
„Experience with next generation hand disinfection monitoring approach in Germany (IoHT) ”

Session

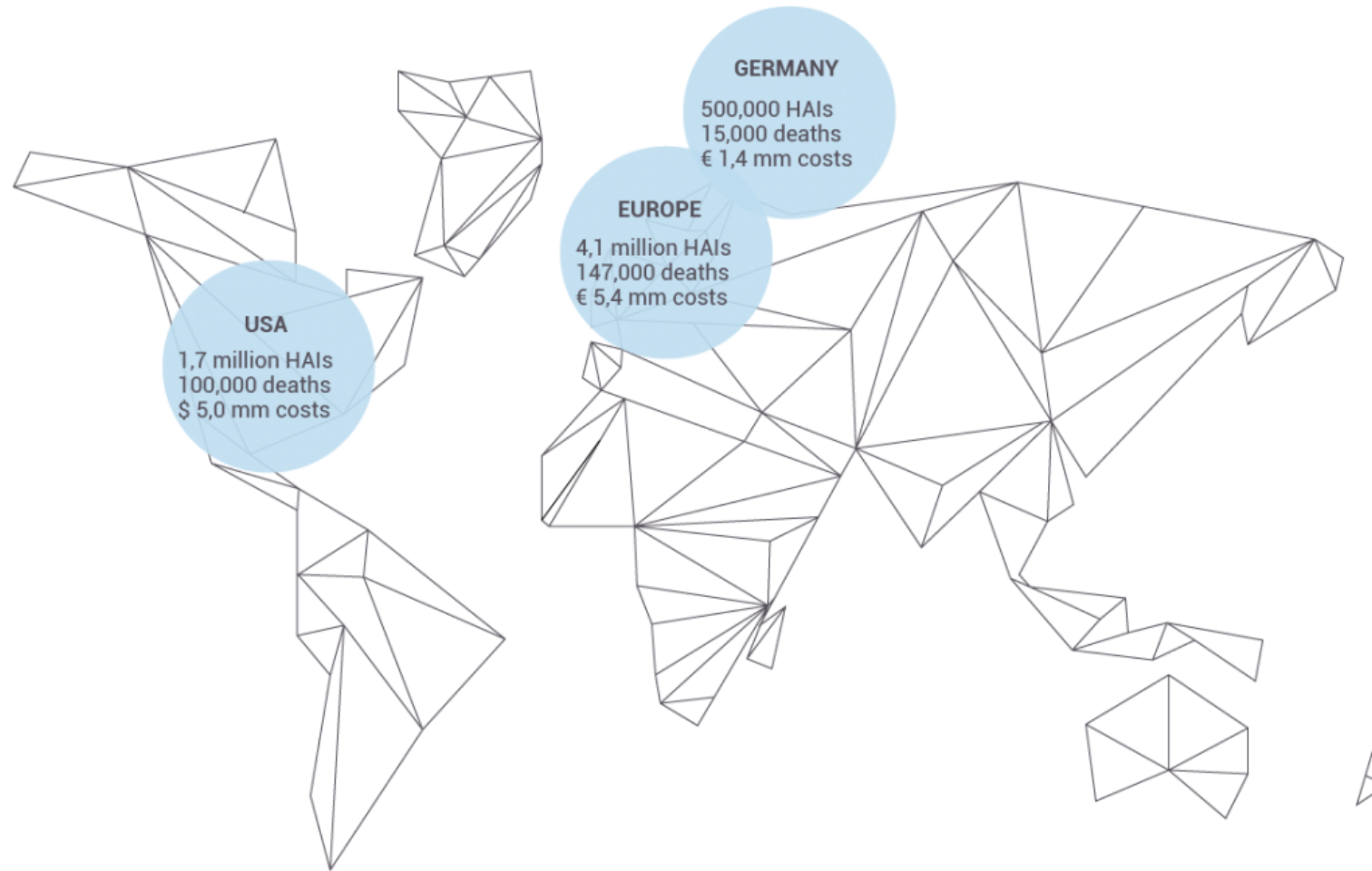
“Epidemiologically significant microorganisms - preventive and repressive anti-epidemic measures: disinfection & sterilization in healthcare facilities and hospital disinfection plans (directives and rules)“

Dr. Ehsan Khaljani, FEBU, MBA

Surgeon/ Professor for Healthcare Management / Managing Director of HygNova
16.04.2019, Brno/ Czech Republic



HYGIENE IS A GLOBAL CHALLENGE!



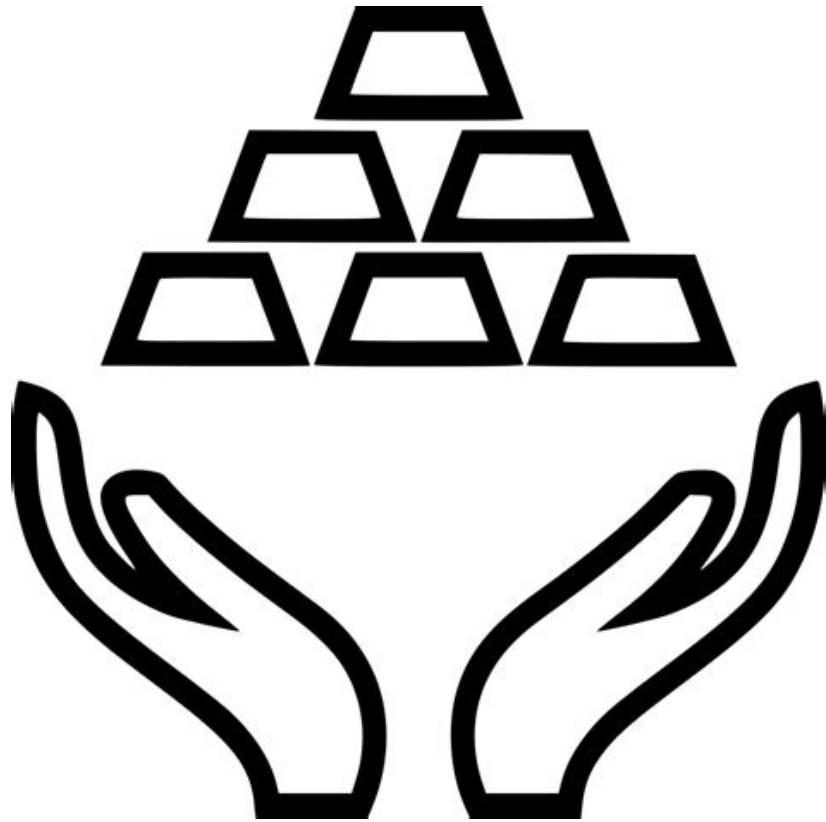
HAIs : Healthcare-associated infections

Source:
Deutsche Gesellschaft für Krankenhaushygiene
Analysis of position paper
Popp et al., März 2016

Source:
World Health Organisation
WHO Guidelines on Hand Hygiene in Healthcare
WHO, 2009

GOLD STANDARD IN HAND HYGIENE MONITORING

Direct observation by hygiene experts



Challenges

- Observer Bias
- Not permanently
- No reproducible data
- No real-time data
- Costly

STATE OF THE ART

Wearable Devices To Monitor Hand Hygiene



Various technical approaches exist to measure hand hygiene.

All approaches are based on **wearable devices.**

BIASES OF WEARABLES



USER-BIAS

Staff doesn't use wearable devices as required!

USER-BIAS



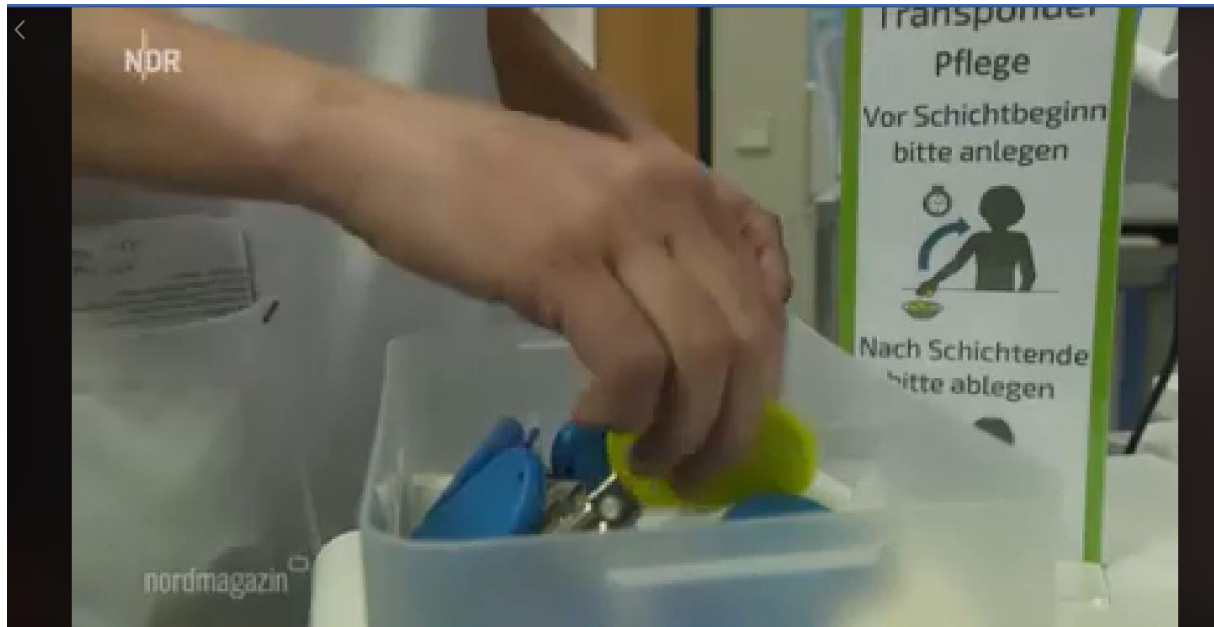
Less than 40%
of staff wears wearables.

- No valid data
- Personalization problems
- GDPR inconsistency

BIASES OF WEARABLES

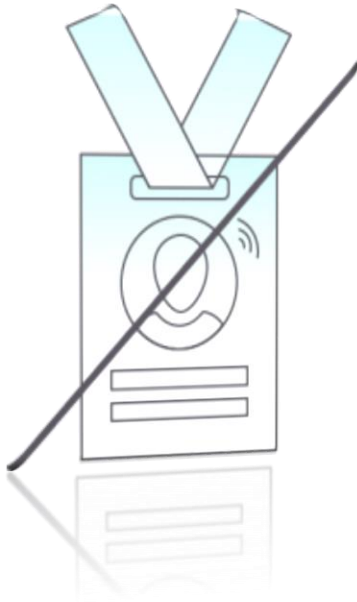
Hygienic vulnerabilities

Transmission of antimicrobial resistant germs via wearables in charging points.



Source: NDR - nordmagazin

NEXT GENERATION APPROACHES



Solutions without
wearable devices

- Reproducible data
- GDPR conformity

NEXT GENERATION APPROACHES – OpHardt OHMS



New, smart dispensers

- Sending information via WIFI
- Data gathered in dashboards

NEXT GENERATION APPROACHES – OpHardt OHMS

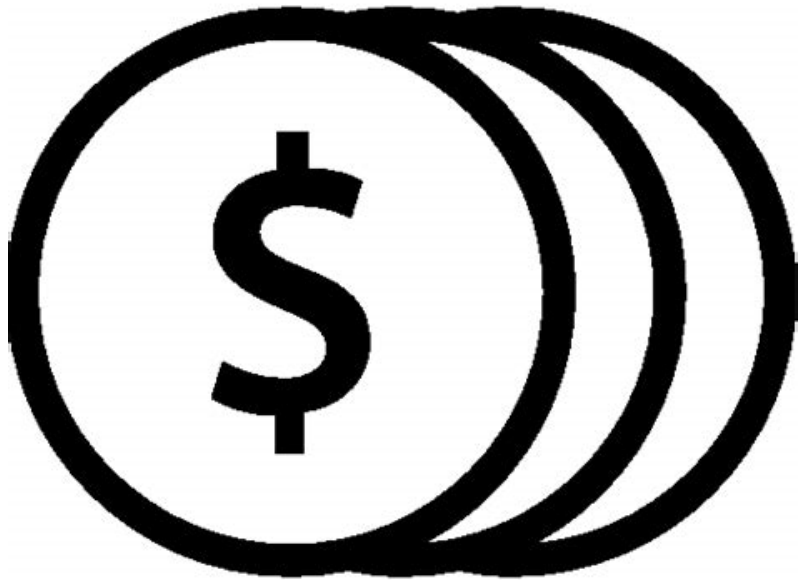


Value

- Increase in
hand hygiene compliance

CHALLENGES

OpHardt OHMS



Price

- Need for new dispensers (>200 € per dispenser)
 - Installation costs

Requirements for next generation hygiene monitoring solutions



Increase in
hand disinfection rate
via Hawthorne effect



Anonymous data analysis
in the 5 WHO moments
for hand hygiene



No use of
wearable devices due
to lack in compliance

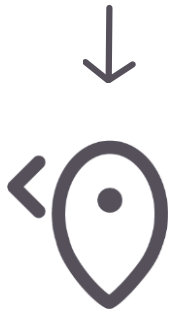
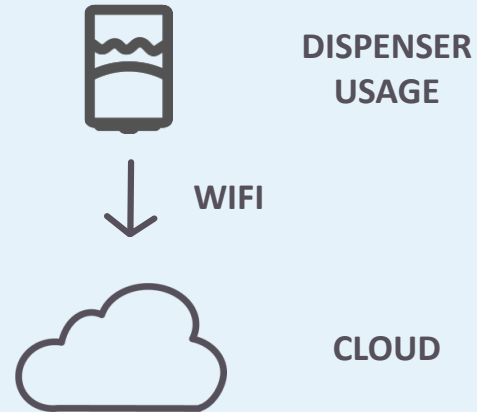


HYGNOVA ADVANCE
IoT-MOTION DETECTION
FOR HAND HYGIENE

HYGNOVA ADVANCE TECHNOLOGY

Step 1

Upgrade of
existing dispensers
with smart chips



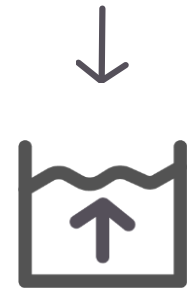
LOCALISATION



COUNT OF USAGE



FLUID USAGE PER TIME

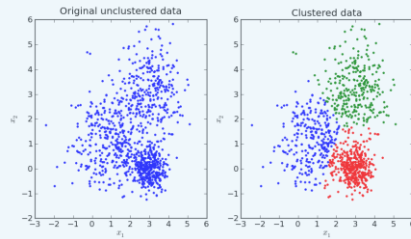


FILLING LEVEL

HYGNOVA ADVANCE TECHNOLOGY

STEP 2

DATA ANALYSIS
VIA
ARTIFICIAL INTELLIGENCE



CLOUD



Moment for disinfection?



MOTION DETECTION SENSOR
CHECKS MOVEMENTS IN THE ROOM

HYGNOVA ADVANCE TECHNOLOGY

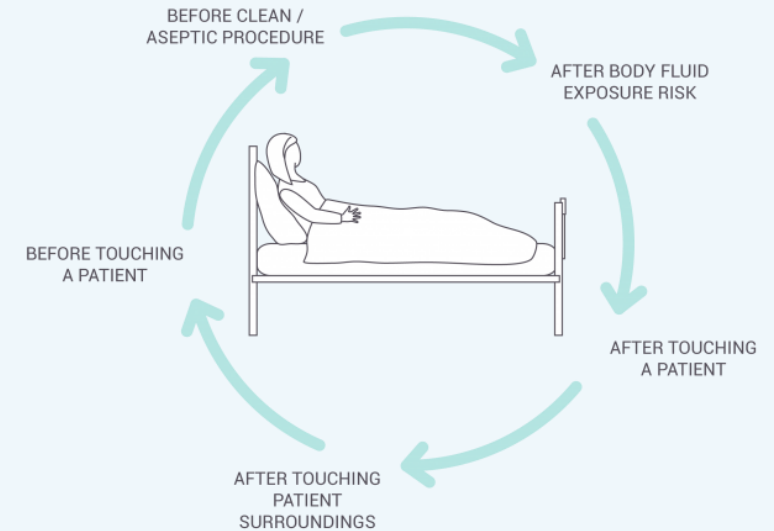
Step 2

Data of > 60 surveillance studies
i.e. Allegranzi et al.,
Journal of Hospital Infections, 2013

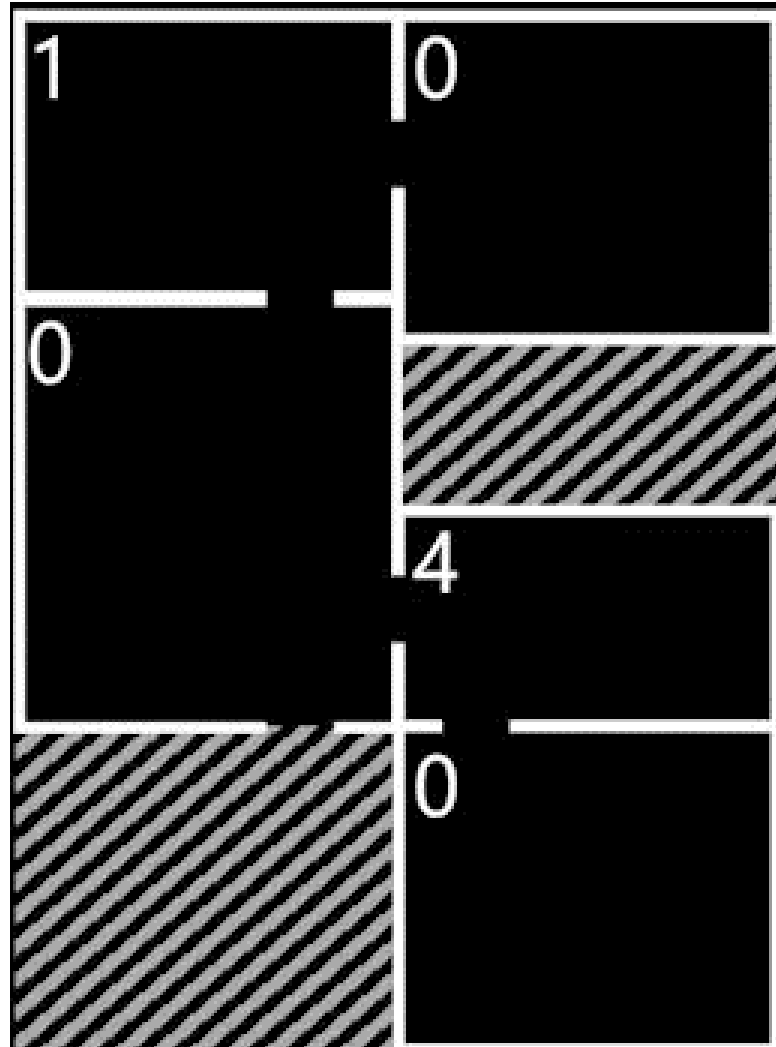
Moment for disinfection?

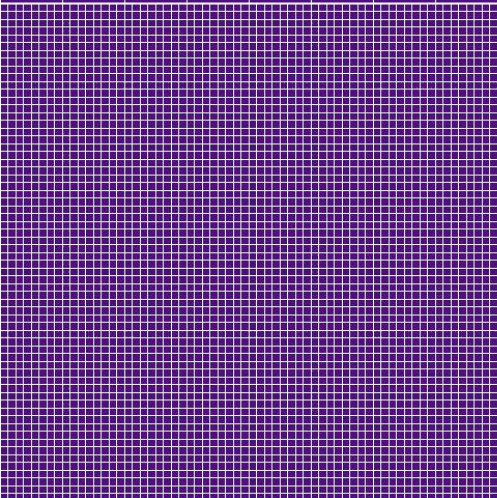


HygNova pattern recognition algorithm



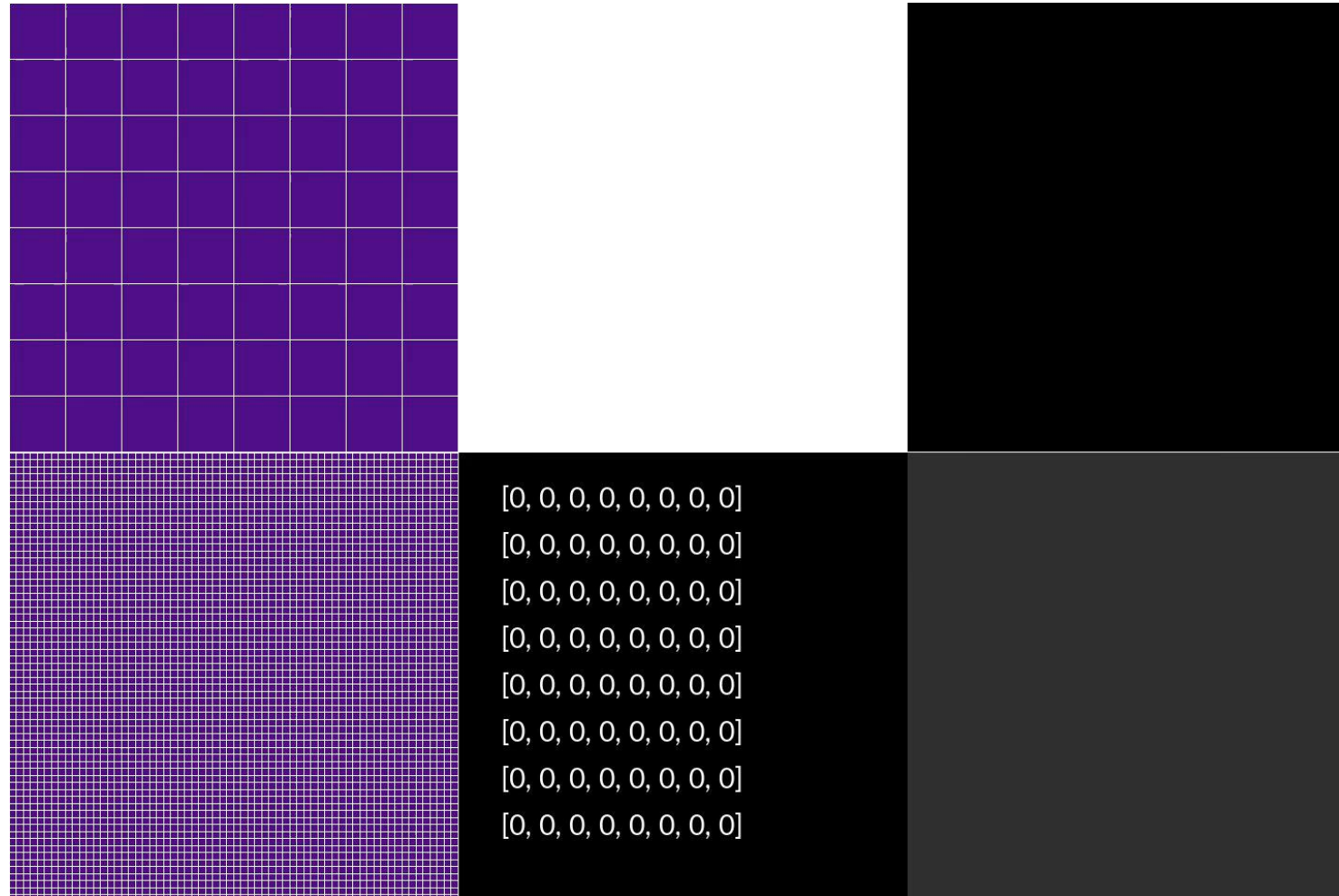
ANONYMOUS TRACKING OF MOVEMENT PATTERNS





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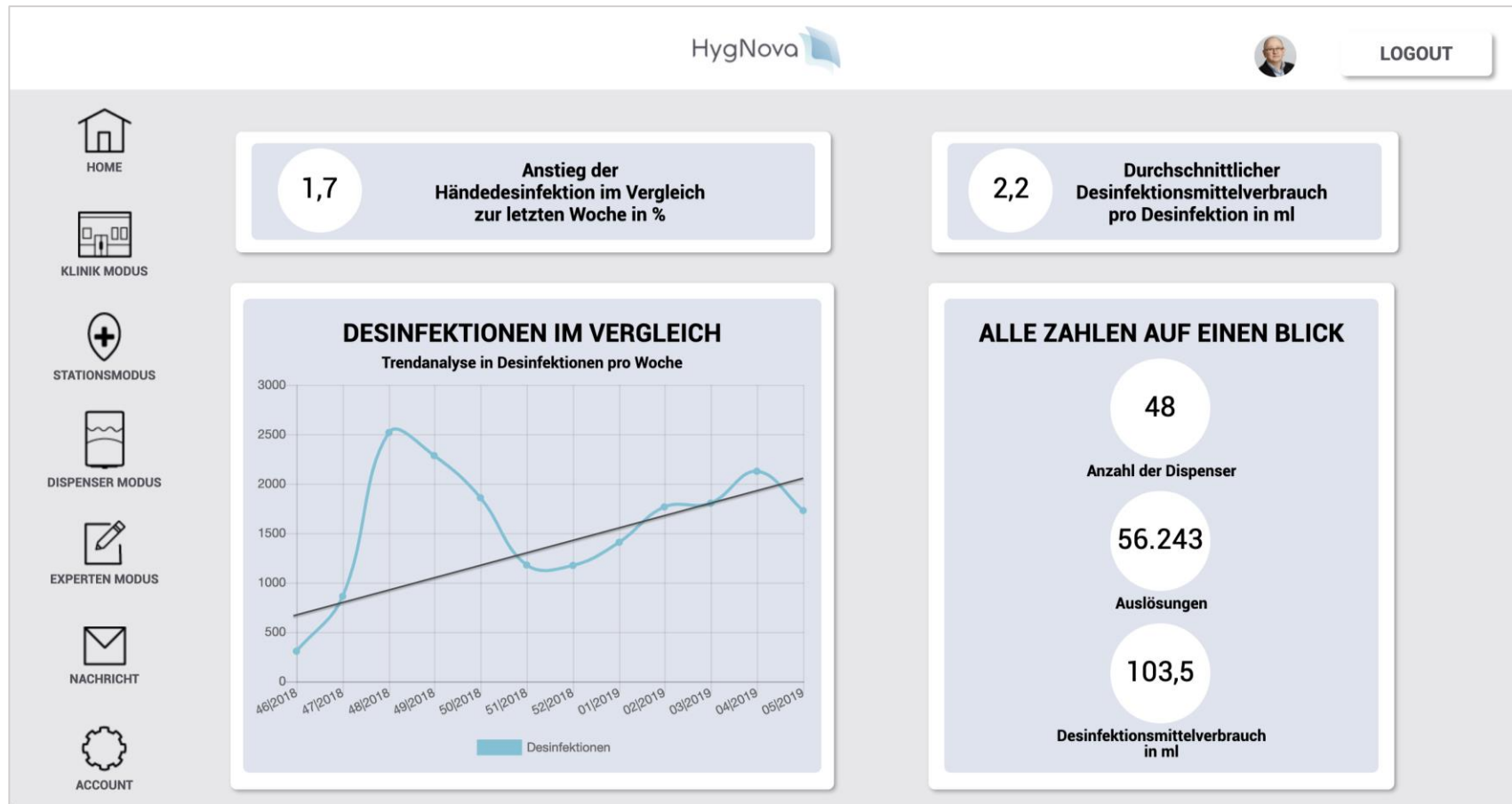
ANONYMOUS TRACKING OF MOVEMENT PATTERNS



VALUE

Increase of hand disinfections > 36% via Hawthorne effect
(3 months of surveillance)

Hospital in Berlin/Brandenburg region | Source: HygNova GmbH



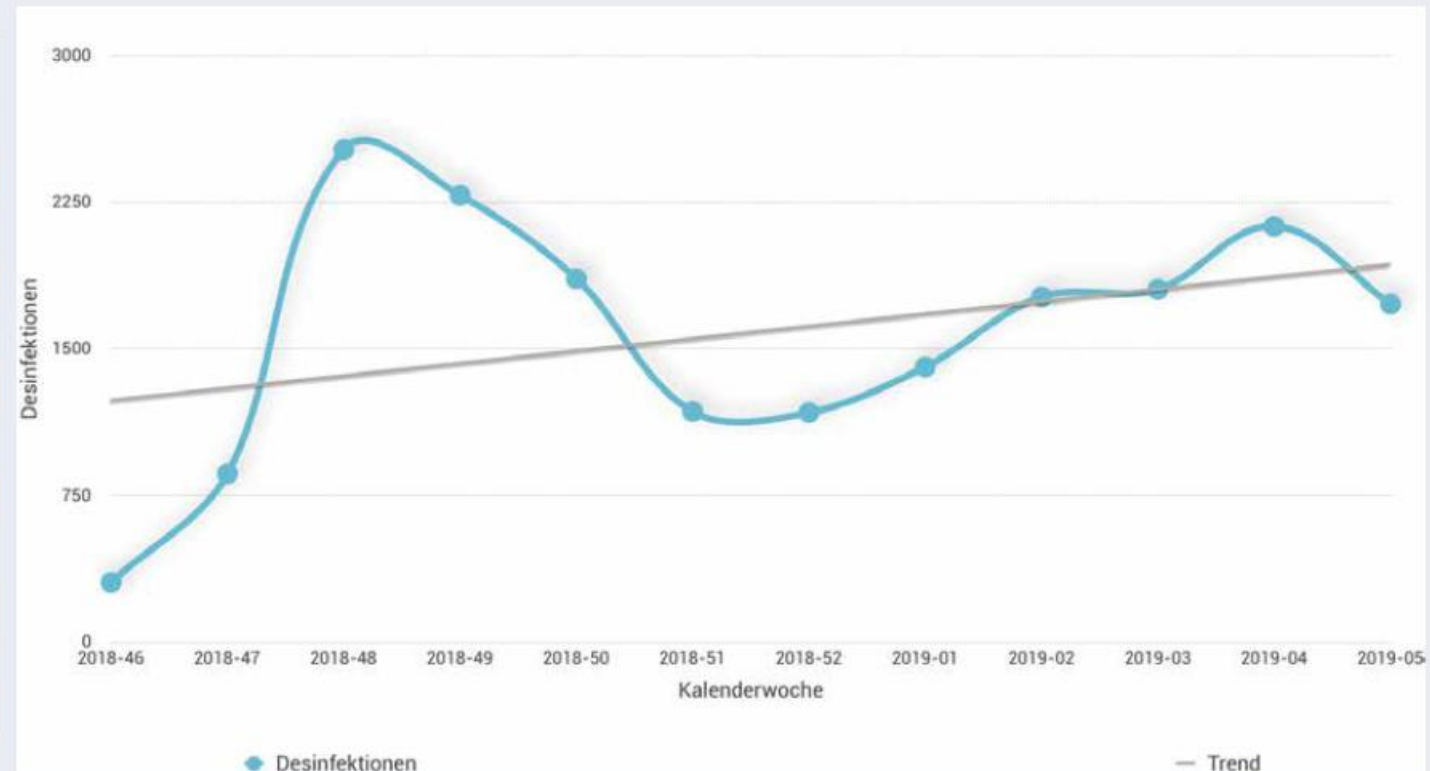
VALUE

Increase of hand disinfections > 36% via Hawthorne effect
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TREND ANALYSIS FOR DISINFECTIONS

Kalenderwoche	Desinfektionen
2018-46	307
2018-47	862
2018-48	2518
2018-49	2285
2018-50	1859
2018-51	1179
2018-52	1174
2019-01	1408
2019-02	1766
2019-03	1804
2019-04	2126
2019-05	1729



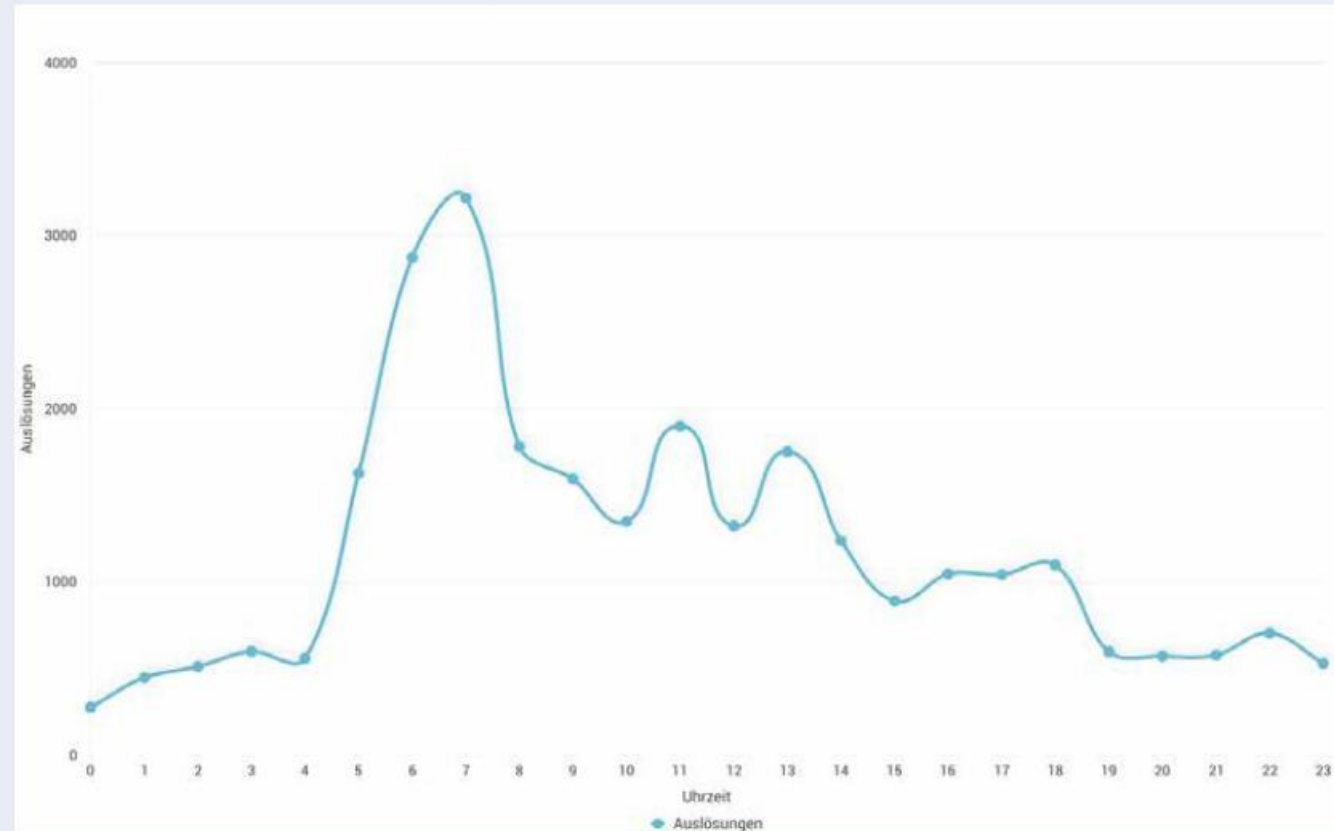
VALUE

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TIME PATTERN FOR DISINFECTIONS

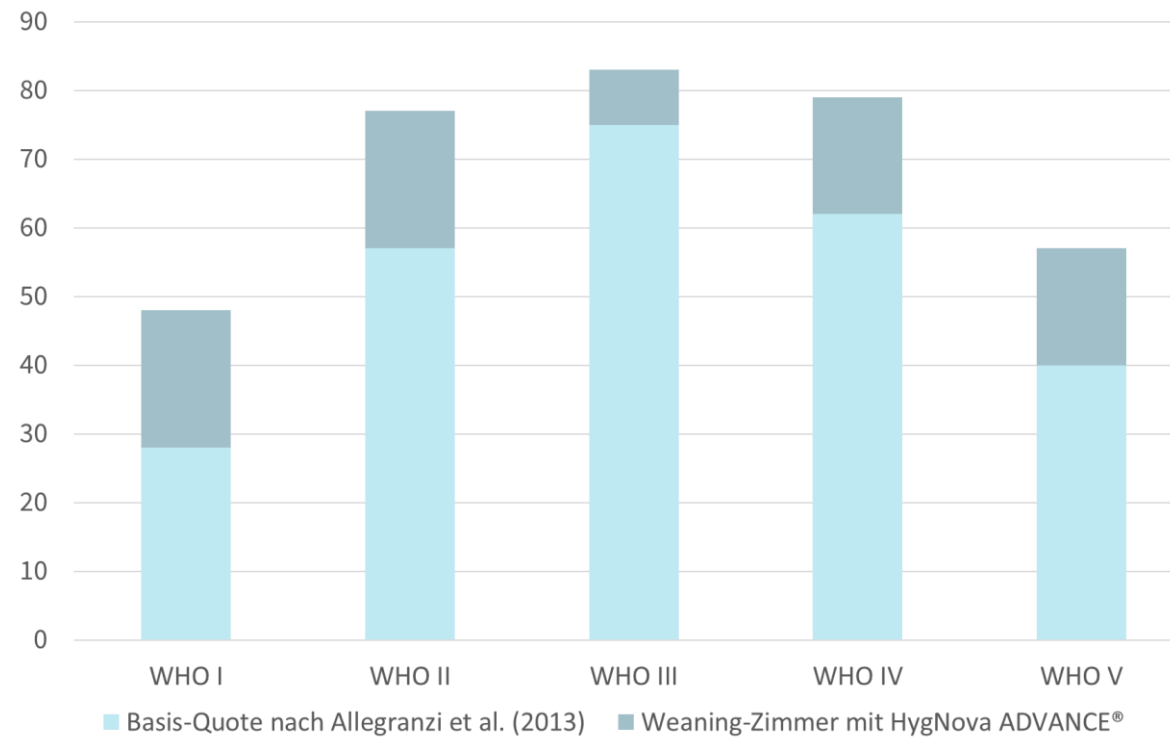
Uhrzeit	Auslösungen
0	276
1	447
2	512
3	599
4	559
5	1628
6	2873
7	3216
8	1781
9	1594
10	1349
11	1899
12	1323
13	1751
14	1238
15	890
16	1046
17	1042
18	1097
19	597
20	572
21	578
22	705
23	530



VALUE

Approximation of 5 WHO moments for hand hygiene (3 months of surveillance)

Hospital in Berlin/Brandenburg region | Source: HygNova GmbH



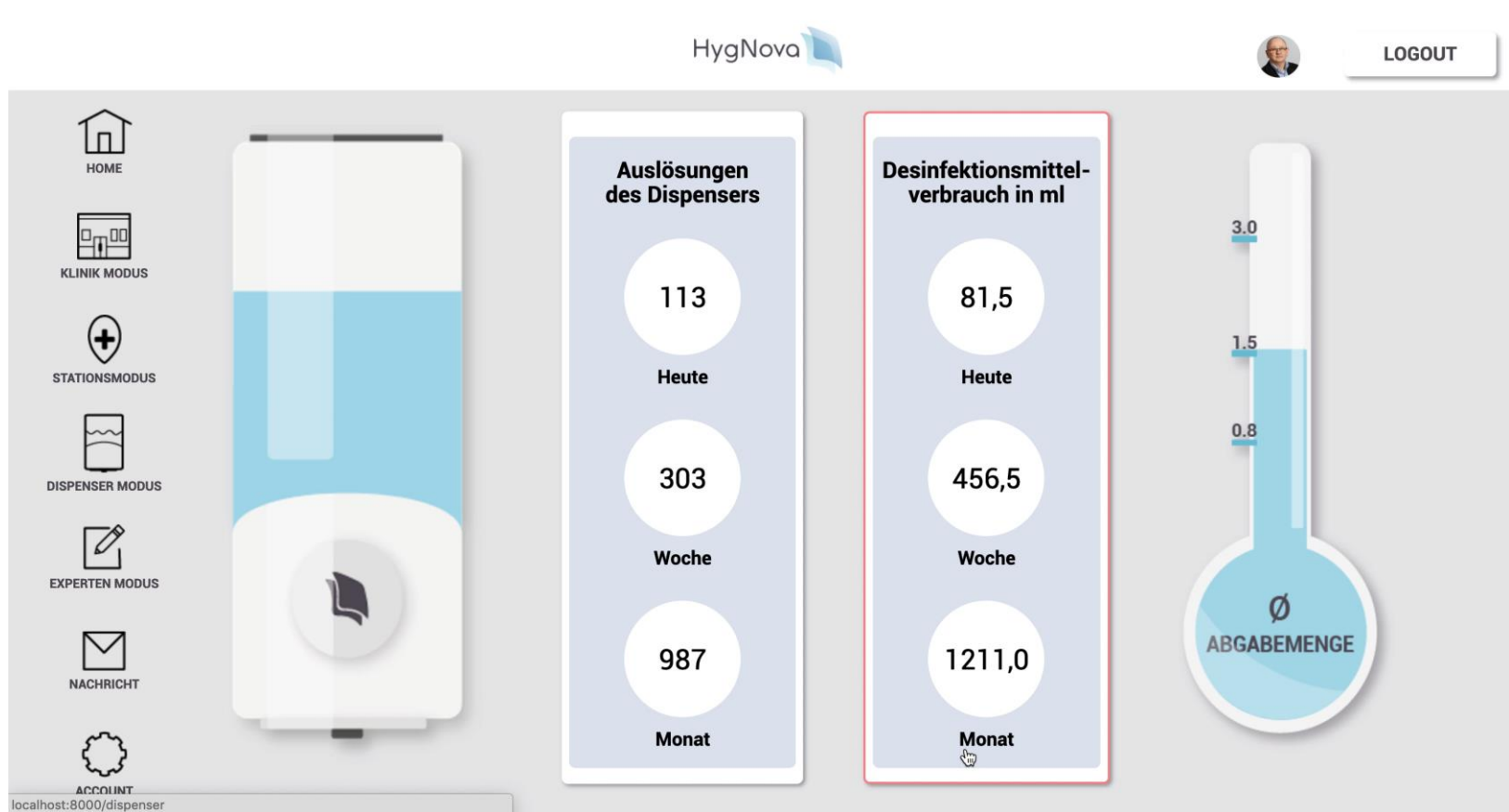
Approximation of 5 WHO moments in weaning clinic for 3 months

Berlin/Brandenburg, 2017, Source: HygNova

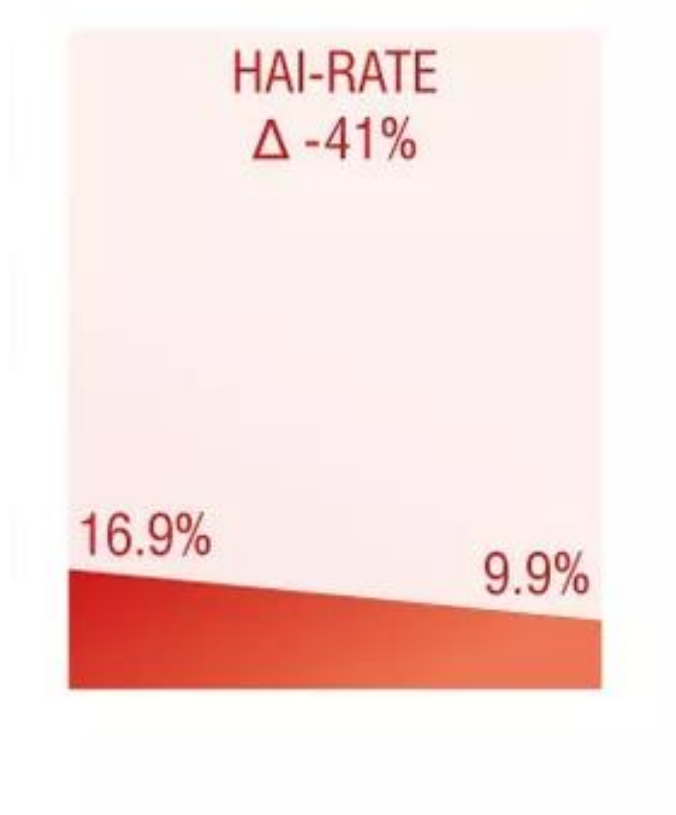
VALUE

Live data in user friendly data dashboards

Hospital in Berlin/Brandenburg region | Source: HygNova GmbH



VALUE



Less hospital infections

An increase in hand disinfections about 18% leads to 41% less healthcare acquired infections

Source: PITTET et al, Lancet, 2000

BENEFITS IN DETAIL

1. DIRECT BENEFIT

Immediate improvement in
hygienic behavior of staff



Instant savings
by less hospital infections

2. LONG-TERM BENEFITS

Continuous improvement of processes
with valid data



Sustainable savings
due to lowered costs for personnel

EFFECTS



Ease-of-use
Smart patients room in
less than 2 minutes

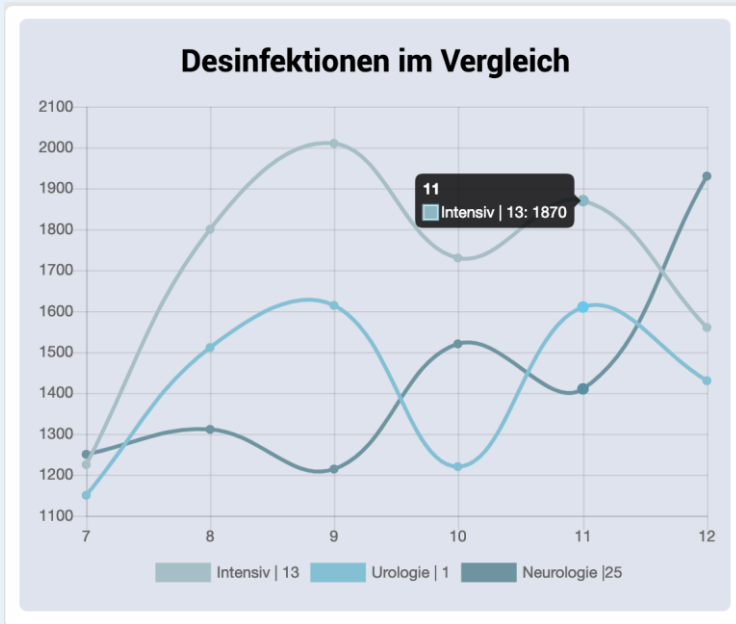


Cost-effective solution with
high potential for relevant
savings on the long-term



Amortization is reached
after 1-2 months due to
lowerd costs

PENDING



LONG-TERM, MULTICENTRAL
COST-EFFECTIVENESS ANALYSIS

Study protocol in development with University Hospital Heidelberg, Prof. Frank

UPCOMING, RUNNING & COMPLETED INSTALLATIONS (SELECTION)



This project received funding by:



Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages



Quote

“The time will come soon when our colleagues and students place stringent demands on us and our actions, in which general comments about the success of this or that operation will be not enough anymore, but **keeps any doctor for a charlatan** who will be not able to **express his experiences in numbers**”
in „Chirurgische Erfahrungen“ (Zürich 1860-1867)

Theodor Billroth (1829 –1894) the surgeon, who is generally regarded as the founding father of modern abdominal surgery.

