EE342

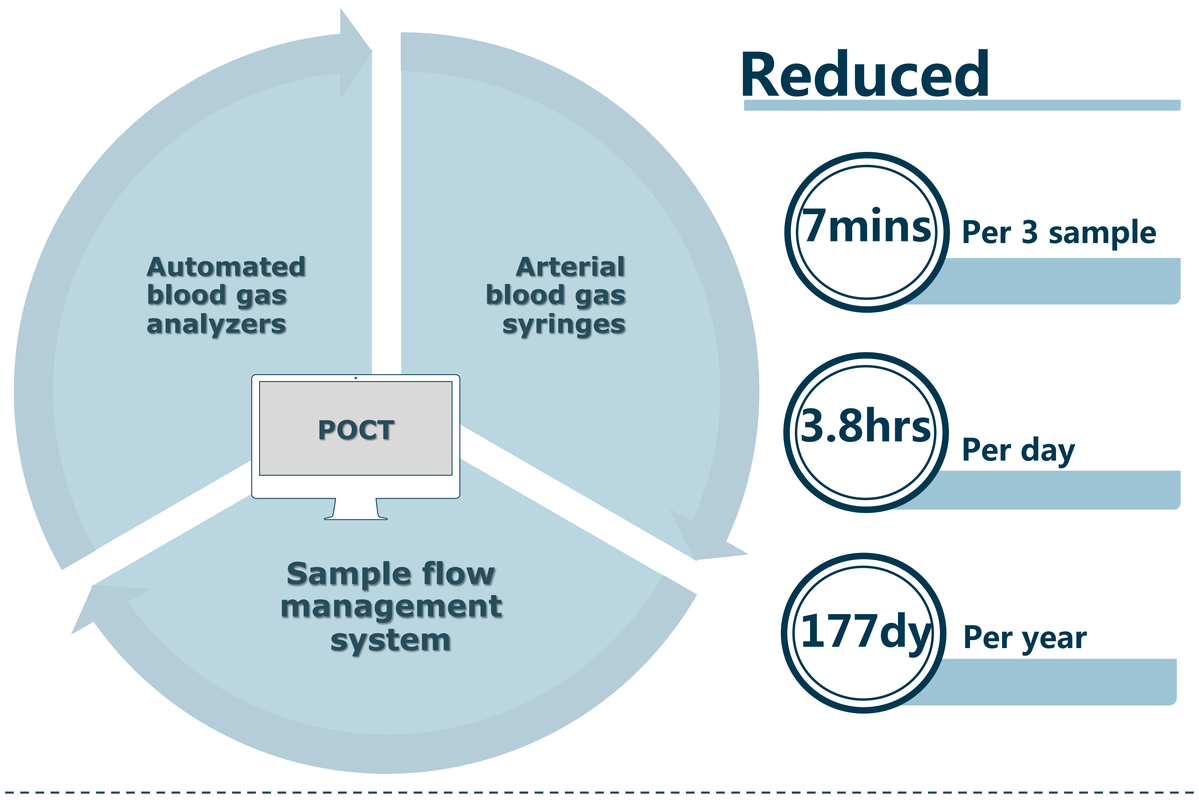
The Budget Impact of Introducing an Arterial Blood Gas Syringe with or without an Automatic Blood Gas Analyzers in Intensive Care Units in China

Chang L[1], Guo X[2], Peng W[1], Xu S[2], Wang L[1], Liu X[3], Yang X[4], Li D[5], Li X[1]

[1]Sichuan Provincial People's Hospital, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, [2]The First Affiliated Hospital of Xinjiang Medical University, Ürümqi, China, [3]University of California, Los Angeles, Los Angeles, CA, USA, [4]University of Southern California, Los Angeles, CA, USA, [5]Guangdong Province Health Economics Association, Guangzhou, Guangdong, China

BACKGROUND

- Errors occurring in the preanalytical phase—such as insufficient mixing of blood samples—account for a significant percentage of laboratory errors, which have a negative impact on sample quality, and consequently, the accuracy of patient diagnosis and treatment.[1,2]
- Implementing automatic blood gas analyzers with electrolyte-balanced heparinized (EBH) arterial blood gas syringe not only reduces manual handling time but also provides more reliable results by reducing the likelihood of errors during manual processing.[3,4]



OBJECTIVE

- To estimate the economic impact of introducing an electrolyte-balanced heparinized (EBH) arterial blood gas syringe with or without an automatic blood gas analyzer in intensive care units (ICU) from a hospital's perspective and a patient's perspective in China.

METHODS

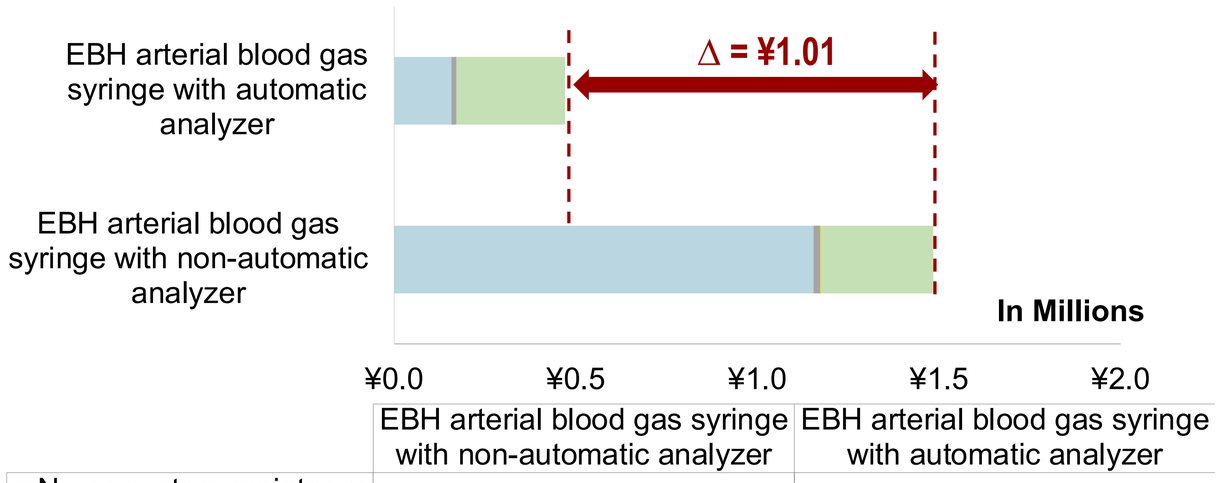
Overview:

- For hypothetical 26,639 ICU patients in a local hospital, a budget impact model was developed to assess the difference in total healthcare costs per year and per patient per stay costs by introducing an EBH arterial blood gas syringe with or without an automatic blood gas analyzer.
- The model considered:
  - Syringe material costs
  - Nurse labor costs (system operation and maintenance)
  - Hospitalization and testing costs
  - Costs associated with occupational exposure to contaminated blood and body fluids
- All costs were estimated in 2024 Chinese Yuan.
- Model Inputs were obtained from published sources or expert opinions.

RESULTS

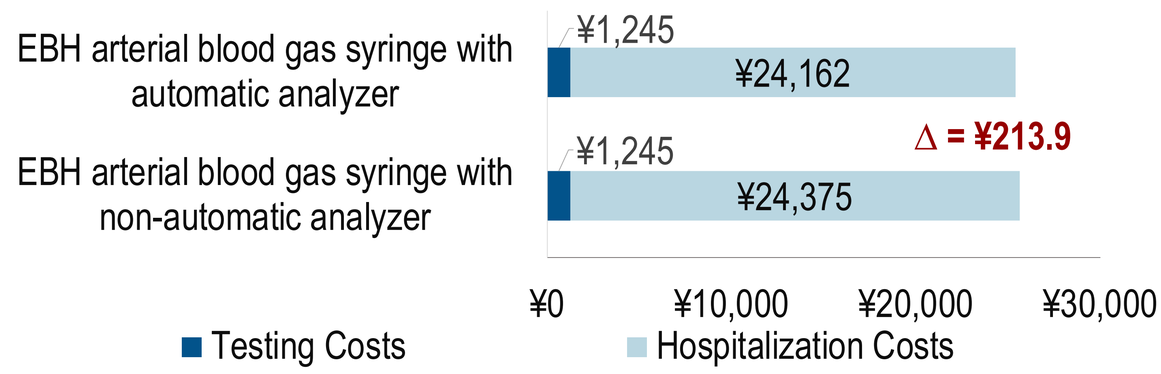
- In the base case, the inclusion of the EBH blood gas syringe with vs. without an automatic blood gas analyzer decreased the healthcare budget by ￥1 million from a hospital's perspective and ￥214 per patient per stay from a patient's perspective.
- The budget decrease was mainly due to shorter hands-on time of tests, fewer occupational exposures, and fewer machine maintenance efforts.
- Results were the most sensitive to the hands-on time of tests.

Figure 1. Budget Impact Results – Total Healthcare Costs per Year



	EBH arterial blood gas syringe with non-automatic analyzer	EBH arterial blood gas syringe with automatic analyzer
Nurse system maintance costs	¥1,121	¥828
Nurse operation costs	¥1,153,033	¥156,690
Occupational exposure costs	¥17,923	¥13,416
Cleaning costs of contamination	¥1,433	¥0
Material costs of retests	¥310,662	¥299,238

Figure 2. Budget Impact Results – per Patient per Year (PPPY) Costs



CONCLUSIONS

The inclusion of an EBH blood gas syringe with an automatic blood gas analyzer in ICU offers an efficacious approach with a decrease in the healthcare budget from both a hospital's perspective and a patient's perspective in China.

REFERENCES

1.Zemlin, A. E. (2017). Errors in the Extra-Analytical Phases of Clinical Chemistry Laboratory Testing. Indian Journal of Clinical Biochemistry. Retrieved from Lab Testing Matters(Oxford Academic)(WHO EMRO Dashboards).

2.Plumhoff, E. A., Masoner, D., & Dale, J. D. (2008). Preanalytic Laboratory Errors: Identification and Prevention. Mayo Clinic Communications, 33, 1-8. Retrieved from Cureus(Cureus).

3.Green, S. F. (2013). The Cost of Poor Blood Specimen Quality and Errors in Preanalytical Processes. Clinical Biochemistry, 46, 1175-1179. Retrieved from Lab Testing Matters(Lab Testing Matters).

4.Kasatpibal, N., Whitney, J. D., Katechanok, S., Ngamsakulrat, S., Malairungsakul, B., Sirikulsathean, P., ... & Muangnart, T. (2016). Practices and impacts post-exposure to blood and body fluid in operating room nurses: A cross-sectional study. International journal of nursing studies, 57, 39-47.