Schweizerische Gesellschaft für Infektiologie
Swiss Society for Infectious Diseases
Société Suisse d'Infectiologie

SGM·SSM

swissnoso National Center for Infection Control

SwissASP networking call: antimicrobial consumption monitoring - what's new? Wed, 29 Jun 2022, 9-10h a.m.

Summary

Overall aim

Provide an update on the status and ongoing developments of antimicrobial consumption (AMC) monitoring and an opportunity for user questions and suggestions for local stewardship leads in Swiss acute care hospitals.

Agenda

Time	Topic	Presenter
9.00	Welcome and introduction	PD Dr Julia Bielicki, UKBB Project lead Antimicrobial Stewardship
9.02	Status and continuous operation of AMC monitoring	Dr. Catherine Plüss-Suard, ANRESIS
9.08	Access to monthly AMC monitoring through an interactive dashboard; Impact of the COVID-19 pandemic on inpatient antibiotic consumption in CH	Dr. Olivier Friedli, ANRESIS
9.22	Technical feasibility of adding patient-level data (dashboard)	Ms. Luzia Renggli, ANRESIS
9.30	Challenges and possibilities with monthly AMC reporting	Ms. Delia Bornand and Prof. Sarah Tschudin Sutter, USB Basel
9.40	Interactive Q&A session	Dr. Catherine Plüss-Suard and Prof. Andreas Kronenberg, ANRESIS
10.00	Meeting closes	Swissnoso/ANRESIS

Target group/participants

More than 50 individuals participated in the call, primarily senior physicians and pharmacists involved in AM stewardship and infection control in Swiss hospitals.

Summary of the presentations (see slide sets attached below)

JB welcomes the participants and reiterates the **purpose of the call** to provide an update on AMC monitoring to support local stewardship activities in Swiss acute care hospitals.

CP provides an overview of AMC's status and continuous operation as part of the FOPH mandate for monitoring bacterial resistance and antibiotic consumption. ANRESIS provides aggregated, anonymized AMC data based on inpatient consumption data provided by hospital pharmacies. In addition to annual feedback and benchmarking reports, an interactive dashboard has been developed to allow users to access data.

OF demonstrates the ANRESIS **interactive AMC monitoring dashboard** to the audience and presents the advantages for hospitals providing **monthly consumption data** (in addition to data on a quarterly or annual basis): a more precise/granular analysis of local AMC, reviewing any potential effects of interventions or detecting seasonal trends or possible correlations with antibiotic resistance. The dashboard view will allow a review of AMC stratified by specific units (DDD per 100 bed days or 100 admissions), e.g., antibiotic category/AWaRe group/spectrum/administration route. For annual data, the dashboard provides a benchmarking option. In addition, data can be exported to Excel for further local analysis.

OF presents ANRESIS collaborative research on the **impact of the COVID-19 pandemic on inpatient antibiotic consumption in Switzerland** (Chur and Thurgau hospitals and the Inselspital Bern; published in *Antibiotics* in 2022). A review of national antimicrobial use involving data from 56 acute care hospitals (and monthly data from 4 acute care hospitals) demonstrated increased antibiotic consumption, especially during the first wave and the beginning of the second wave, most pronounced in intensive care units/for broad-spectrum antibiotics. Their work demonstrates the use of monthly data, allowing more precise surveillance of antibiotic consumption for individual or multiple hospitals.

LR presents the ANRESIS pilot project on the technical feasibility of converting electronic patient records to provide **patient-level data for AMC monitoring**. Thirty-seven different quality indicators (QIs) on the appropriateness of antibiotic therapy were retrieved from literature and applied to health records (25'338 hospitalizations of patients receiving ≥1dose of an antibiotic over two years [Oct 2019-Sep 2021] at the Lucerne Cantonal hospital). QIs included microbiology samples taken pre-antimicrobial therapy, surgical prophylaxis duration <24h, and stop and re-assessment therapy orders according to inflammatory markers and culture results. In 42% of those hospitalizations, an antibiotic indication was documented (and in 12 %, a *meaningful* indication). There were data processing issues in 11 % (4/37) of QIs and insufficient categorized information in metadata. In addition, the work demonstrated the need to improve data structure within electronic medical records for a better validity of patient-level data, the need to define format specifications and legal requirements, and choosing the most relevant QIs for continued monitoring.

DB and STS gave an overview of **AMC at the university hospital in Basel**. SAP data are exported to Excel, and consumption data are connected to pharmacodes (a relatively straightforward process, same as yearly data collection). AMC data are separate for the whole hospital vs intensive care. The ANRESIS feedback loop and critical review of data discrepancies (e.g., compared to USB internal patient-level data) are important. Potential reasons may include changes in delivery units (antibiotic delivery vs pharmacode units, e.g., different numbers of pieces or mg vs pcs). Data analysis allows monitoring and surveillance, including trends and benchmarking (for yearly data).

Further multidisciplinary ASP activities at the hospital pharmacy at USB include assisting with logistics and drug selection, patient and therapy-oriented solutions (IV/oral switch, TDM, dosage in limited renal function and OPAT, and review after 48-72h and collaboration in guidelines). In addition, a dashboard is used with ANRESIS-specific data and options for more specific data analysis (e.g., Carbapenems) by ward. Further, an app solution for drug safety and patient monitoring via an electronic support system is being planned.

Summary of the Q&A session (see full details below)

CP and AK discuss the results of a **Zoom poll** (5 questions completed by 30 participants): Around half of the participants reported using the ANRESIS report for discussions with ID specialists or pharmacists or the antibiotic working group. More than half (53%) thought there was a benefit from monthly AMC data. Nearly two-thirds (63%) felt their hospital was able to provide monthly data to ANRESIS. Already 17% thought their hospital was able to provide patient-level data from electronic medical record systems to ANRESIS, while a further 30% thought this would be possible in the next 2-3 years. Ninety per cent of participants were interested in receiving dashboard plus PDF-based ANRESIS reports on AMC (rather than dashboard or PDF only).

Key take-away **points from the questions, comments and answers** in the remaining session included

- the need for expanding monthly AMC reporting and sharing of more detailed data (to allow a more granular view in the dashboard)

- the dashboard is expected to become available to users the later in 2022 (technical issues still need to be resolved)

- concerning the patient-level data: whereas the pilot study included a large range (37) of QIs, it will be essential to explore the minimal dataset providing the most useful information and using an appropriate format (e.g., similar to resistance data). Swissnoso antimicrobial stewardship group should take the lead in this collaborative work on selecting the most valuable and adequate parameters

The moderators closed the call, and JB informed the participants that attendance certificates and presentation slides would be made available, along with information on the subsequent SwissASP network activities.

Annex

Presentation slides

Status and continuous operation of AMC

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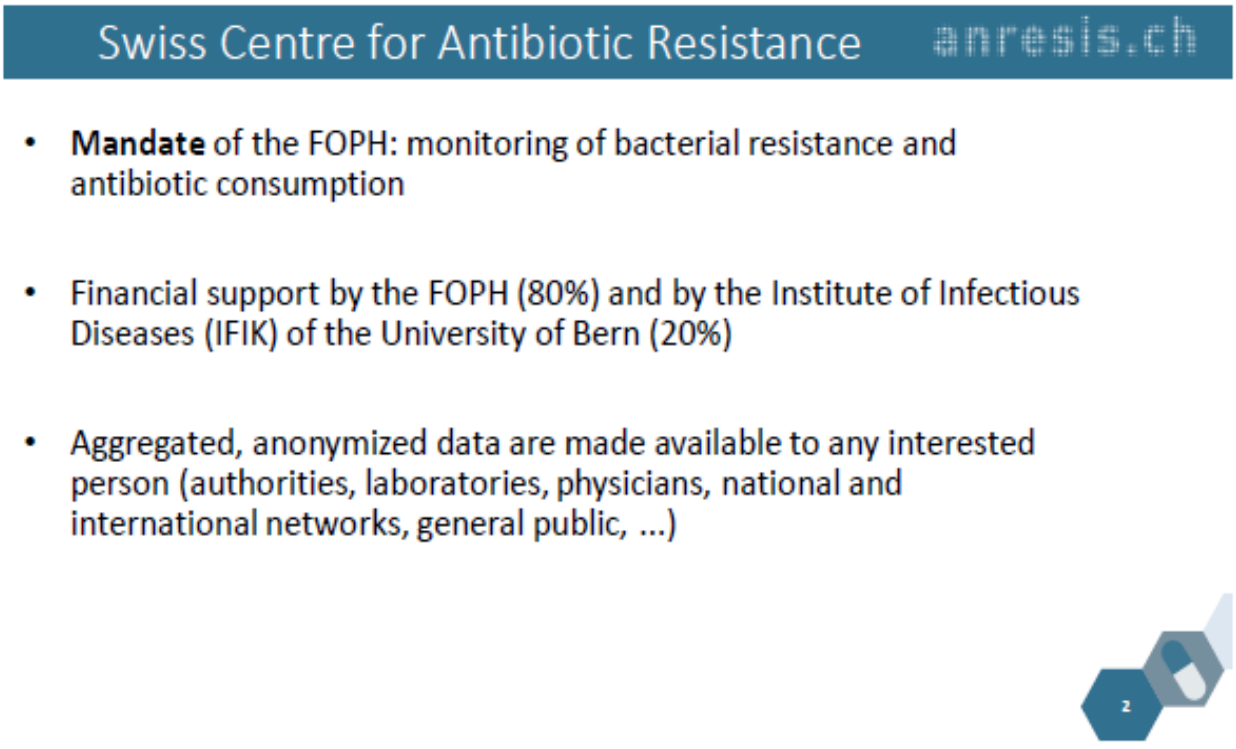

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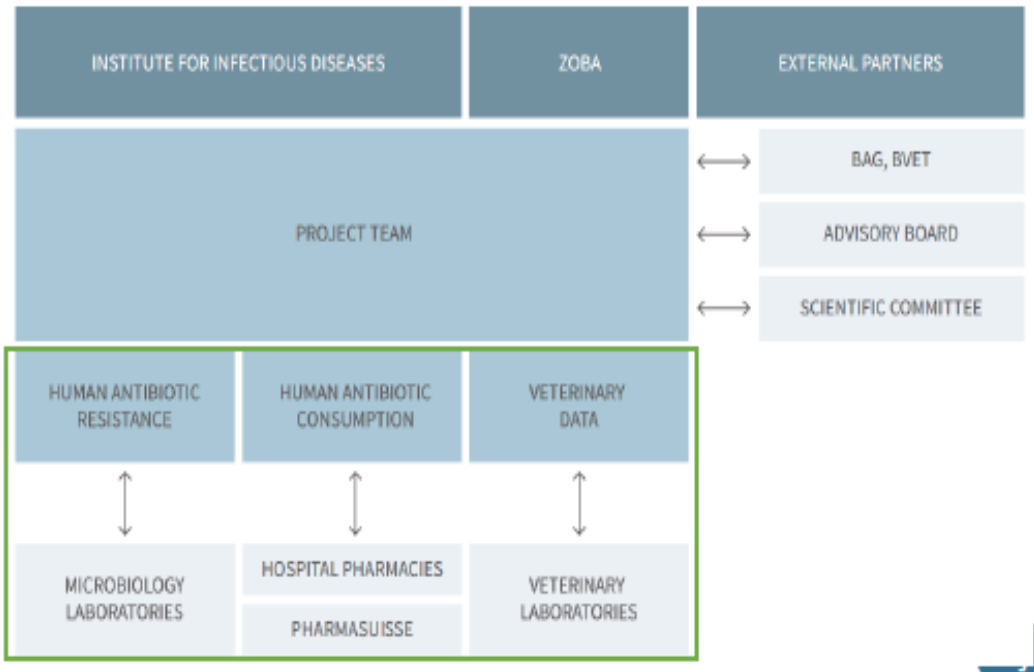
Swiss Centre for Antibiotic Resistance anresis.ch



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Swiss Centre for Antibiotic Resistance anresis.ch

Catalog of services

- Annual feedback and benckmarking reports
- Access to an interactive dashboard (ongoing)

- Monitoring of antimicrobial consumption (Strategy Antibiotic Resistance, StAR)
- Swiss Antibiotic Resistance Report (every 2 years)
- WHO AMC GLASS network
- Research projects

More information available on : www.anresis.ch www.infect.info

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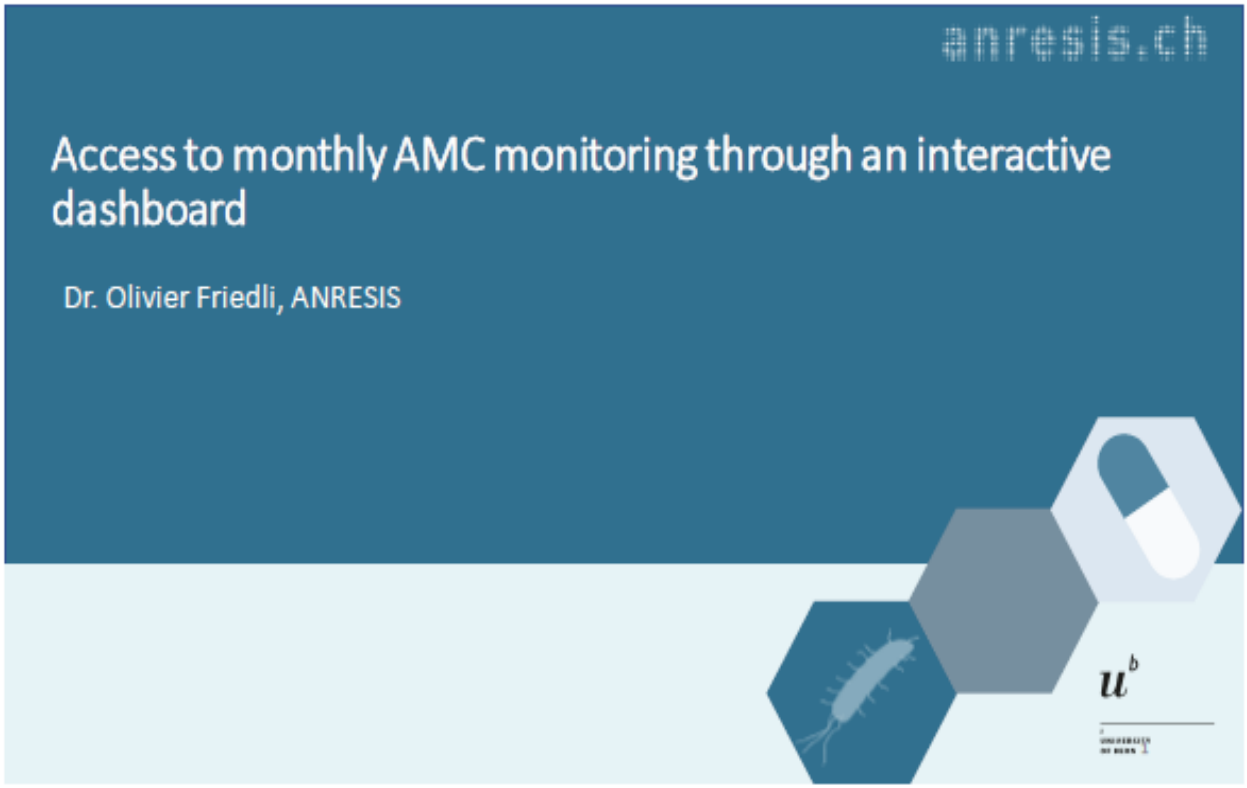
Interactive AMC monitoring dashboard/monthly consumption data



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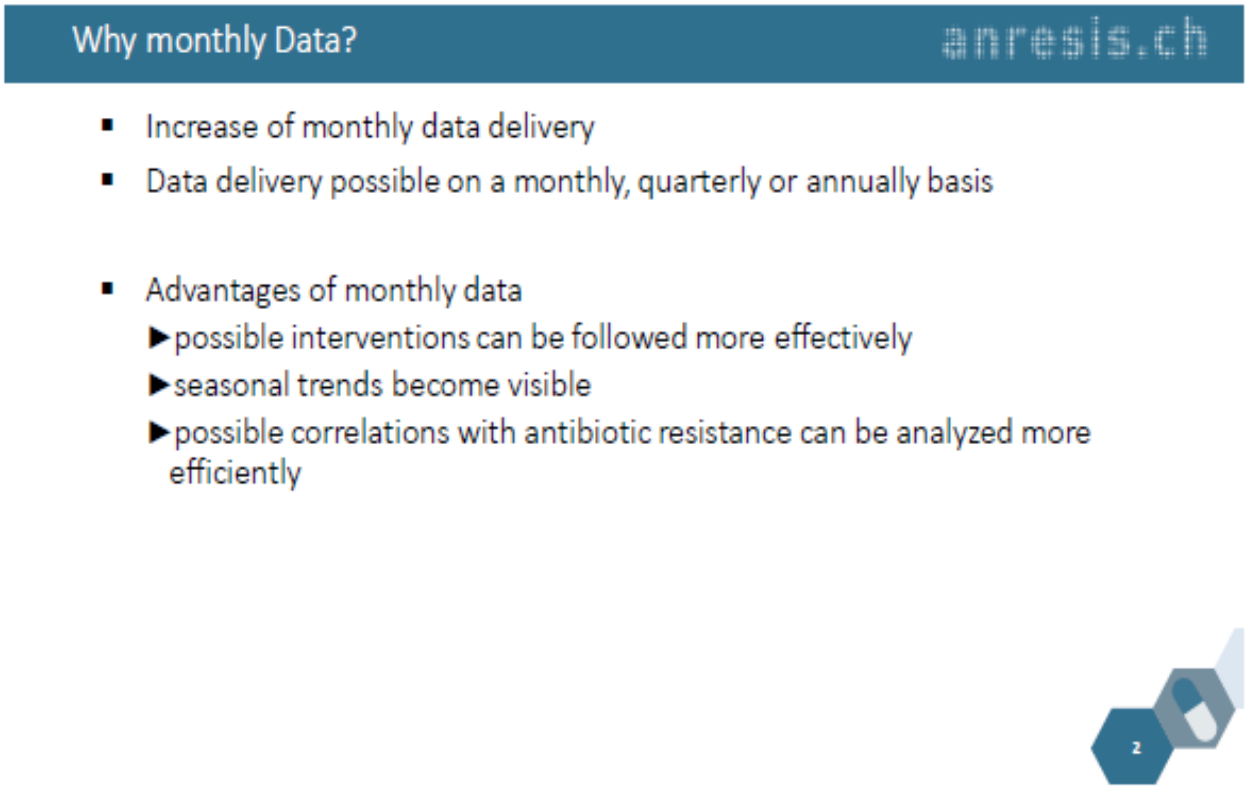

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Impact of the COVID-19 pandemic on inpatient AB consumption in Switzerland

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Impact of the COVID-19 Pandemic on Inpatient Antibiotic Consumption in Switzerland

Antibiotics 2022, *11*(6), 792; https://doi.org/10.3390/antibiotics11060792


antibiotics

MDPI

Article

Impact of the COVID-19 Pandemic on Inpatient Antibiotic Consumption in Switzerland

Olivier Friedli [1,*], Michael Gasser [1], Alexia Cusini [2], Rosamaria Fulchini [3], Danielle Vuichard-Gysin [3], Roswitha Halder Tobler [4], Nanntaja Wassilew [5], Catherine Plüss-Suard [1] and Andreas Kronenberg [1]

3

Background

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- COVID-19 pandemic: enormous burden on health care systems
  - elective procedures being postponed
- Use of antibacterial treatments was common for hospitalized patients (6.9% of COVID-19 patients with bacterial infection, 71% of COVID-19 patients received antibiotics[1])
  - clinical uncertainty
  - lack of effective treatment options for SARS-CoV-2
- Increased antibiotic consumption during the pandemic, particularly of broad-spectrum antibiotics[2,3]
- Aim: Analysing the impact of the COVID-19 pandemic on inpatient antibiotic consumption in Switzerland.

1. Langford, B.J.; Clin. Microbiol. Infect. 2020; Grau, Antibiotics 2021, Abelenda-Alonso, G., Infect. Control Hosp. Epidemiol. 2020

4

Method

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- Two data sources were used:
  - data from the IQVIA™ database, with antimicrobials purchased by the hospital sector
  - data from the ANRESIS sentinel network
    - annual data from 56 acute care hospitals
    - monthly data from 4 acute care hospitals
- Study focus was on total antibiotic and broad-spectrum antibiotic consumption in the entire hospital and in the ICU.
- The entire period was divided into the pre-epidemic period, the 1st wave, the 2nd wave and intermediate periods.
- For monthly data, an interrupted time series analysis (ITS) was used.

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Annual ANRESIS Data – All Antibiotics (J01)

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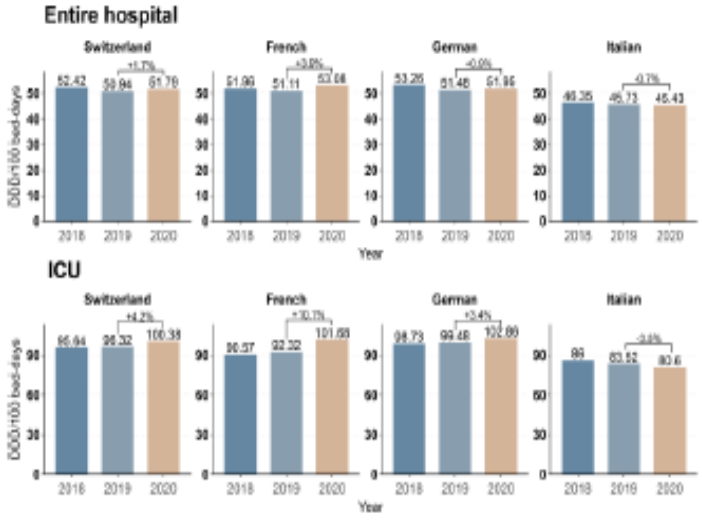

- Overall antibiotic consumption in DDD/100 bed-days remained stable across the entire hospital and was slightly higher in the ICU.

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Annual Anresis Data – Broad-Spectrum Antibiotics

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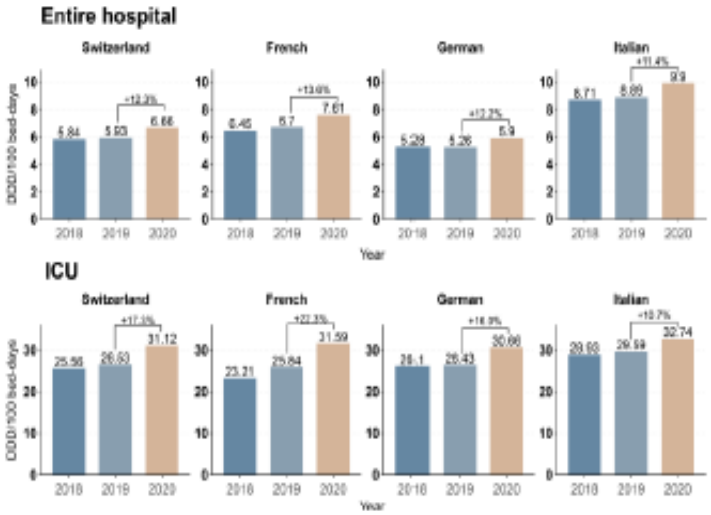

- Broad-spectrum antibiotic consumption in DDD/100 bed-days increased both in the entire hospital and in the ICU.

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Monthly ANRESIS Data – Overall Antibiotics

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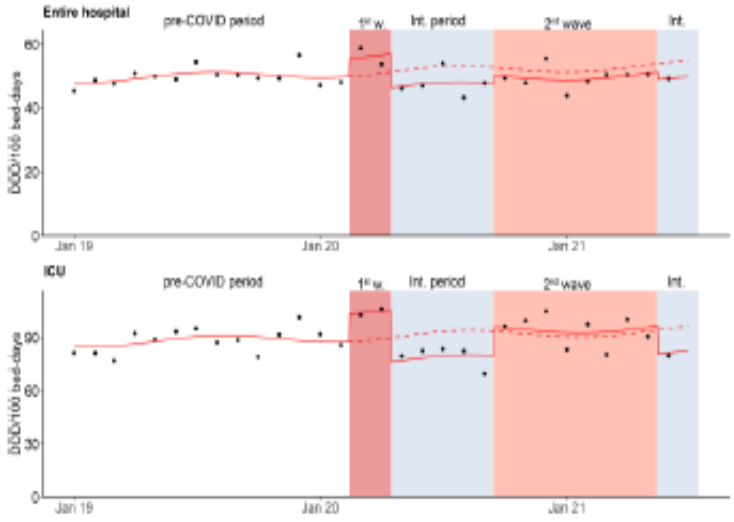

- Consumption in the ICU was significantly higher during the first wave and significantly lower during the intermediate period.

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Monthly ANRESIS Data – Broad-spectrum antibiotics

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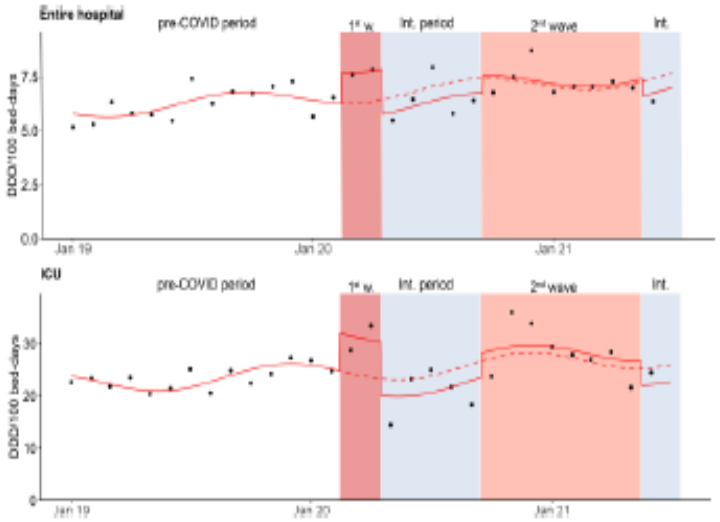

- Consumption of broad-spectrum antibiotics was significantly higher in the entire hospital and in the ICU, while consumption in the other periods was not significantly different from the expected trend.

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Correlation between COVID-19 cases and antibiotic use

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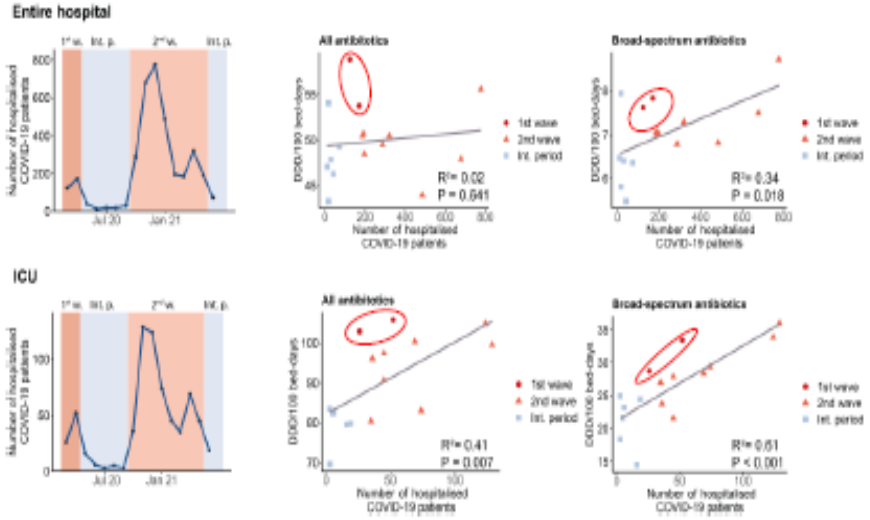

- Consumption was disproportionately high during the first wave.

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Conclusion

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- Antibiotic consumption increased especially during the first wave and at the beginning of the second wave.
- The impact of the COVID-19 pandemic on antibiotic consumption was most pronounced in intensive care units and for broad-spectrum antibiotics.
- The major limitation of the study is the selection bias.
  - ▶ Only 4 hospitals from German-speaking part of Switzerland.
- Monthly data allow a more precise surveillance of antibiotic consumption
- Possibility for evaluating antibiotic consumption for individual or multiple hospitals

11

11

Annual IQVIA Data

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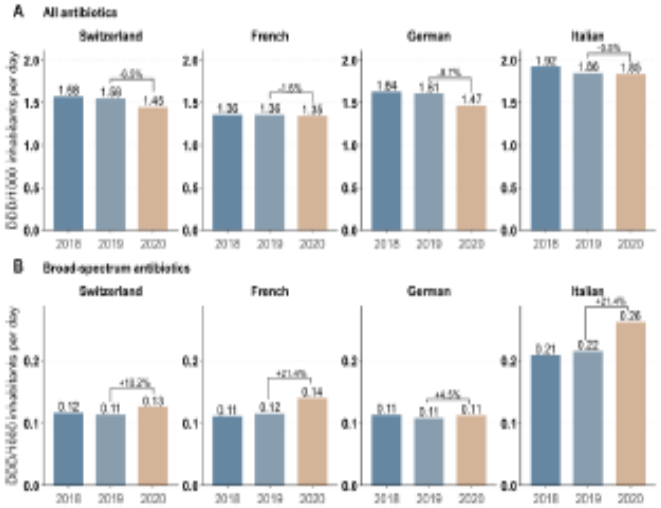

- ▶ The total consumption in DDD/1000 inhabitants per day decreased, while the consumption of broad-spectrum antibiotics increased.

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ITS for monthly IQVIA Sales Data

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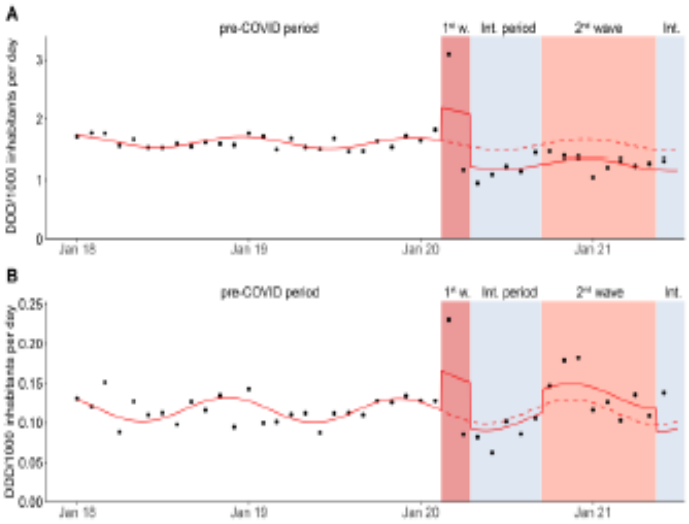

- Overall antibiotic consumption was increased during the first wave and lower in the following periods, while consumption of broad-spectrum antibiotics was also increased in the first month of the second wave.

13

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Patient-level data for AMC monitoring

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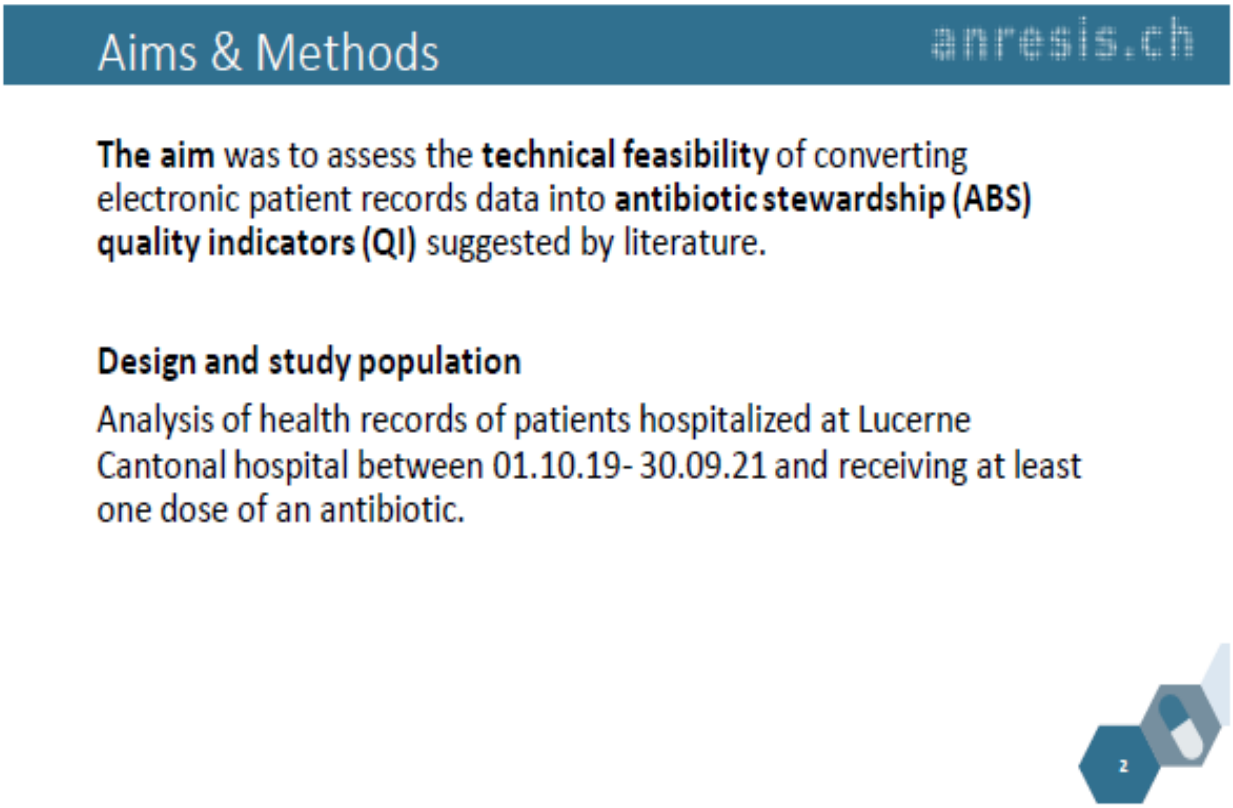

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Results

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- 25'338 hospitalisations from 20'723 individual patients
- 95% (35/37) of defined quality indicators (QI) were calculated
  - 23 QI measuring the **appropriateness** of antibiotic therapy
- Complete data for 57% (21/37) of all QI
  - 42 % of hospitalisations with indication documented
  - 12 % with a **meaningful indication** documented
- Data processing issues for 11 % (4/37) of the QI
  - Missing or too less categorised information in the metadata

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QI measuring the appropriateness of antibiotic therapy

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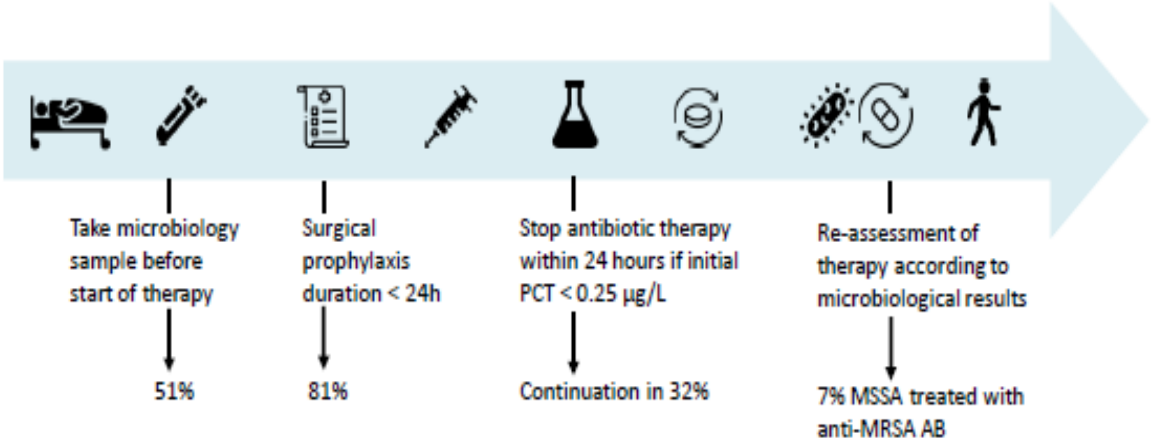

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Visualisation

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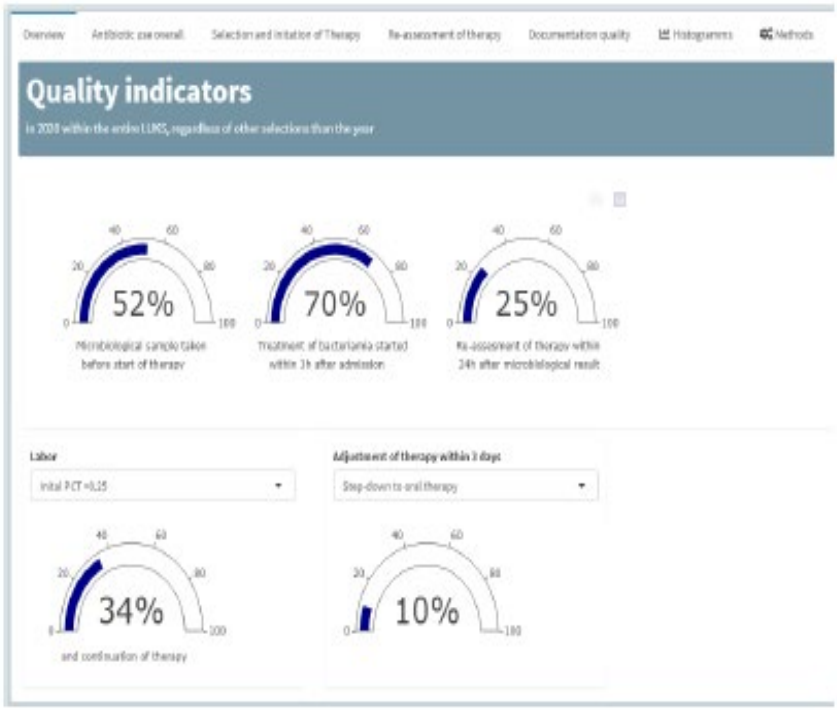

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Visualisation

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Quality Indicator	ICU	Medicine	Surgery
Step-down to oral therapy within 3 days	1 % (N=789)	12 % (N=1988)	9 % (N=2101)
Switch of substance within 3 days	18 % (N=1124)	16 % (N=2288)	11 % (N=2666)
Escalation: At least one AB added within 3 days	8 % (N=1124)	4 % (N=2288)	3 % (N=2666)
Escalation: narrow to broad-spectre within 3 days	5 % (N=1124)	2 % (N=2288)	1 % (N=2666)
De-escalation: At least one AB less within 3 days	3 % (N=1124)	2 % (N=2288)	1 % (N=2666)
De-escalation: from broad to narrow-spectre within 3 days	3 % (N=1124)	3 % (N=2288)	1 % (N=2666)
Stop within 3 days	45 % (N=1124)	35 % (N=2288)	56 % (N=2666)

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6

Limitations

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Plausibility control

- Need for benchmarking
- Patient-level vs. hospital-level pharmacy data

Data structure indication and allergy

- Better structured pre-defined list to avoid free text and improve documentation
- Uniform labelling of drugs and the pre-selection "unknown antibiotic" and "no allergy" are needed

Missing indication

- Limits informative value of QI such as duration of therapy
- Prescriptions for prophylaxis are not of interest for evaluating empirical therapy
- Limits selection of QI

7

7

Conclusion

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- Calculation of quality indicators reflecting the appropriateness of antibiotic prescription out from electronic medical records was **feasible**.
- A **better data structure** within the electronic medical records is crucial for **improving the validity** of the results.

https://www.anresis.ch/publication-category/anresis-posters/

https://www.anresis.ch/wp-content/uploads/2022/04/20222_ECCMID_Renggli_poster_quality-indicators.pdf

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Outlook

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- A **continuous monitoring** of the quality indicators could be used as tool for local antibiotic stewardship programmes to **define and measure interventions including association with resistance**.
- Monitoring of patient-level data for interested Swiss hospitals
  - Format specifications for patient-level data
  - Legal requirements
- Choice of most relevant quality indicators considered in future continuous monitoring will be defined in collaboration with Swissnoso.

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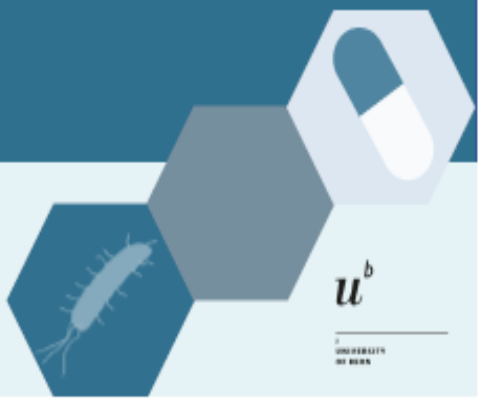
luzerner kantonsspital

Thank you for your attention!



10

AMC at the university hospital in Basel

SwissASP networking call

Challenges and possibilities with a monthly reporting

Prof. Sarah Tschudin
Delia Halbeisen Bornand
29.06.2022

1

Contents

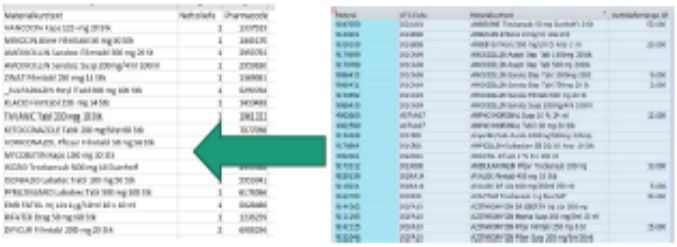
- Anresis with monthly data
- Overview of activities in Basel and Outlook

29.06.2022

2

Anresis: How to get monthly data

- Standardized reporting in SAP, export to Excel
  - Consumption data connected to pharmacodes
  - 10-15 minutes per month with data validation
- Entire USB and intensive care separately, not for ambulatory setting or external wards (paediatrics, geriatrics, private hospitals)
- Same process as collection of yearly data, but a tertial collection of monthly data
- Feedback loop from anresis



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Anresis

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Schweizerisches Zentrum für Antibiotikaresistenzen

Advantages:

- Monitoring and surveillance with trends
- Benchmark
- Monthly and yearly report

Pitfalls in data delivery:

- Monthly patient data needed
- Changings in delivery units (Metronidazol Miniflac 500mg: Delivery unit USB --> 1 pcs. Pharmacode 2215093 = 20 pcs)
- Stock outs and replacement with drugs without pharmacode
- Mixture of units in SAP with mg and pcs for one pharmacode

29.06.2022 4

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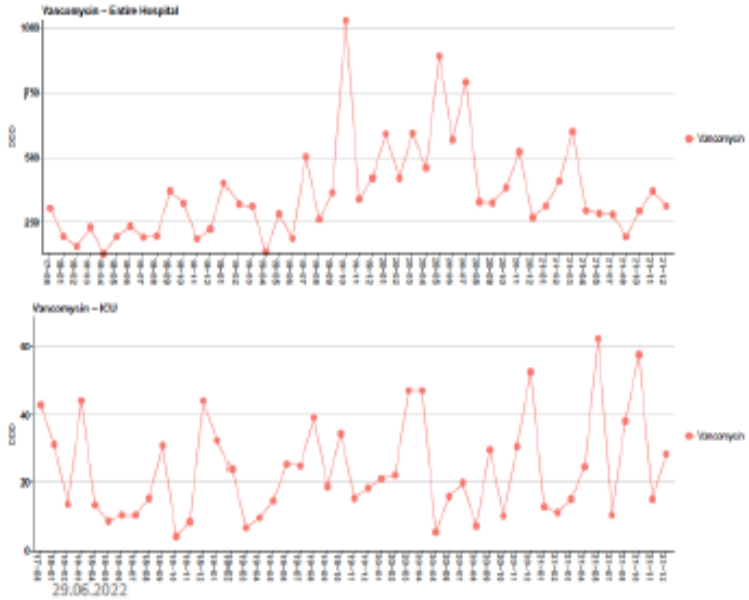
Direct feedback for validation from Anresis



- New production → Ciprofloxacin and vanco-lock solution for better drug safety
- Delivery unit in mg instead of pcs in SAP
- Direct feedback from Anresis to optimize data and find pitfalls

29.06.2022 5

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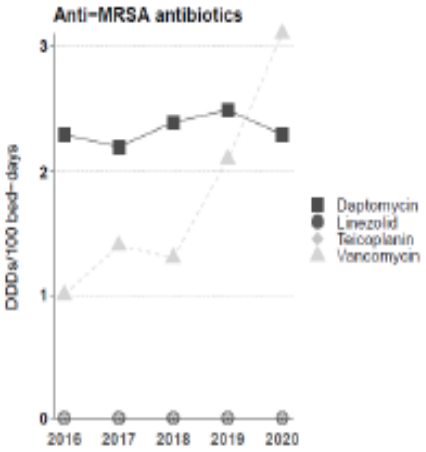
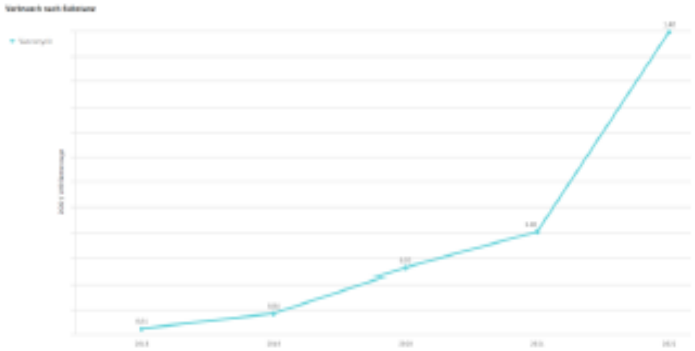
Anresis data and USB data





- Anresis: delivery amounts
- USB Dashboard: patient oriented used amounts
- Anresis with a longer history
- Benchmark is possible with anresis, not with USB dashboard

29.06.2022 6

6

ASP at the hospital pharmacy USB

Table 1: Topics covered in antimicrobial treatment guidelines or stewardship policy according to the respondents surveyed (n = 50; guidelines were not available in 13 hospitals).

Topic	Percentage
Avoidance of broad-spectrum antimicrobials	70%
Documentation of indications and severity of illness	30%
Specimen collection before antimicrobial treatment initiation	62%
Treatment duration	74%
Antibiotic formulary	36%
Review of antibiotic therapy at 48 or 72 hours	36%
Intravenous to oral switch	60%
Therapeutic drug monitoring	38%
Treatment of specific diseases	76%
Situations when antimicrobial therapy is NOT required	48%
Antifungal treatment	46%
Antiviral treatment	32%
Surgical antibiotic prophylaxis	74%
Alternative antimicrobial choices (e.g., if allergic)	64%
Dosage for special populations (e.g., renal impairment)	50%
Side effects	16%
Outpatient parenteral antibiotic therapy	12%

29.06.2022

- Assistance with logistic and drug selection
- Patient and therapy-oriented solutions:
  - Iv→oral switch
  - TDM
  - Dosage in limited renal function
- OPAT: stability studies
- Review after 48-72 h
- Collaboration in guidelines

Osthoff M, Bielicki J, Widmer AF, For Swissnoso. Evaluation of existing and desired antimicrobial stewardship activities and strategies in Swiss hospitals. *Swiss Med Wkly*. 2017;147:w14512. Published 2017 Oct 20. doi:10.4414/smw.2017.14512 7

7

Outlook: App solution for drug safety

- Monitoring of all patients in Meona with an electronic support system
- Automated Screening for selected patients
  - 48 h after start of an aminoglycoside
  - No dose adjustments for patients with cefepime in renal dysfunction
  - TDM with azoles
  - No TDM after start vancomycin
  - i.v. switch ...

29.06.2022 8

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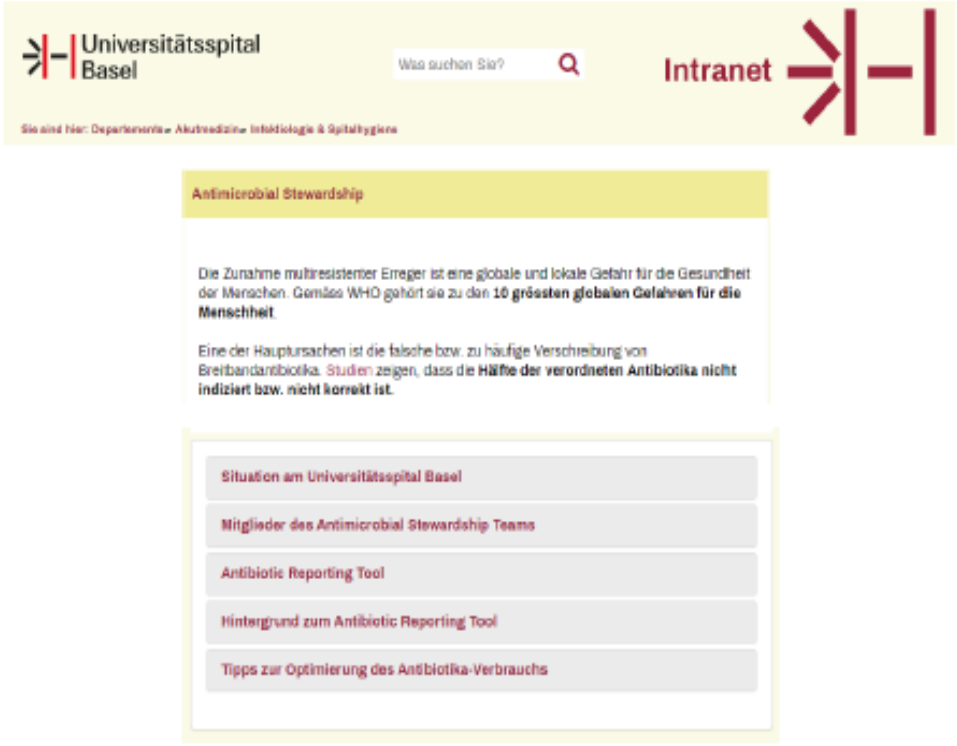

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Antibiotic Reporting Tool

Made by: Data To Business, Infektiologie & Spitalhygiene, Spitalpharmazie

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Übersicht USB gemäss ANRESIS

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Intensivstation und Carbapenem-Verbrauch

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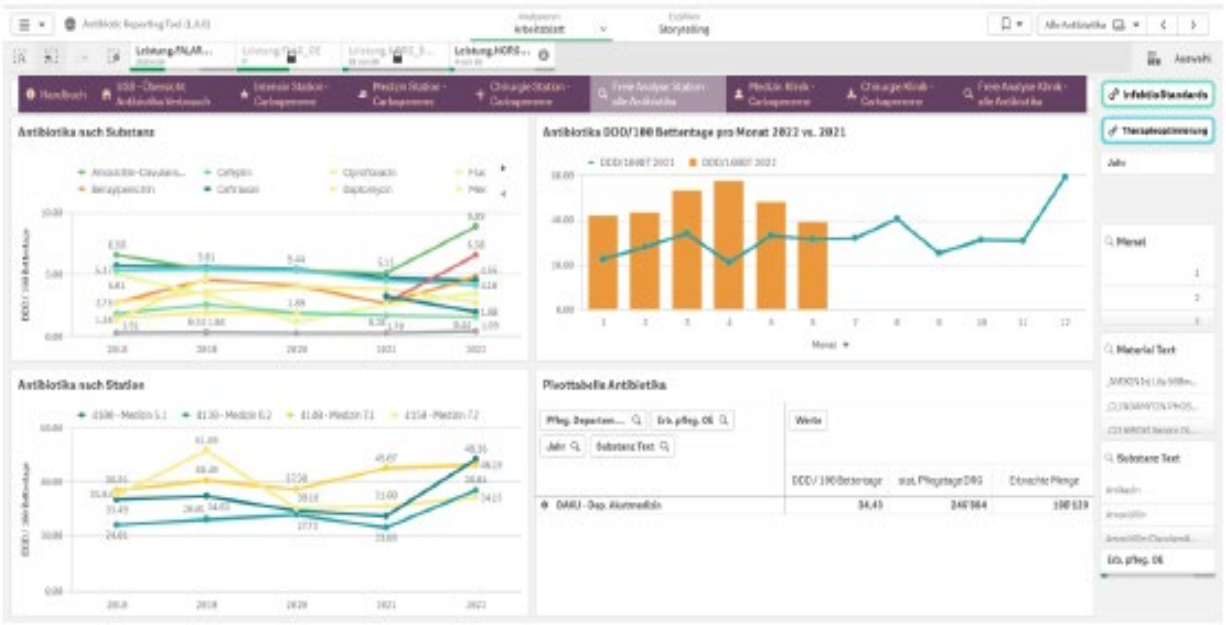

Freie Analyse Station: Bsp. Med. 5.1, 6.2, 7.1, 7.2

14

Zoom poll (Q&A session)

SwissASP: antimicrobial consumption

5 questions | 30 participated

1. How do you use the reports from ANRESIS inside the hospital ? (Multiple Choice) (Multiple Choice) *

30/30 (100%) answered

Sending the report to the hospital management	(8/30) 27%
Sending the report to other ID specialists or pharmacists	(14/30) 47%
Sending the report to other physicians (e.g. chief physicians, senior physicians)	(14/30) 47%
Basis for discussion during meetings, f.e. antibiotic working group	(15/30) 50%
Use of graphs in presentations	(11/30) 37%
reports not used yet	(6/30) 20%
Useful for lightening cheminee fire	(0/30) 0%

2. To support antimicrobial stewardship at your hospital, how much benefit you think there is in receiving results from ANRESIS on monthly consumption ? (Single Choice) *

30/30 (100%) answered

great benefit	(16/30) 53%
average benefit	(12/30) 40%
no real benefit	(2/30) 7%

3. Is your hospital able to provide monthly data to ANRESIS (even if once a year) ? (Single Choice) *

30/30 (100%) answered

Yes	(19/30) 63%
No	(2/30) 7%
I don't know	(9/30) 30%

4. Is your hospital able to provide patient-level data from electronic medical record system to ANRESIS? (Single Choice) *

30/30 (100%) answered

Yes	(5/30) 17%
No, but possible in 2-3 years	(9/30) 30%
No, but in 5-7 years	(2/30) 7%
Have no idea when it will be possible	(14/30) 47%

5. In which types of data visualisations from ANRESIS are you interested? (Single Choice) *

30/30 (100%) answered

Dashboard in addition to pdf- report	(27/30) 90%
Report as PDF only	(2/30) 7%
Dashboard only	(1/30) 3%