

Process Optimization for Improved Delivery of Surgical Instruments

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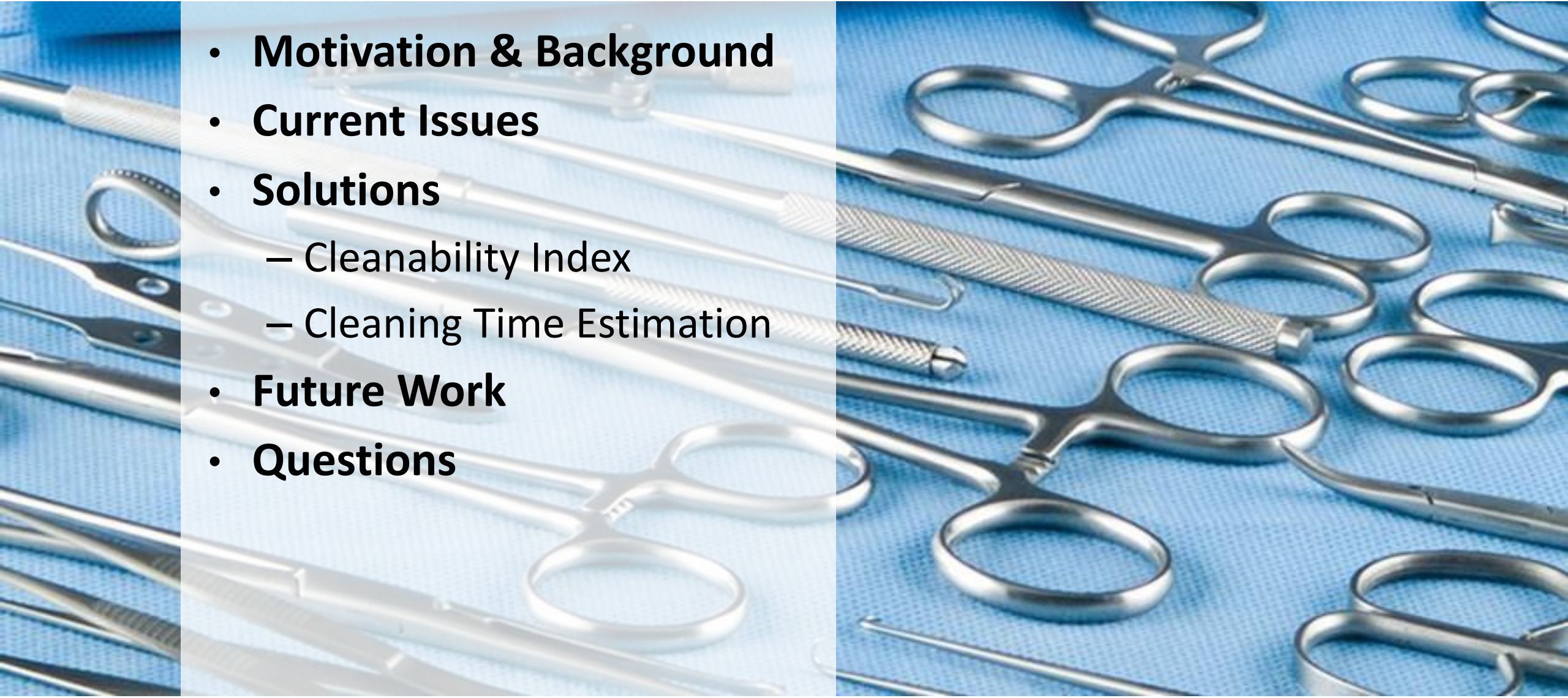
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- **Motivation & Background**
 - **Current Issues**
 - **Solutions**
 - Cleanability Index
 - Cleaning Time Estimation
 - **Future Work**
 - **Questions**



MOTIVATION & BACKGROUND



Goals



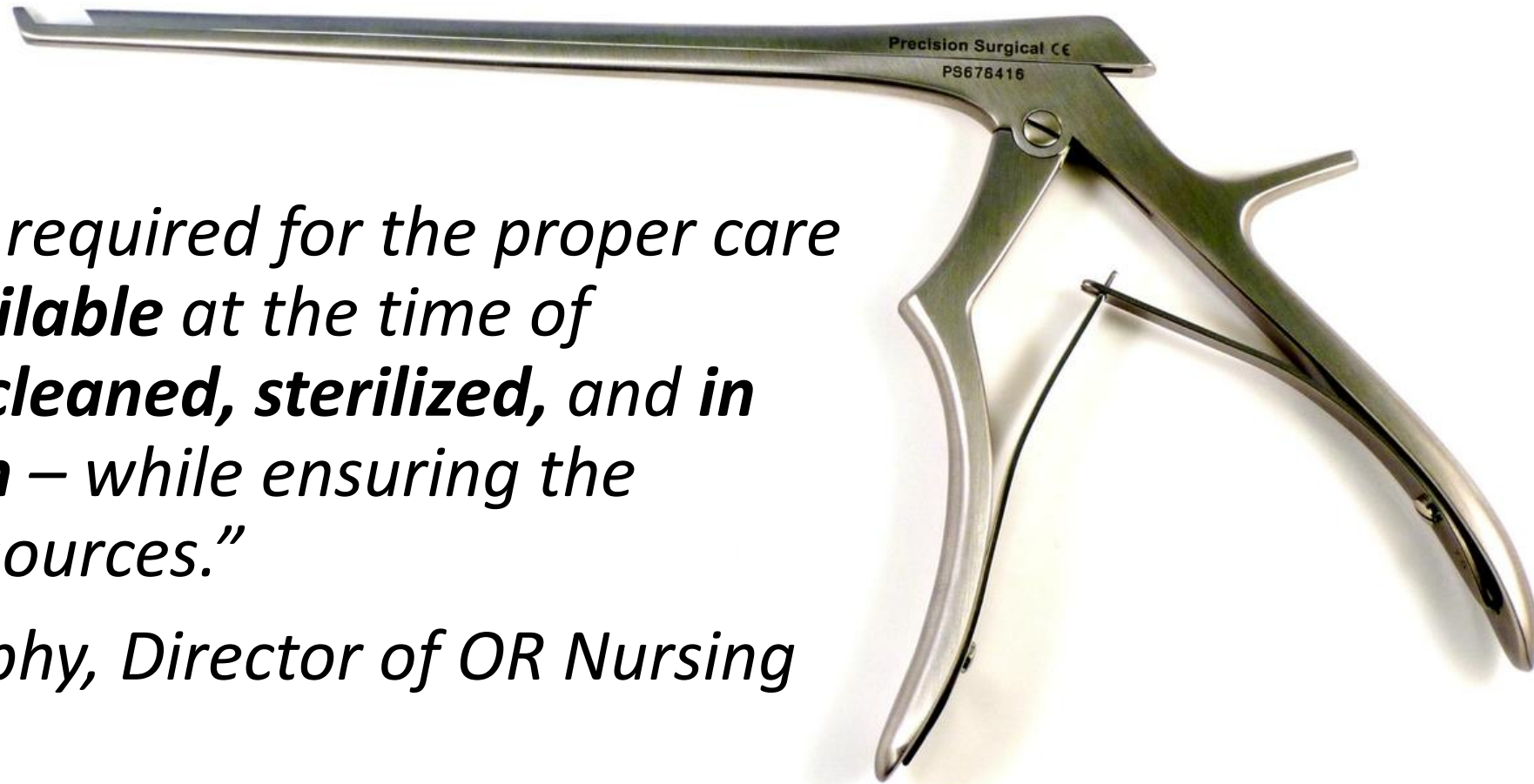
Key Terms



Surgical Instrument Cycle & Reprocessing

*“To have all items required for the proper care of the patient **available** at the time of surgery, properly **cleaned, sterilized**, and in **working condition** – while ensuring the efficient use of resources.”*

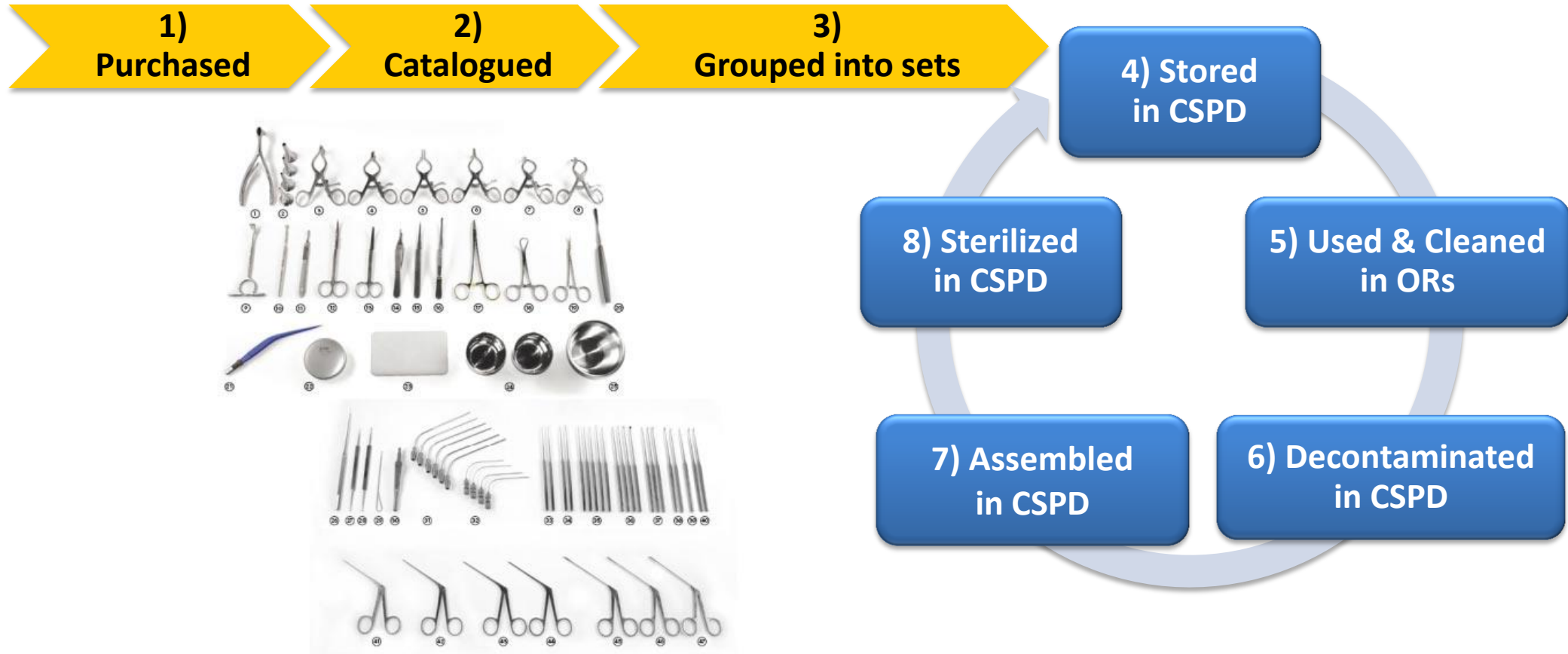
--Shawn Murphy, Director of OR Nursing



- **Bioburden** Contamination by tissue from a previous surgical case (e.g. blood, bone)
- **CSPD** Central Sterile Processing Department
- **OR** Operating Room
- **Surgical Case** Surgery



Surgical Instrument Cycle






Tympanoplasty Instrument Set

Surgical Instrument Reprocessing

- Industry-wide efficiency challenge



- Complicated & resource-intensive process
- Current state at UMHS:
 -  28 ORs
 -  51,000+ cases per year → 65-70 cases per day
 -  4,000 instruments processed per day



CURRENT ISSUES

 Contributing Factors

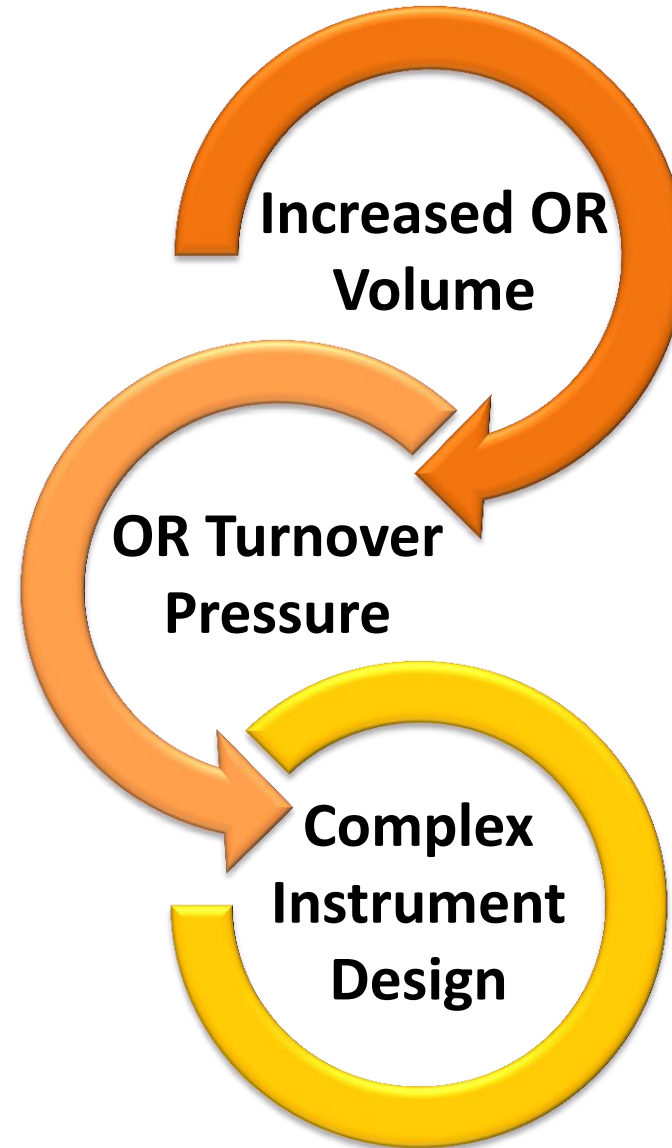
 Challenges



These issues lead to Surgery delays, potential hazards to patients, and excess workload for staff.

- Institutional outcome measures not being met:





- CSPD struggles to keep up with the demand
- OR staff forgo point-of-use instrument-cleaning protocol
- Each instrument has a unique cleaning protocol (IFU)



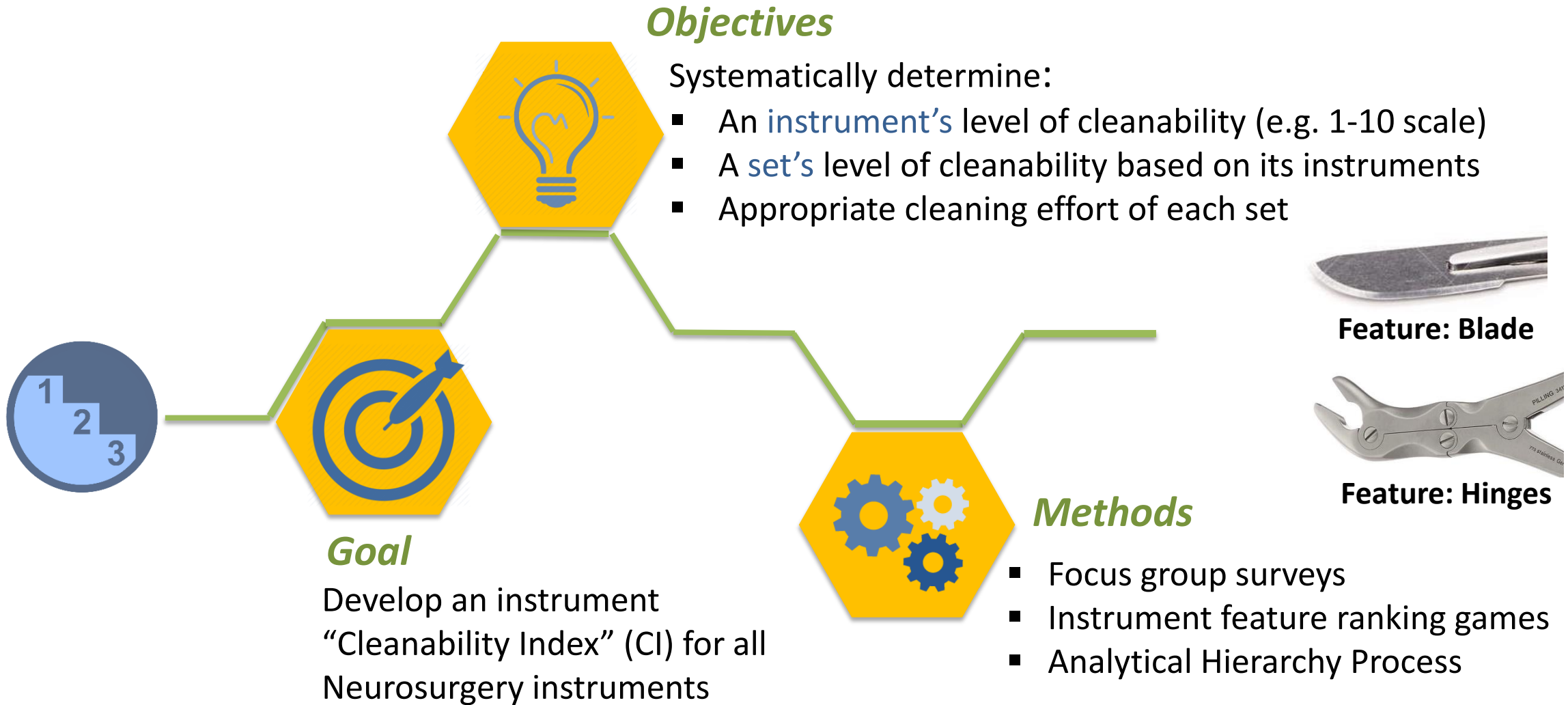
SOLUTIONS



Cleanability Index



Cleaning Time Estimation



Findings and Conclusions

- With this information, we identified Neurosurgery's **low-risk** and **high-risk** instruments (1.3%) and their associated design features
- Preliminary analysis showed **positive correlations** between
 - Staff perceptions and trending bioburden incident data
 - Staff perceptions and hard-to-clean instruments identified by the CI system
- Results could be used to **guide additional cleaning efforts**

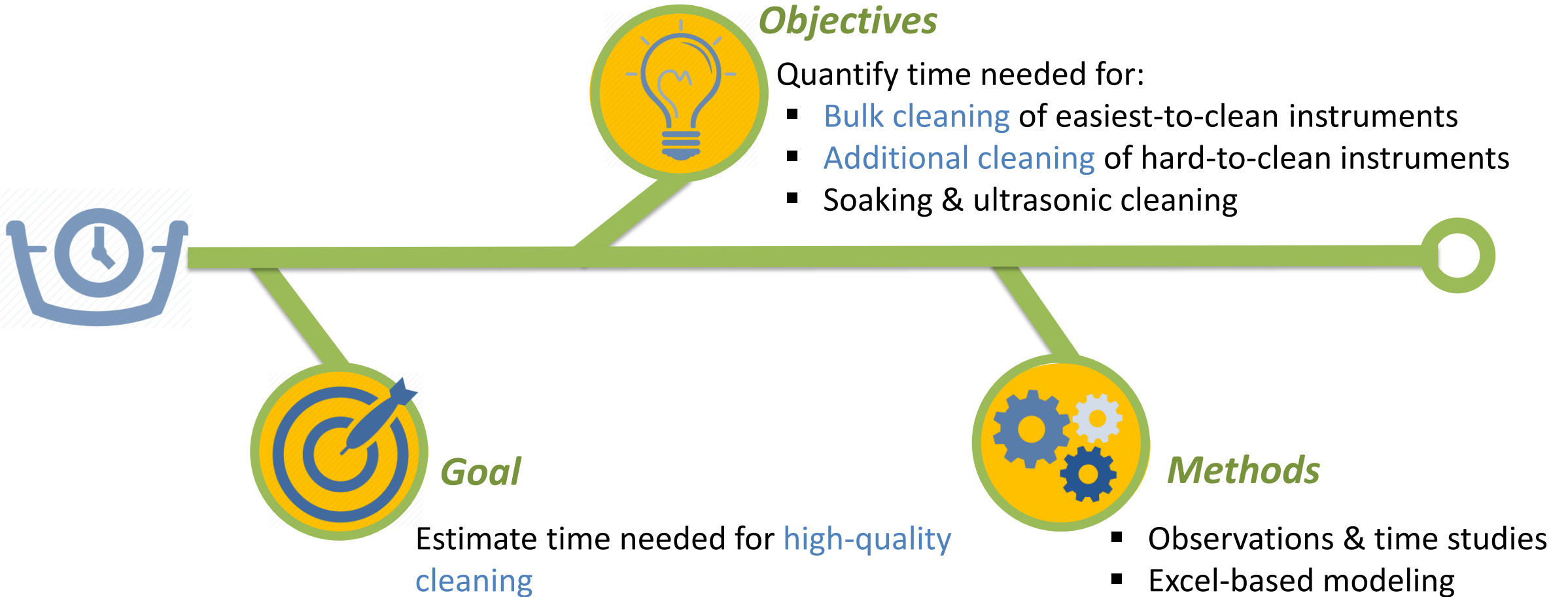


Surgical Bowl
EASIER to clean



Retractor
HARDER to clean

Cleaning Time Estimation





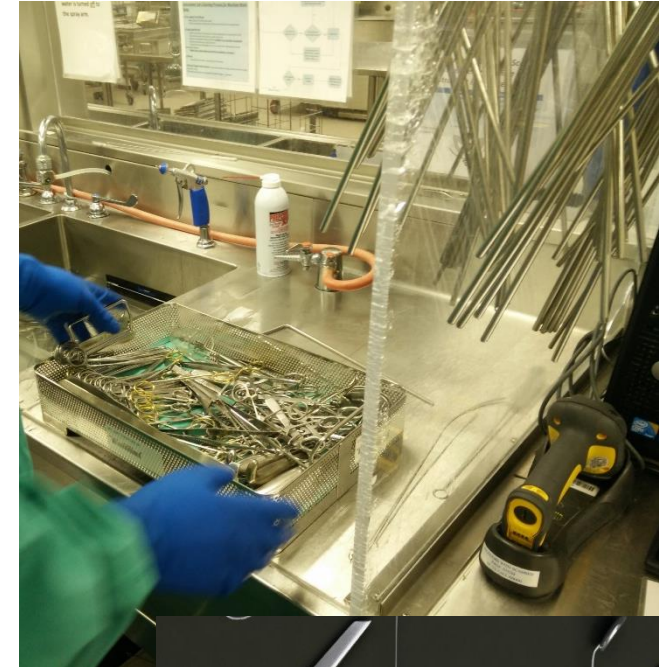
Observations:

- 12 sessions across all shifts
- 26 videos filmed



Result times (Avg+1SD):

- Bulk cleaning: 5.2min
- Hard-to-clean instrument: 6s - 60s
- Soaking & ultrasonic: 20min



Findings and Conclusions



Most sets require around 30 minutes of cleaning time



Cleanability Index highly correlated with hard-to-clean instrument cleaning time



Variabilities between similar instruments and across different individual staff are surprisingly high

Cleaning Time Estimation

Instrument Set Dashboard Examples:

Set Type Name: SET, MINOR NEURO UH

Set Type ID: 500148

Usage per Month 143

Update Filters

SET, MINOR NEURO UH - 500148

Initial Configuration	SET TYPE	% sent back	# Instruments	Weight (lbs)	# Categories	Original Tray Size	Expected Cleaning Time	Cleanability Index
	Mother Set	12.5%	123	22.33	22	Large	37.76353343	184.95

Set Type Name: SET, TRANSPHENOIDAL NEURO UH

Set Type ID: 500153

Usage per Month 143

Update Filters

SET, TRANSPHENOIDAL NEURO UH - 5001

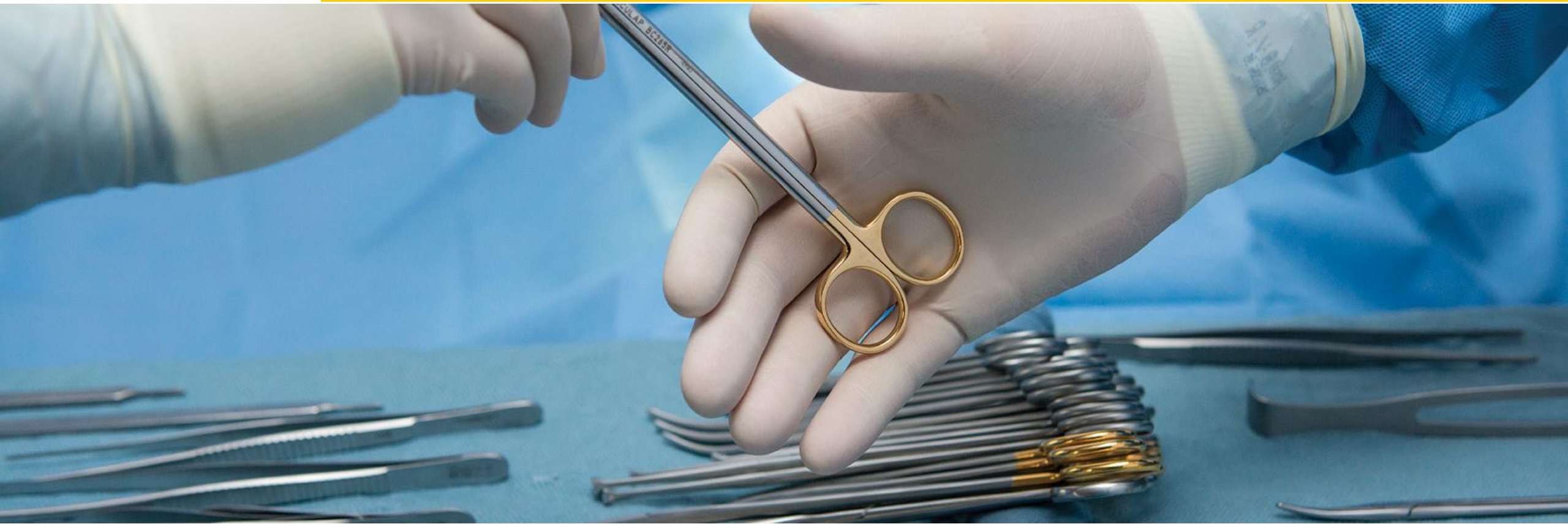
Initial Configuration	SET TYPE	% sent back	# Instruments	Weight (lbs)	# Categories	Original Tray Size	Expected Cleaning Time	Cleanability Index
	Mother Set	#VALUE!	94	0.00	25	Large	37.8052001	37.10

Expected Cleaning Time

Cleanability Index

- Institutional outcome measures potential improvements:





FUTURE WORK

1

- Standardize the cleaning procedures across CSPD technicians and similar instruments

2

- Expand the Instrument Set Dashboard to other instrument sets beyond Neurosurgery

3

- Use the Dashboard to identify additional bioburden-prone instruments
 - Separate these instruments to form a new set
 - Allow for more cleaning time to focus on such instruments

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Thank you!

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