

Utilization of RWD in Pediatric Medical Device Development

Ryo Inuzuka MD PhD

Department of Pediatrics, University of Tokyo, Japan

On behalf of **JCIC registry working group**

and **AMED Fujii research group**

Features of Pediatric Medical Device in Japan

- Small market due to the rarity of the diseases
- Variable kinds and sizes of devices are required
- Difficult to perform clinical trials due to small number of patients and too many institutions
- Precise post-marketing surveillance (PMS) tends to be required as a condition of device approval (as a means of assessing safety and effectiveness in the real world)

Utilization of Academic Registry Data for Pediatric Device Development

JCIC registry (2013-) operated by National clinical database (NCD)

JCIC: Japanese society of Congenital Interventional Cardiology

- Pediatric interventional cardiac catheter (PICC) procedures from nationwide 92 institutions (~**4500 procedures** annually)
- 146 variables/case (blanks are not permitted)
- **Meticulous collection of complications**
- **Strict error-check at data entry**



→ **Ensuring high-quality data on PICC procedures**

Utilization of Academic Registry Data for Pediatric Device Development

- Needs Discovery (mainly from off-label use)

Stent: 470 off-label uses/3 years

Static Balloon Atrial Septostomy: 247 off-label uses/3 years

☐ Approval of TMP PED[®] for static BAS in Japan

- Increase market predictability by identifying needs
- Use for PMS (regulatory use)

Cost reduction

Reduction of input burden



PMS for pediatric medical devices

using JCIC registry ~ direct use of registry data for PMS



Become compliant with GPSP (Good Post-marketing Study Practice)
Already fulfilled the minimal requirement for audit trails

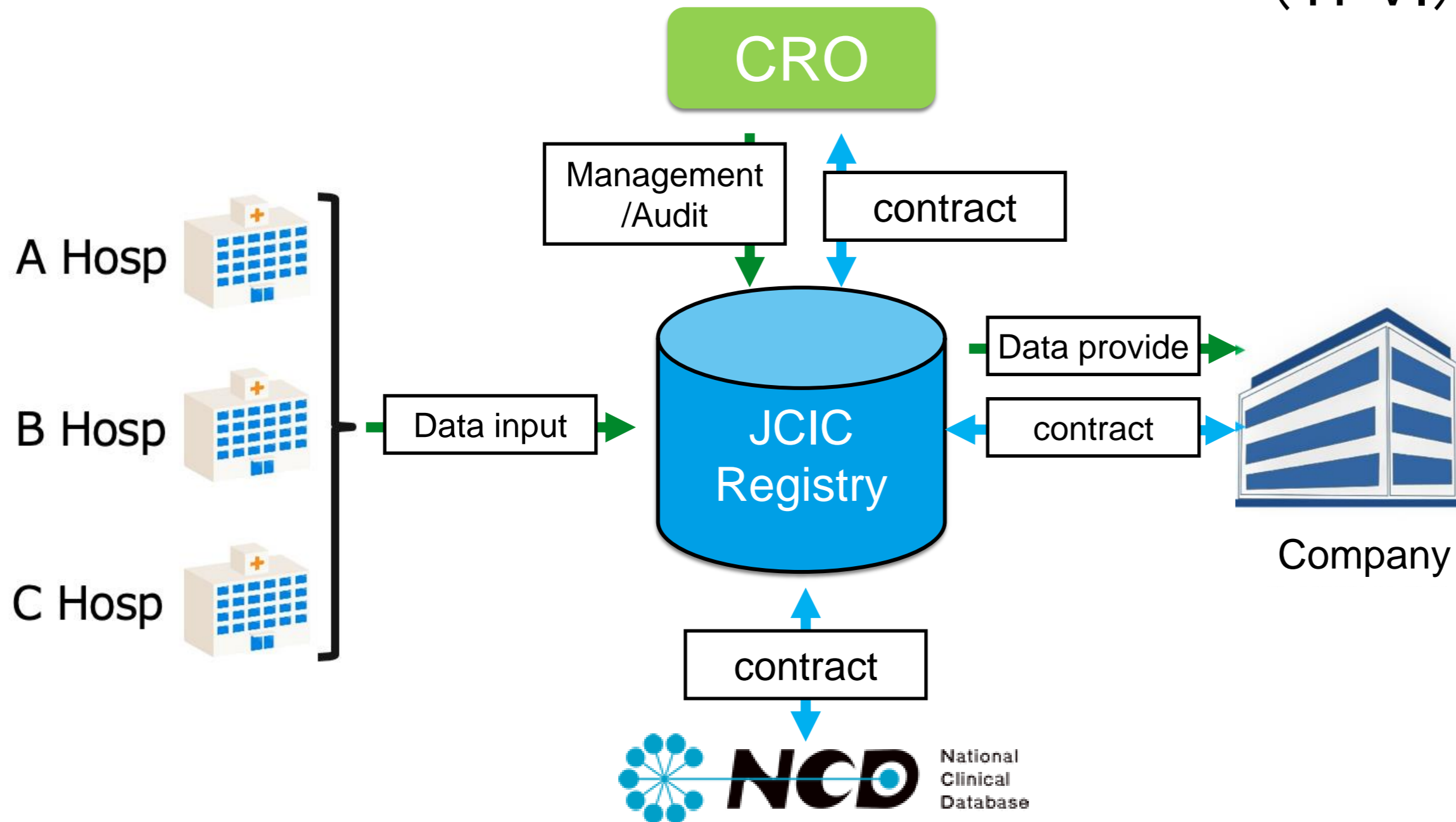
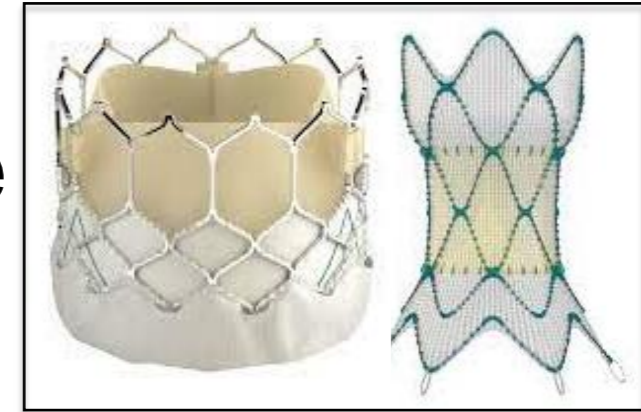
≡ Development of universal platform for PMS on pediatric medical devices
→ Faster and more efficient collection of PMS data at lower cost

✓ Ongoing Registry-PMS

Piccolo Occluder



Transcatheter Pulmonary Valve Implantation (TPVI)



Registry-PMS required

- Preparation of SOPs
- Patient Consent by Opt-out
- Progress management using shipping records

User-friendly data entry system

JCIC registry

Baseline data
(43 items)

11

20 items

Automatic
copy

Procedure/AE
data (95 items)

14

31 items

Follow-up data
(8 items)

166
items

Piccolo PMS

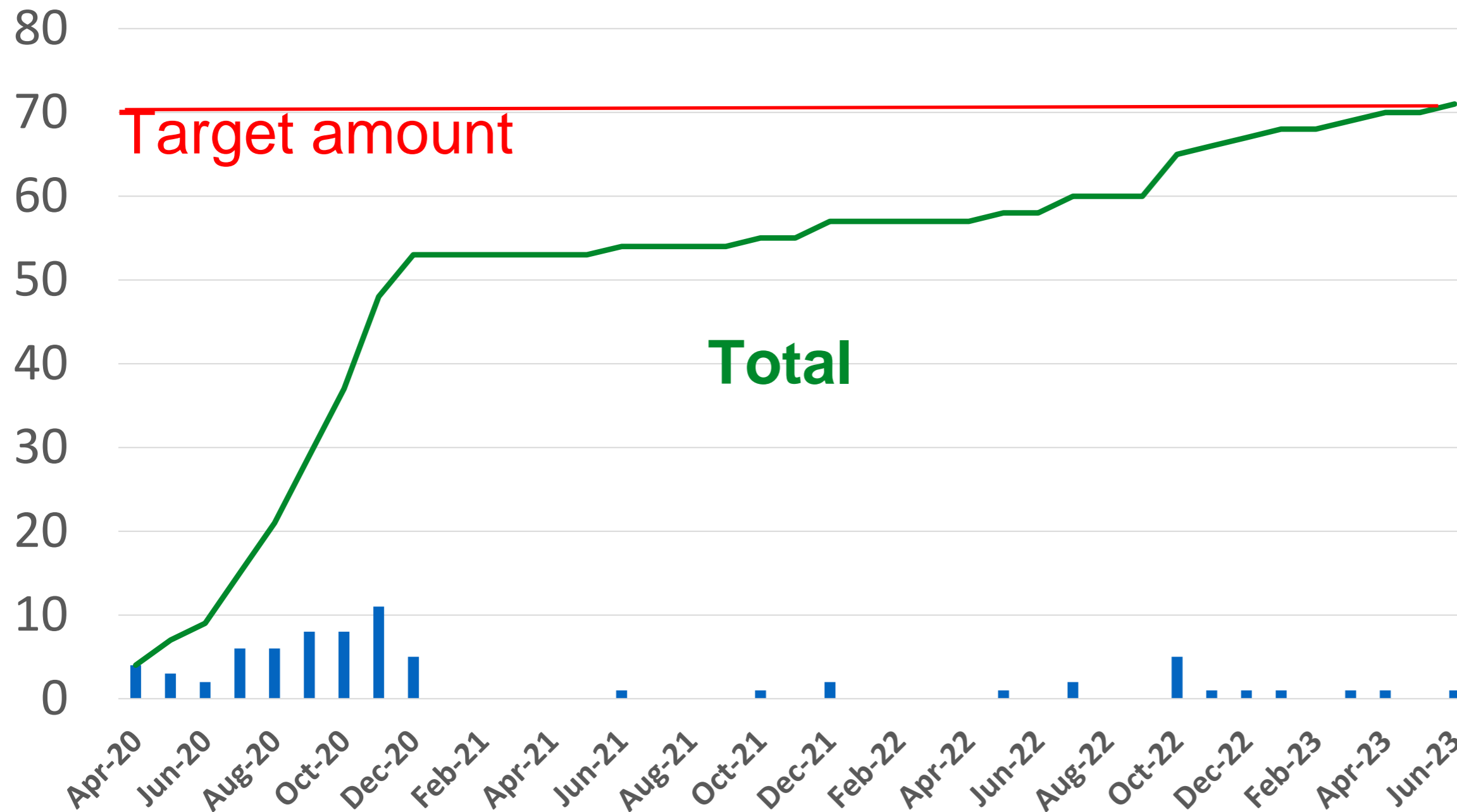
Piccolo AEs format
33 items

Piccolo device
deficiency format
16 items

Discontinuation
format
11 items

Needed to be fit into the existing format

Progress Chart and Actual Cost for Piccolo Occluder



**Cost for the system:
~\$ 100,000**
**Total cost: ~60% of
conventional PMS cost**

Challenge : Too many survey items

Abbott **DRAFT** **BASELINE**

CRD_981: AMPLATZER Piccolo Japan

Date of Registration 症例登録日
Month Day Year
2 0

Site Name 施設名
Abbott Site ID 施設ID
Abbott Subject ID 症例ID
(E.g. JP 1234-0567)

Physician Name 医師氏名 : _____

1. **Subject Demographics** 患者背景

1.1 Subject's age at the time of registration 登録時の年齢: Year/s 年 Month/s ヶ月 Week/s 週 Day/s 日

1.2 Subject's weight at baseline 体重: _____ grams

1.3 Subject's length/height at baseline 身長: _____ cm

1.4 Subject's sex 性別: Male 男性 Female 女性

2. **Baseline Medical History** 既往歴

2.1 **Date medical history completed 既往歴記入日:** M M / D D / 2 0

2.2 subject's gestational age at birth 出生までの在胎週数: _____ weeks 週

2.3 subject's weight at birth 出生時の体重: _____ grams

2.4 **Is there a history of congestive heart failure? うっ血性心不全** Yes 有 No 無 Unknown 不明

2.5 **Is there a history of failure to thrive? 成長障害** Yes 有 No 無 Unknown 不明

2.6 **Is there a history of poor feeding? 哺乳不良** Yes 有 No 無 Unknown 不明

2.7 Is there a history of any other cardiac procedures? その他の心臓手術歴 Yes 有 No 無 Unknown 不明

2.7.1 If yes, specify 「有」の場合、具体的に記入: _____

2.8 **Is there a history of frequent respiratory Infections (defined as >2 per year)? 年3回以上の頻発呼吸器感染** Yes 有 No 無 Unknown 不明

2.9 Is there a history of any other cardiac co-morbidities? その他の心臓併存症 Yes 有 No 無 Unknown 不明

2.9.1 If yes, specify 「有」の場合、具体的に記入: _____

2.10 **Is there a history of respiratory distress syndrome (RDS)? 呼吸窮迫症候群 (RDS) の既往** Yes 有 No 無 Unknown 不明

2.11 **Is there a history of retinopathy of prematurity? 未熟児網膜症の既往** Yes 有 No 無 Unknown 不明

2.12 **Is there a history of intraventricular hemorrhage (IVH)? 脳室内出血 (IVH) の既往** Yes 有 No 無 Unknown 不明

2.13 **Is there a history of necrotizing enterocolitis (NEC)? 壊死性腸炎 (NEC) の既往** Yes 有 No 無 Unknown 不明

2.14 **Is there a history of sepsis? 敗血症の既往** Yes 有 No 無 Unknown 不明

CLXXXXXXXX/Version X

Courtesy, Abbott Medical Japan

× 21
pages !!

- Too many items increase the cost and input burden (input/error check/query)
- Too different from academic survey items

Minimizing survey items

Essence of PMS

1. Efficacy

- Clinical outcomes
- Device performance
- Procedure-related endpoints

2. Safety

- AEs related to device or procedure
- Unknown AEs



Research on the Improvement
of the Environment to Promote
the Development of Pediatric
Medical Devices

2023-2025 PI Dr. Takanari Fujii

→ Reduction of survey items by 60-70%?

Remaining Issues for Registry-PMS

- Templatization of SOPs
- Relatively high maintenance costs (progress management and manual check): Increased PMS costs due to extended Registry-PMS due to missed targets.

e.g. Piccolo Occluder for 2.5kg has not reached the target of 32 cases.



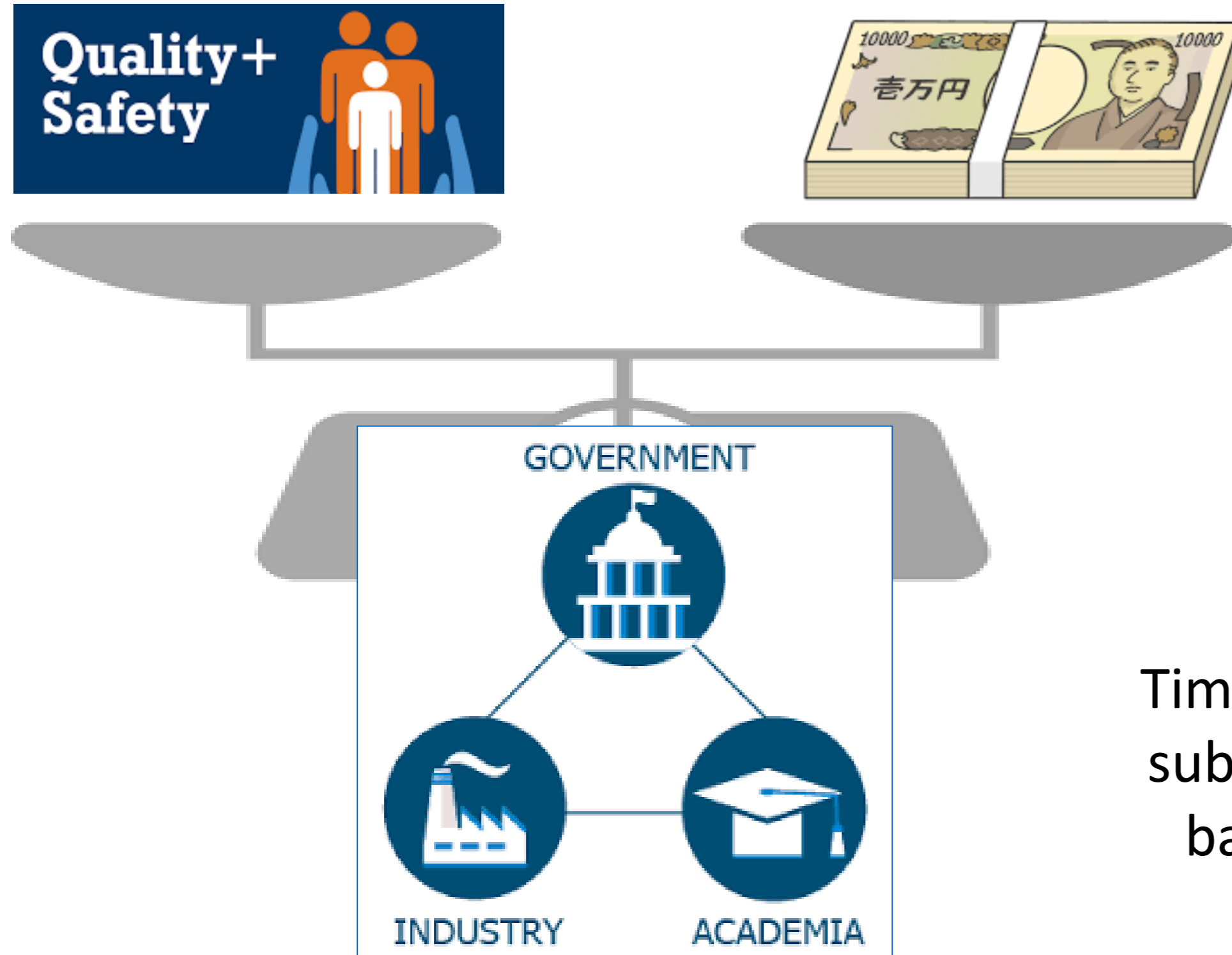
- PMS cost reduction is small compared to total application cost.



e.g. Increased costs due to nonclinical-data requested for CP stent applications (lack of historical raw data).

- Cost estimates for Registry-PMS (or conventional PMS) not yet available.

Development of small-market medical devices



- ✓ Improved efficiency
- ✓ Cost reduction achieved by cooperation b/w government and academia

Time to think about more deregulation and subsidies for small-market medical devices based on their actual cost for approval?

Summary



- Registry-PMS enabled an efficient data collection by direct use of registry data and system
- Further cost reduction may be possible once developing the minimum dataset for PMS
- Still a long way to go to develop medical devices for children