# The Child Growth Monitor is a mobile app to digitally measure children's height and weight to detect malnutrition

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# The starting point: the CGM, a mobile app to measure height and weight

## Digitized data

- Replace error prone process of plotting points on a paper graph
- Digital data generated instantly – difficult to manipulate

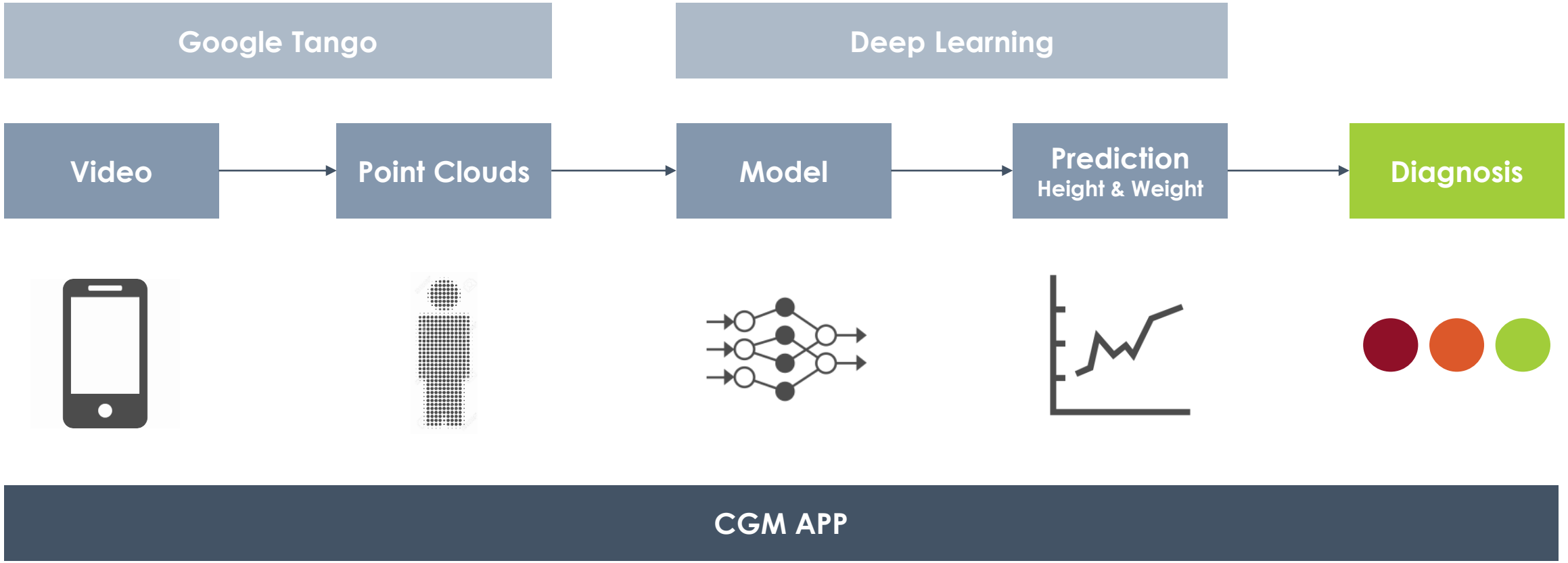
## Better height measurements

- Remove need for heavy, expensive wooden measuring board
- Avoid stretching the child - lower stress for child, mother & health worker

## Better weight measurements

- Remove need for heavy, expensive scales
- Avoid regular calibration of equipment to maintain accuracy

# The CGM today is using AR in combination with AI to diagnose malnutrition



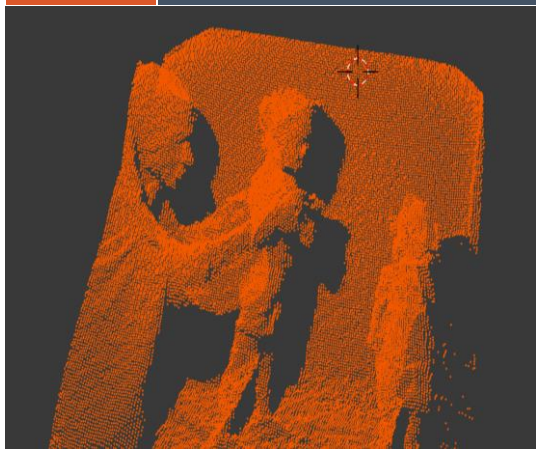
User experience

# Current CGM user experience is inferior to manual measurement

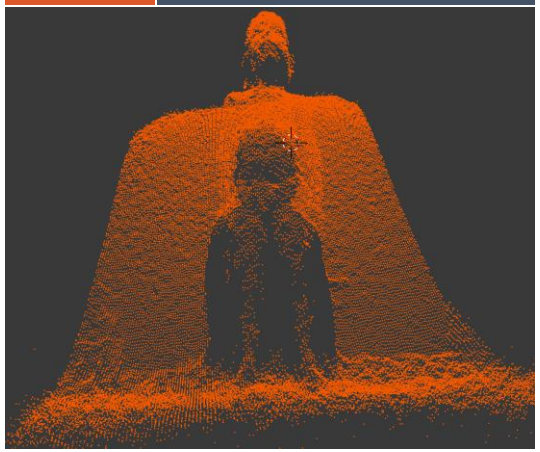
1. Scan takes longer than manual measurement
2. Scan is more exhausting for child and support worker
3. No feedback of scan quality when it's being taken

# Current user experience leads to poor data quality and affects the accuracy of the CGM prediction model

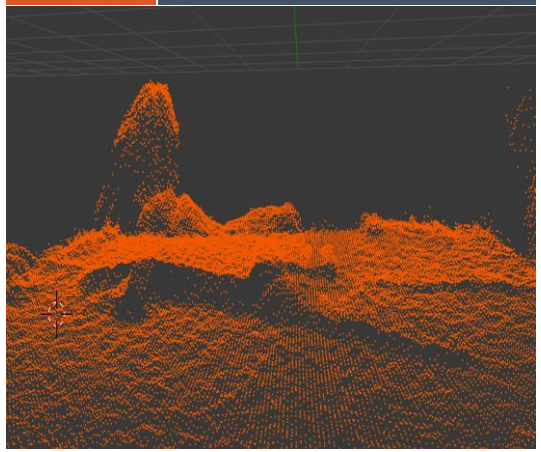
| 51% | 1. Other people in field of view |
|---|---|



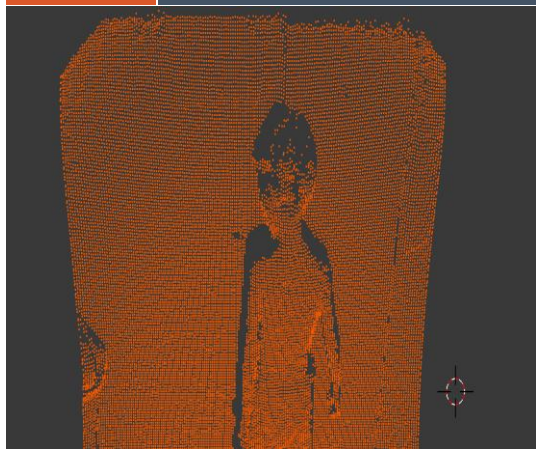
| 29% | 2. Body parts in shadow |
|---|---|



| 28% | 3. Body in wrong position |
|---|---|



| 18% | 4. Body parts outside of field of view |
|---|---|



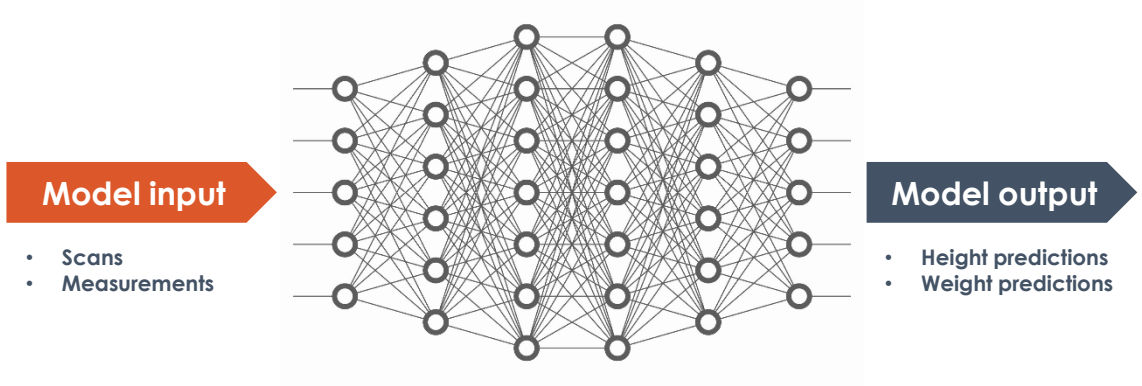
Of **72** CGM scans analyzed, ~**80%** belong to at least one of **4** error classes

## Measurement prediction

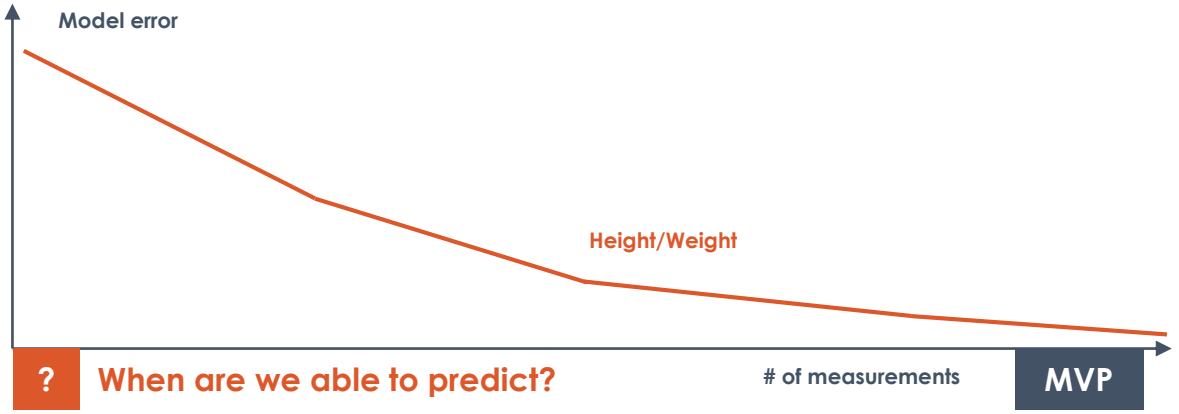
# Uncertain if height and weight can be predicted

1. Unclear how much sample data is required to reach desired accuracy
2. Unclear if current algorithm is the right approach
3. Research on weight estimation is far from required accuracy

### Deep Learning Models must be trained on ground truth data



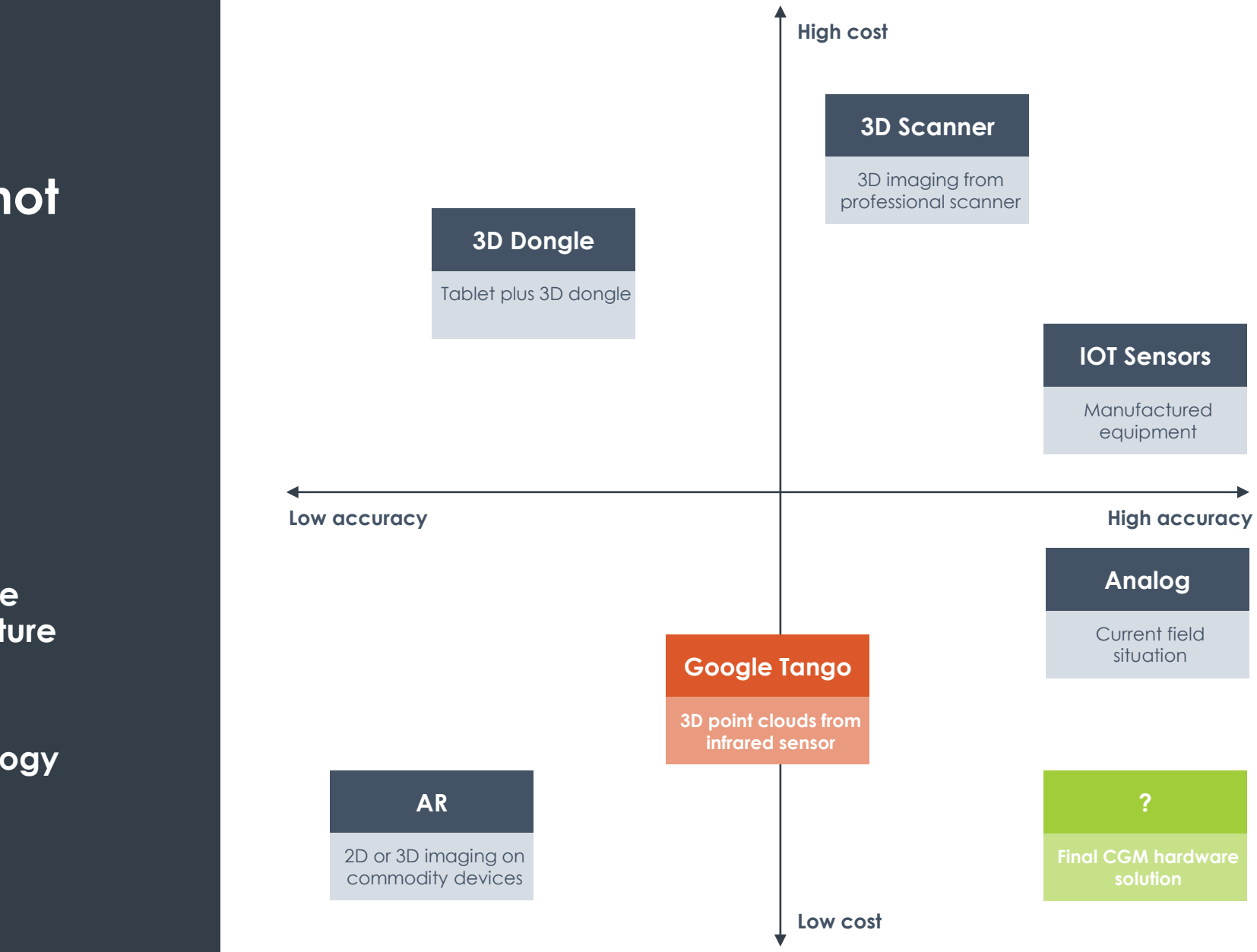

### Model error should decrease as a function of the amount of input



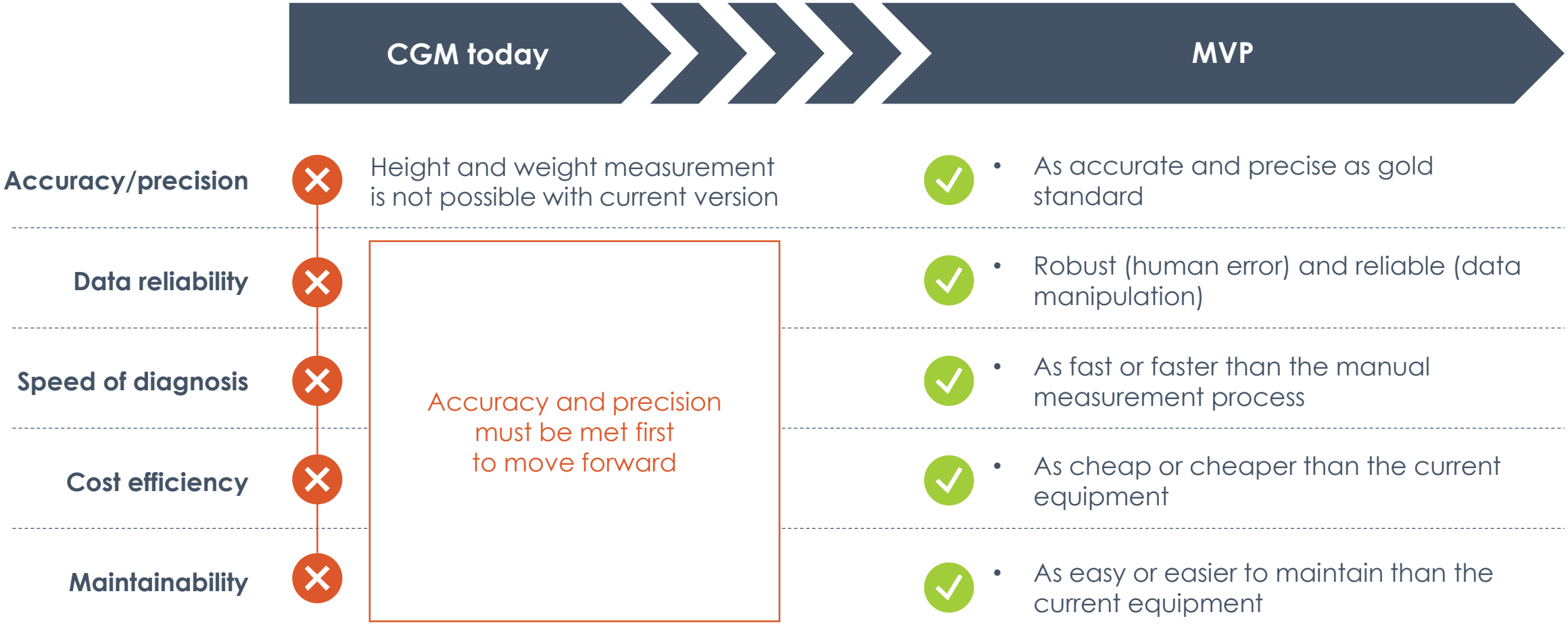
## Hardware

# Selected hardware is not future proof

1. Current hardware has been discontinued
2. Data collected today has to be compatible with alternative future solutions
3. Thus far no alternative technology identified



# Today, the CGM is not fulfilling any of the required key dimensions



# ….the realization of massive leaps

## Dimensions

| | | | | | |
|---|---|---|---|---|---|
| **Accuracy/ Precision*** | Height: +/- 0.6 cm<br>Weight: +/- 0.1 kg | Height: +/- 5 cm<br>Weight: N/A | Height: +/- 2 cm<br>Weight: +/- 5 kg | Height: +/- 1 cm<br>**Weight: +/- 2 kg** | Height: +/- 0.6 cm<br>**Weight: +/- 0.1 kg** |
| **Data reliability** | 40-50% | Not used under real conditions | Not used under real conditions | Not used under real conditions | Approx. 90% |
| **Speed of diagnosis** | 6 min | N/A | **< 6 min** | **< 3 min** | < 2 min |
| **Cost efficiency** | €~ 1,30 per scan | N/A | ~€ 1,40 per scan | ~€ 1,20 per scan | ~€ 1,10 per scan |
| **Maintainability** | Specific measuring instruments | Specific device | **Specific device** | **Commodity device** | Commodity device |

Outperform research

Shift in scanning process

Change of tech stack



*Accuracy numbers are up for discussion

## Conclusion

# CGM is at a junction: there are great challenges that need to be overcome, but the potential for creating impact is huge.