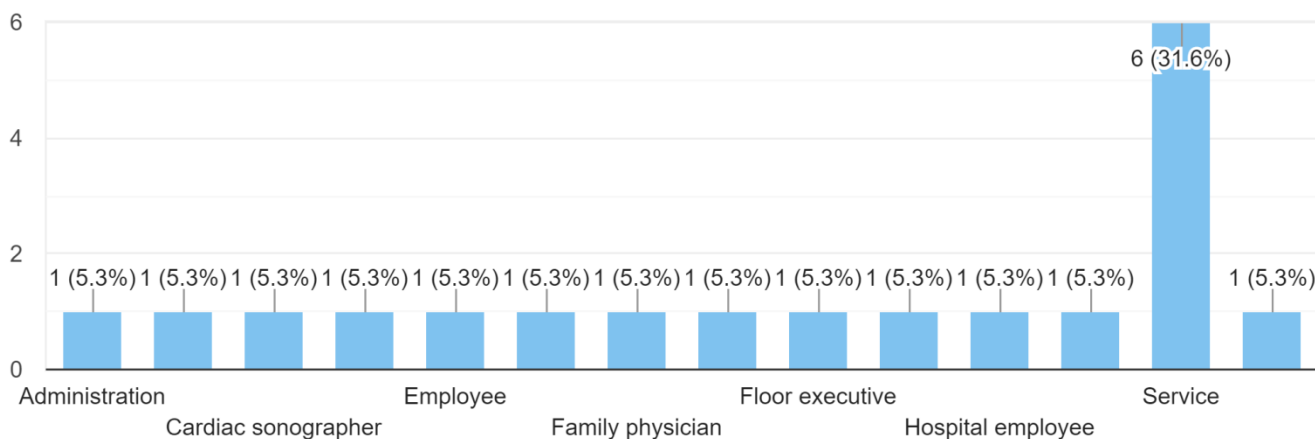
Gender  
 19 responses





### Occupation

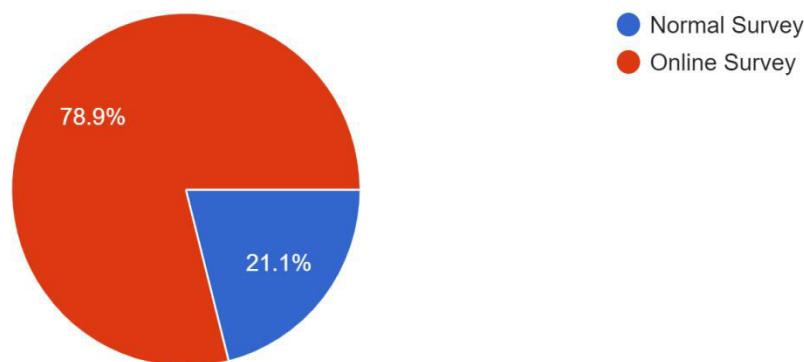
19 responses



The results show that more than 30% are occupied in service : Staff from medical companies, while other occupations include cardiac sonographer, hospital employee, family physician and floor executive.

### Select, the data collection method you think is better -

19 responses



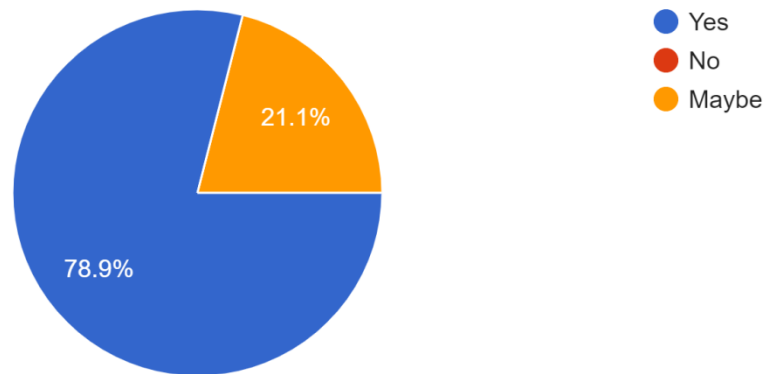


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More than 70% in healthcare prefer online surveys for hospitals and clinics, as it avoids contact and decreases the chance of infectious diseases spreading. The survey can be taken over a distance also, it can also be useful for observing patients outside medical buildings in Remote Health Monitoring System.

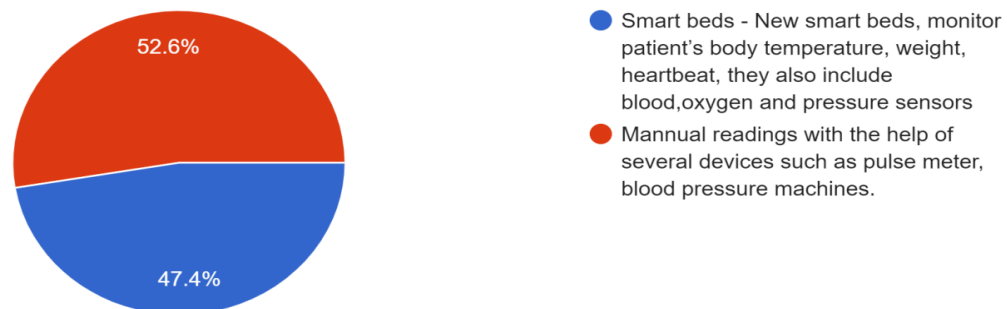
Has data collection through the use of technology saved your time -

19 responses



Which method is more likely to PRODUCE ERRORS while collecting clinical measurements of the patient :

19 responses

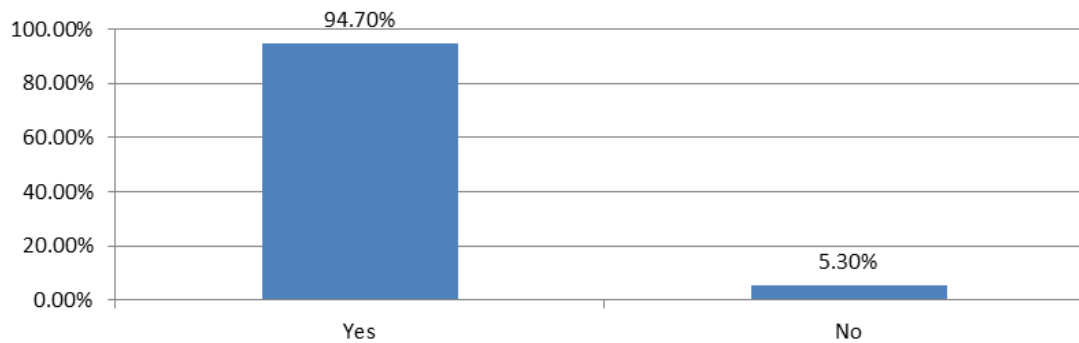




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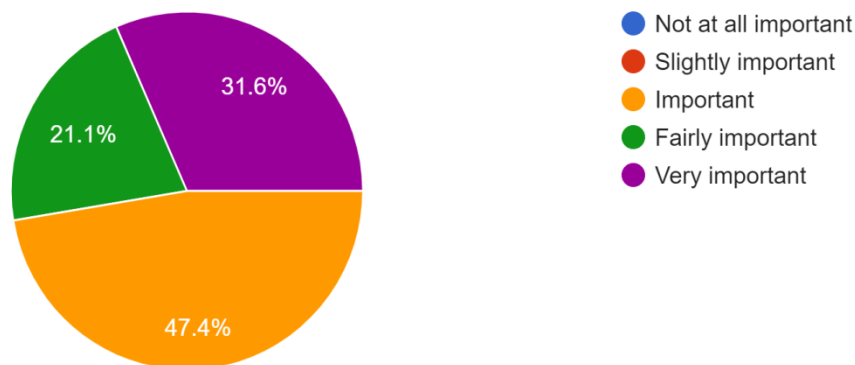
More than 50% stated that measuring clinical values manually is more error prone than smart beds as several clinical readings has to be taken through diverse devices, however smart beds provide these values altogether, in just a few seconds.

Data collection methods - Digital contact tracing| RFID Tags| Artificial Intelligence (AI)|Automated data collection system |Remote health monitoring system| Real Time locating system (RTLS)|  
If these data collection methods are fully implemented world-wide, then can times of pandemic and epidemic be EASILY CONTROLLED  
19 responses



94.7% state that total execution of the mentioned technologies can help control times of pandemic and epidemic as the devices can help trace infected citizens, medical equipment and patients count. Moreover, it can also provide distanced medical services. Implementation of such devices has broadly increased in the pandemic of COVID-19.

From your experience, rate the IMPORTANCE OF TECHNOLOGY FOR DATA COLLECTION -  
19 responses



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