

CURRENT STATUS OF NEONATAL TRANSFER IN OSAKA & JAPAN

1

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This is my second time to visit Taipei



My major research interest:
“Chronic lung disease and lung function”
and “Neonatal transfer”



“Long-term lung function sequelae of CLD”

1st time in Taiwan

<https://www.great-towers.com/tower/taipei-101>

The 1st Taiwan - Korea - Japan
Joint Congress on Neonatology

11-12 MAR 2017, Taipei

Home contact information Login

2017

27th Annual Meeting of

Taiwan Society of Neonatology



The 1st Taiwan - Korea - Japan
Joint Congress on Neonatology 2017
27th Annual Meeting of
Taiwan Society of Neonatology



<https://www.flickr.com>

TODAY'S TOPICS

- Introduction of neonatal transfer
- Neonatal transfer in Japan
- Neonatal transfer in Osaka
- How to establish neonatal transfer system

TODAY'S TOPICS

- **Introduction of neonatal transfer**
- Neonatal transfer in Japan
- Neonatal transfer in Osaka
- How to establish neonatal transfer system

WHY NEONATAL TRANSFER REQUIRED?

- Delivery is not always safe!
 - Some kind of treatment is required in **10%** of normal deliveries
 - About **5%** of neonates are considered to require moderate or higher level neonatal care
 - Many children are **born in facilities with no NICUs (especially in Japan)**

STATISTICS ON PERINATAL CARE IN JAPAN

- Nearly **1 million deliveries/year**
- C-section rate has been increased to **19.5%** (2015)
- Low birth weight rate **9.5%** (2015)
- Premature birth rate **5.6%** (2015)
- Neonatal death rate (to 1,000 births) **0.9** (2015)
- Maternal death rate (to 100,000 deliveries) **3.8** (2015)

- Birth place: hospital and clinic **99%** (In 1950, 95% of deliveries were home birth)
- Clinic **45.5%**, hospital **53.7%**, midwifery home **0.7%**, home birth **0.1%**

HOW MANY NEONATES ARE TRANSFERRED IN JAPAN?

PEDIATRICS
INTERNATIONAL

Official Journal of
the Japan
Pediatric Society



Pediatrics International (2016) 58, 311–313

doi: 10.1111/ped.12908

Brief Report

Nationwide survey of neonatal transportation practices in Japan

Takehiko Hiroma,¹ Hiroyuki Ichiba,² Kazuko Wada,³ Jun Shiraishi,⁴ Hiroshi Sugiura⁵ and Tomohiko Nakamura^{1,6}

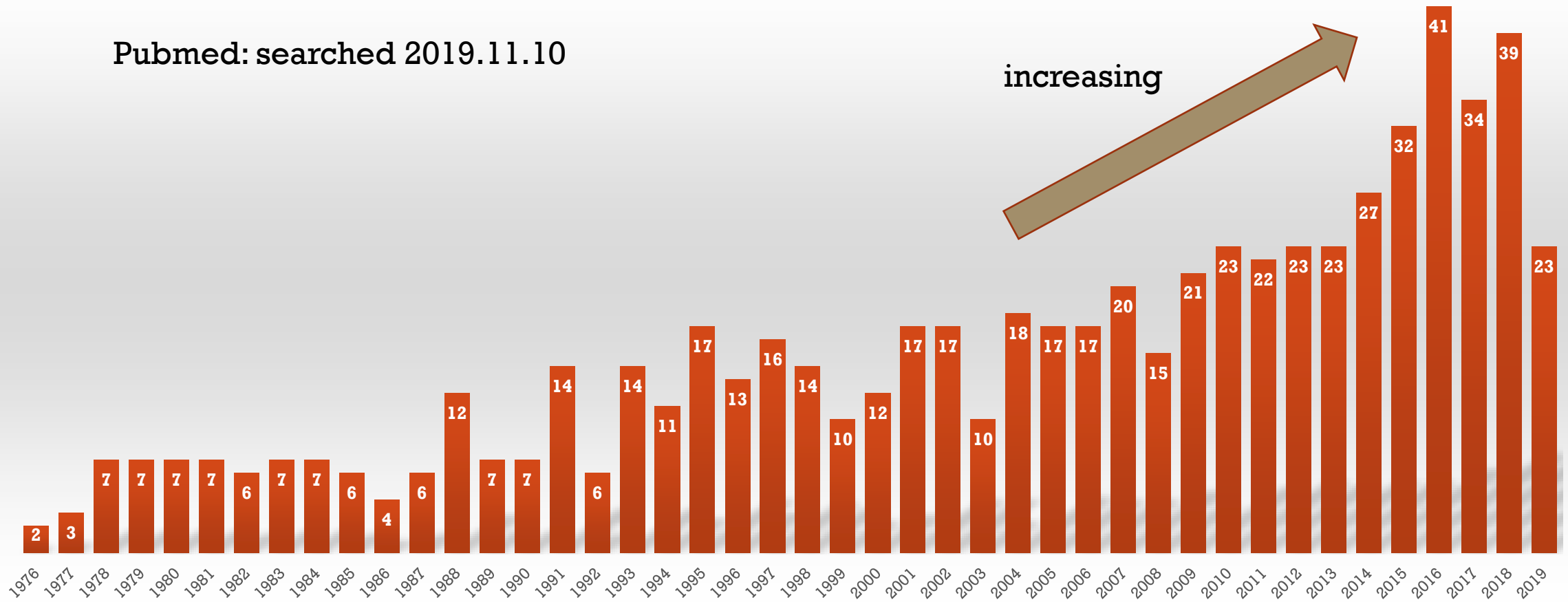
- Approximately **15,000 newborns** are estimated to **be transferred** each year in Japan! (2012)

INDICATIONS OF NEONATAL TRANSFER

- **Low birthweight/preterm birth**
- **Asphyxia**
- Respiratory failure (TTN, RDS, MAS, air leak, apnea...)
- Surgical disease (vomiting, abdominal distention...)
- Cardiovascular disease (murmur, low SpO₂ despite oxygen...)
- Neurosurgery disease (seizure, brain hemorrhage...)
- Other symptoms (hypoglycemia, jaundice...)
- Major anomaly

PUBLICATIONS ABOUT NEONATAL TRANSFER/NEONATAL TRANSPORT/OUTBORN INFANT

Pubmed: searched 2019.11.10



OUTBORN LOW BIRTH WEIGHT/PRETERM BIRTH

Neonatal transfer of premature/low birth weight neonates is linked to **the increase of intraventricular hemorrhage, necrotizing enterocolitis and death rate**

- Outcomes of outborn extremely preterm neonates admitted to an NICU with respiratory distress. Arch Dis Child Fetal Neonatal Ed 2019
- Risk of Severe Intraventricular Hemorrhage in the First Week of Life in Preterm Infants Transported Before 72 Hours of Age. Pediatr Crit Care Med. 2019
- Outcomes of infants born at 22-27 weeks' gestation in Victoria according to outborn/inborn birth status. Arch Dis Child Fetal Neonatal Ed. 2017
- Transport of premature infants is associated with increased risk for intraventricular haemorrhage. Arch Dis Child Fetal Neonatal Ed. 2010

September 1, 2010

Perinatal Regionalization for Very Low-Birth-Weight and Very Preterm Infants

A Meta-analysis

Sarah Marie Lasswell, MPH; Wanda Denise Barfield, MD, MPH; Roger William RoCHAT, MD; [et al](#)

» [Author Affiliations](#)

JAMA. 2010;304(9):992-1000. doi:10.1001/jama.2010.1226

Data Synthesis We observed increased odds of death for VLBW infants (38% vs 23%; adjusted OR, 1.62; 95% confidence interval [CI], 1.44-1.83) and VPT infants (15% vs 17%; adjusted OR, 1.55; 95% CI, 1.21-1.98) born outside of level III hospitals. Consistent results were obtained when restricted to higher-quality evidence (mortality in VLBW infants, 36% vs 21%; adjusted OR, 1.60; 95% CI, 1.33-1.92 and in VPT infants, 7% vs 12%; adjusted OR, 1.42; 95% CI, 1.06-1.88) and infants weighing less than 1000 g (59% vs 32%; adjusted OR, 1.80; 95% CI, 1.31-2.46). No significant differences were found through subgroup analysis of study characteristics. Meta-regression by year of publication did not reveal a change over time (slope, 0.00; $P = .87$).

Conclusion For VLBW and VPT infants, birth outside of a level III hospital is significantly associated with increased likelihood of neonatal or pre-discharge death.

Context For more than 30 years, guidelines for perinatal regionalization have recommended that very low-birth-weight (VLBW) infants be born at highly specialized hospitals, most commonly designated as level III hospitals. Despite these recommendations, some regions continue to have large percentages of VLBW infants born in lower-level hospitals.

Objective To evaluate published data on associations between hospital level at birth and neonatal or pre-discharge mortality for VLBW and very preterm (VPT) infants.

Data Sources Systematic search of published literature (1976-May 2010) in MEDLINE, CINAHL, EMBASE, and PubMed databases and manual searches of reference lists.

Study Selection and Data Extraction Forty-one publications met a priori inclusion criteria (randomized controlled trial, cohort, and case-control studies measuring neonatal or pre-discharge mortality among live-born infants ≤ 1500 g or ≤ 32 weeks' gestation delivered at a level III vs lower-level facility). Paired

Short- and Long-Term Outcomes of Extremely Preterm Infants in Japan According to Outborn/Inborn Birth Status

Pediatric Critical Care Medicine, 2019
Report from NRNJ database

Yoshihito Sasaki, MD, PhD¹; Kaoru Ishikawa, MD, PhD²; Akira Yokoi, MD, PhD³;
 Tomoaki Ikeda, MD, PhD⁴; Kazuo Sengoku, MD, PhD⁵; Satoshi Kusuda, MD, PhD⁶;
 Masanori Fujimura, MD, PhD⁷

TABLE 2. The Multivariate Logistic Regression Analysis of Short-Term Outcomes

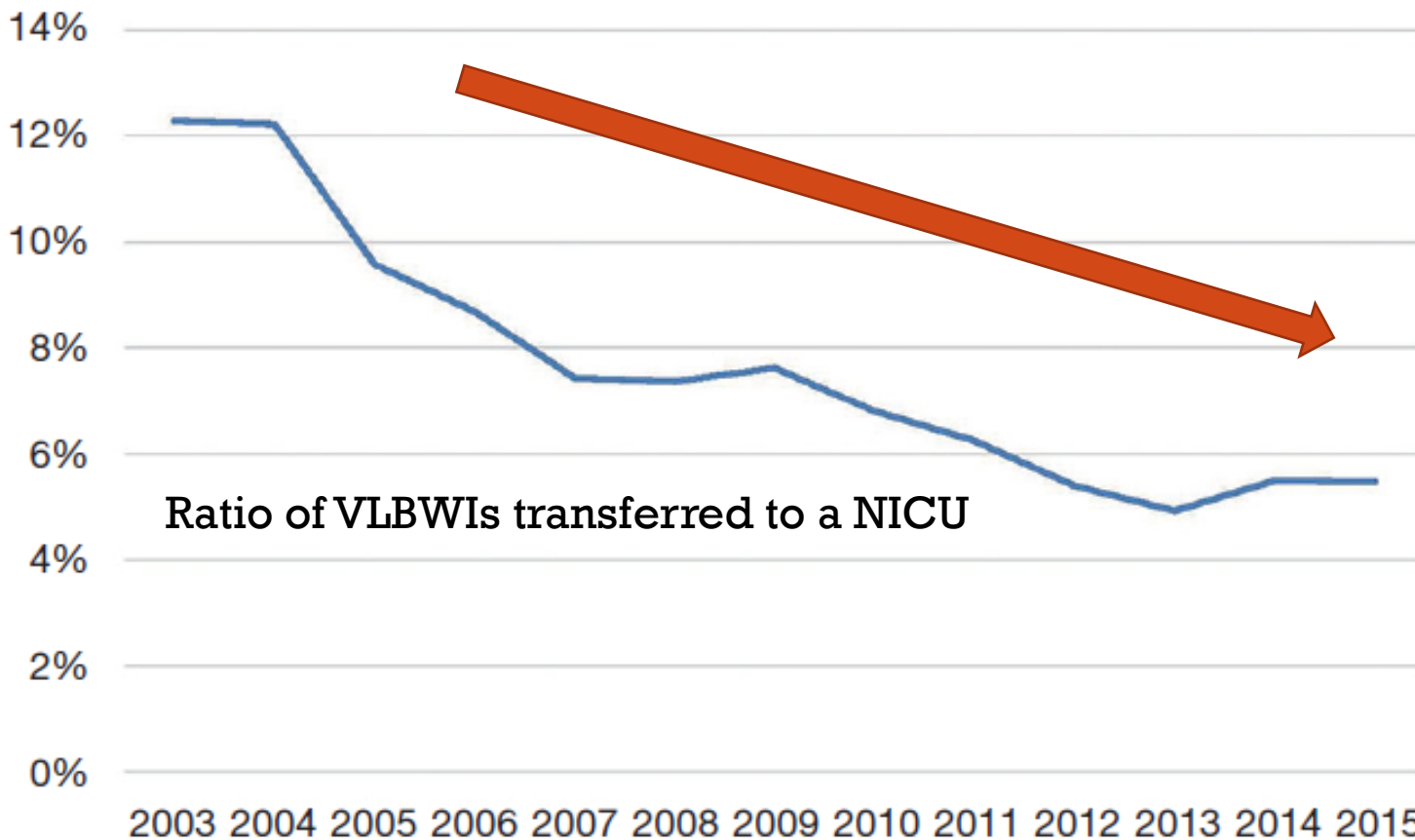
Variable	Outborn	Inborn	Adjusted OR (95% CI)	p
Total number of infants admitted to neonatal ICU	785	11,379		
Respiratory distress syndrome, <i>n</i> /total <i>n</i> (%)	610/784 (77.8)	8,414/11,315 (74.4)	1.141 (0.882–1.475)	0.315
Chronic lung disease, <i>n</i> /total <i>n</i> (%)	212/763 (27.8)	3,530/10,957 (32.2)	1.041 (0.827–1.310)	0.733
Surgery of patent ductus arteriosus, <i>n</i> /total <i>n</i> (%)	87/784 (11.1)	1,216/11,295 (10.8)	1.082 (0.779–1.501)	0.638
Severe intraventricular hemorrhage, <i>n</i> /total <i>n</i> (%)	118/776 (15.2)	1,093/11,273 (9.7)	1.494 (1.115–2.001)	0.007
Cystic periventricular leukomalacia, <i>n</i> /total <i>n</i> (%)	35/782 (4.5)	512/11,317 (4.5)	1.106 (0.726–1.686)	0.639
Sepsis, <i>n</i> /total <i>n</i> (%)	113/784 (14.4)	1,651/11,288 (14.6)	0.849 (0.621–1.160)	0.304
Necrotizing enterocolitis or focal intestinal perforation, <i>n</i> /total <i>n</i> (%)	56/783 (7.2)	664/11,293 (5.9)	1.586 (1.092–2.303)	0.015
Severe retinopathy of prematurity, <i>n</i> /total <i>n</i> (%)	138/555 (24.9)	2,207/8,311 (26.6)	0.942 (0.712–1.246)	0.675
Death before discharge, <i>n</i> /total <i>n</i> (%)	109/785 (13.9)	1,591/11,379 (14.0)	1.025 (0.747–1.406)	0.878

Outborn birth is associated with around 1.5 times higher risk of severe IVH

OR = odds ratio.



HOW MANY VLBW NEONATES ARE TRANSFERRED IN JAPAN?



Declining trend of neonatal transfer of VLBWIs in Japan



Increase of antenatal maternal transfer

NEONATAL TRANSFER RATIO OF VLBWIS

- **Finland: 2-4%** (2005-2017); Highly centralized perinatal care
- **England: 20%** (2008-2015); increased after reorganization of care into regional networks in 2007
- **U.S.A: 15%** (2002)
- **Australia: 15.5%** (2010-2011); 22-27 weeks'
- **Japan: 12% (2005) → 6% (2015)**; not centralized, but sophisticated neonatal/maternal transfer system

ASPHYXIA

85% of neonates begin spontaneous breathing within 10 to 30 seconds after birth.

10% of neonates begin spontaneous breathing after drying and stimulation

3% begin breathing with positive-pressure ventilation.

2% of neonates require respiratory support by endotracheal intubation,

0.1% require chest compressions and/or adrenaline

An estimated 1,000,000 children were born in Japan

→ over 100,000 neonates (one in five minutes) required support to stabilize respiration and circulation at birth.

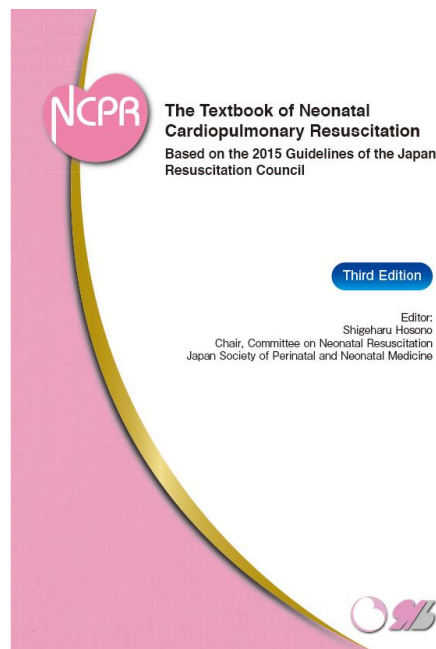
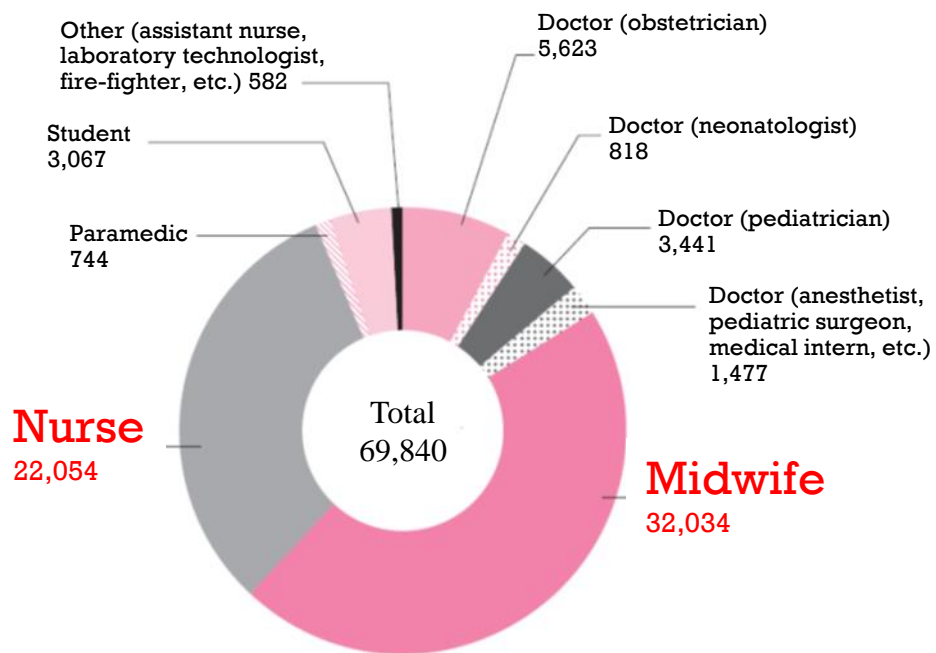
NCPR BY PERINATAL CARE PRACTITIONER AND NEONATAL TRANSFER SYSTEM ARE CRUCIAL

NCPR

Neonatal cardio-pulmonary
resuscitation

Neonatal transfer

Fig. 5 NCPR Training Course Total Number of Certified Individuals (by Occupation) (As of June 2017)



NEONATAL CARDIO-PULMONARY RESUSCITATION PROJECT

SINCE 2007-

NCPR Neonatal Cardio-Pulmonary Resuscitation

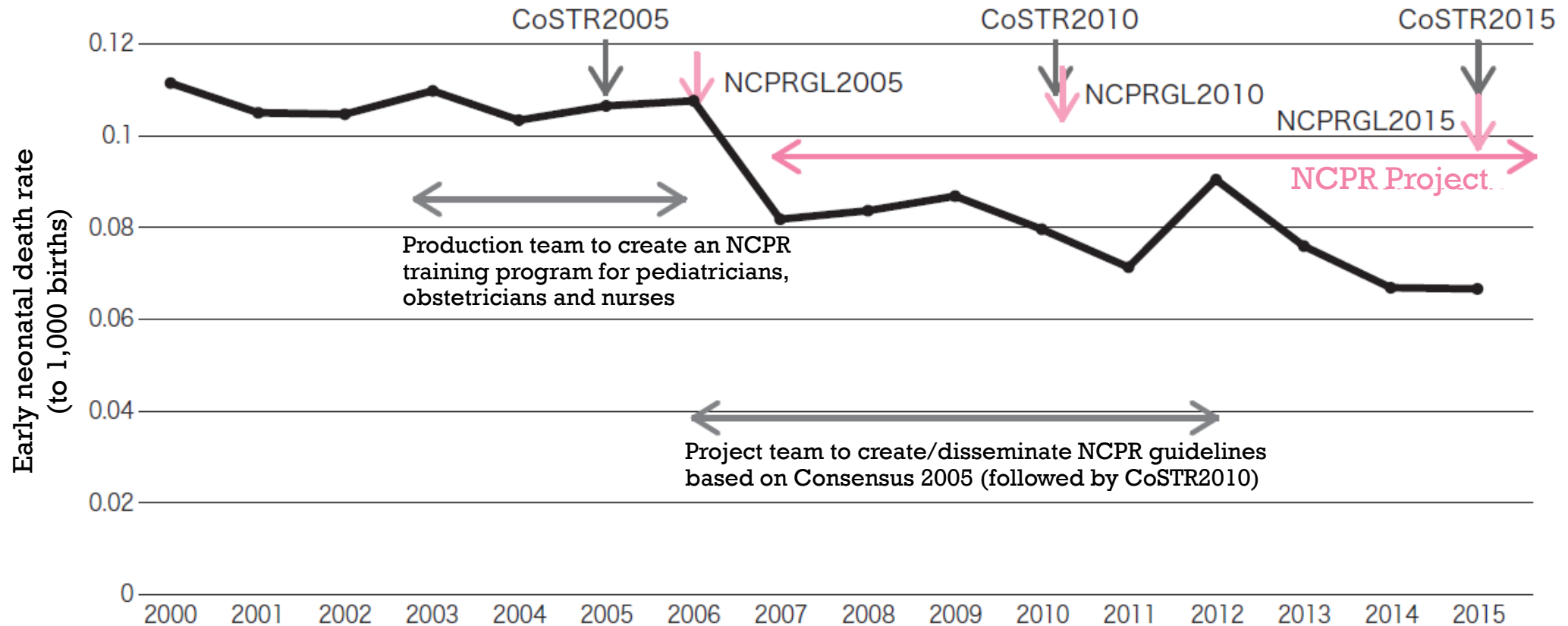
NCPR® Project

Purpose of the Project

The Neonatal Cardio-Pulmonary Resuscitation (NCPR) Project was launched by The Japan Society of Perinatal and Neonatal Medicine (JSPNM) in July 2007. The goal of the NCPR project is to establish a system where all deliveries will be attended by healthcare professionals who have acquired the standard knowledge and skill of neonatal resuscitation.

THE RATE OF EARLY NEONATAL DEATH CAUSED MAINLY BY BIRTH ASPHYXIA DROPPED AFTER THE LAUNCH OF NCPR PROJECT

Fig. 8 Rate of Early Neonatal Death Caused Mainly by Birth Asphyxia (to 1,000 Births)



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- How to establish neonatal transfer system

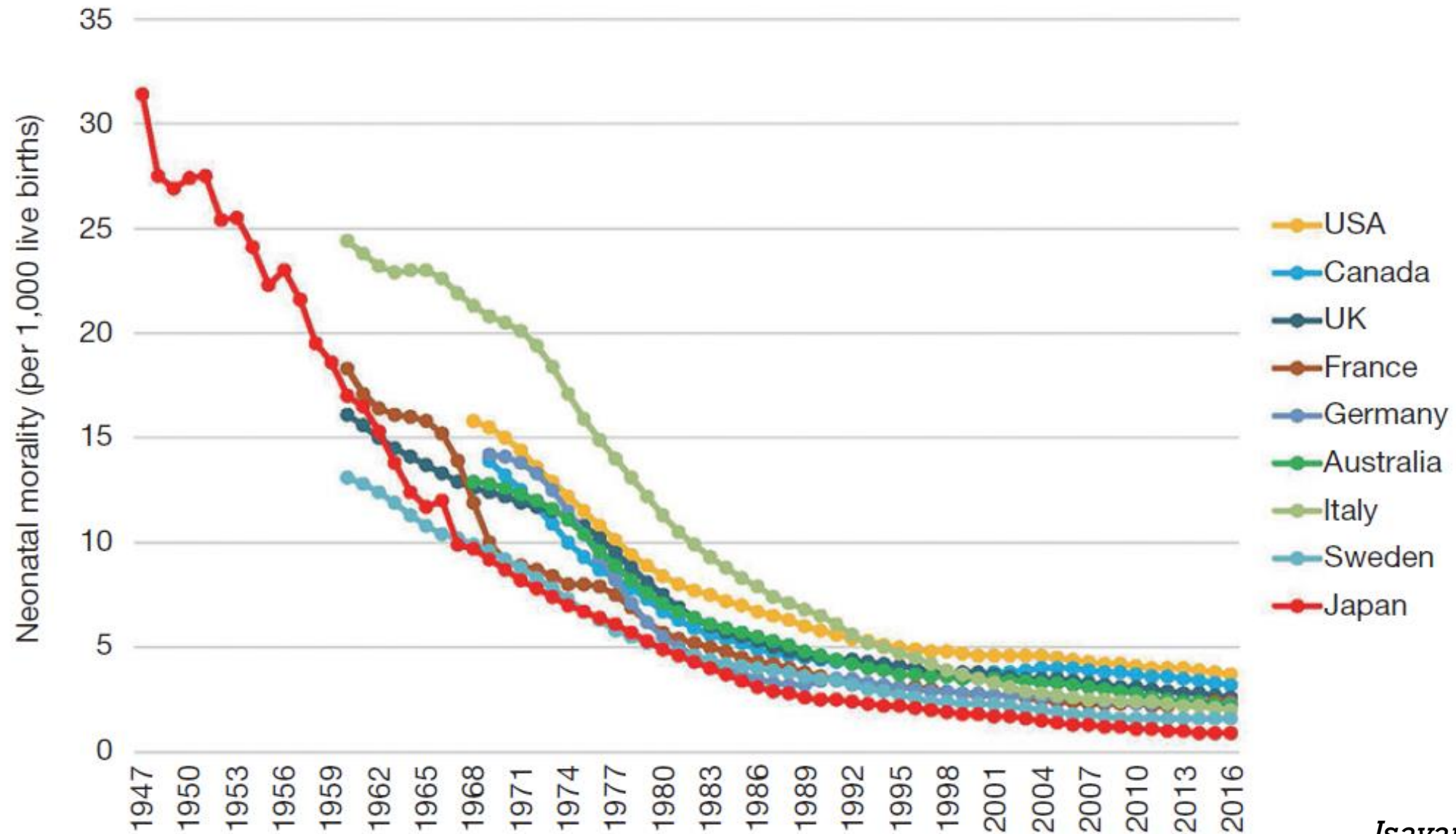
NEONATAL TRANSFER SYSTEM IN JAPAN



JAPAN

- Area; 378,000 km²
(62nd in the world)
- Total population; 126,420,000
(10th in the world)
- Birth; 946,045 (2017)

PERINATAL DEATH RATE IS QUITE LOW IN JAPAN



A COMPARISON OF OUTCOMES OF VLBWIS IN JAPAN AND OTHER COUNTRIES

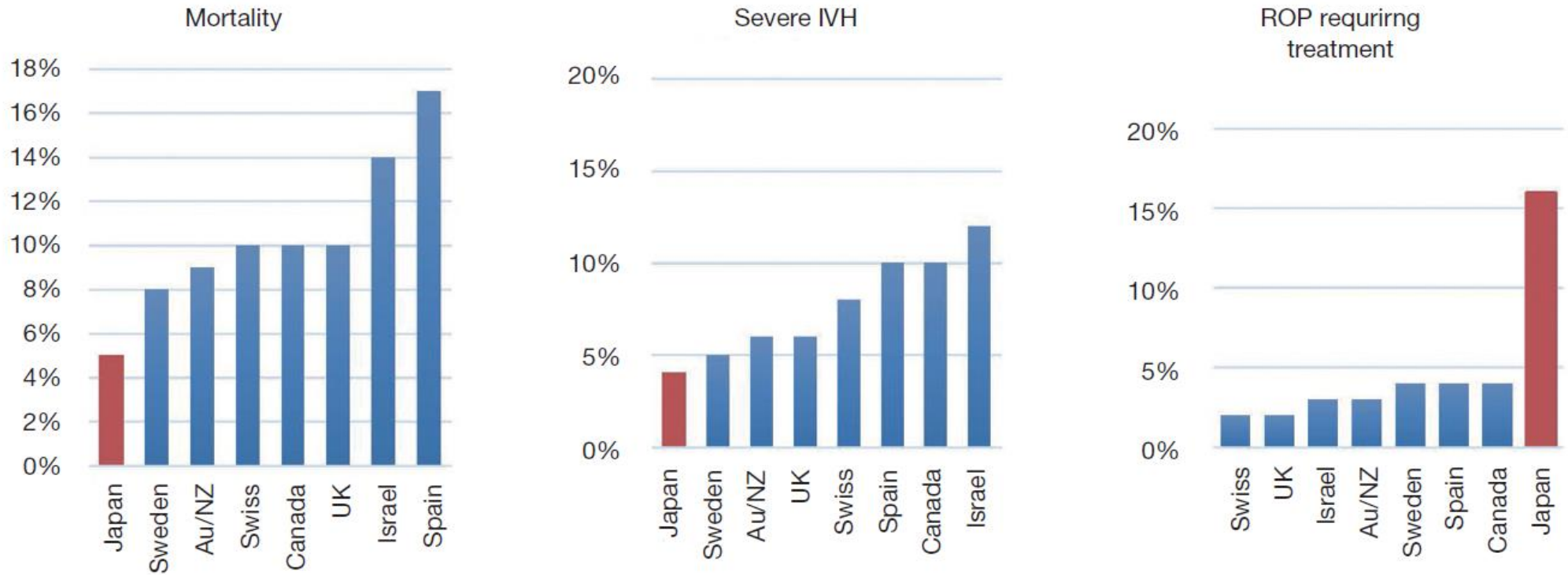


Figure 3 Mortality and morbidity among countries and regions of iNeo. The data were derived from Australian and New Zealand Neonatal Network (Au/NZ), Canadian Neonatal Network (Canada), iNeo, International Network for Evaluating Outcomes; Israel Neonatal Network (Israel), Neonatal Research Network of Japan (Japan), Spanish Neonatal Network (Spain), Swedish Neonatal Quality Register (Sweden), Swiss Neonatal Network (Swiss), and United Kingdom Neonatal Collaborative (UK) (20).

Shah PS, 2016. Isayama T, 2019.

GUIDELINES FOR PERINATAL CARE

- Guideline for Perinatal Medical Care System:

25-30 beds to 10,000 births in every prefecture

- **General perinatal medical centers** provides:
high-level intensive neonatal care (NICU>9 beds) &
high-level intensive obstetric maternal-fetal care
(MFICU>6beds)

- Allocate 2-3 regional perinatal medical centers to one general perinatal medical center
- Allocate **neonatal transfer coordinators** to each prefecture



PERINATAL CARE SYSTEM

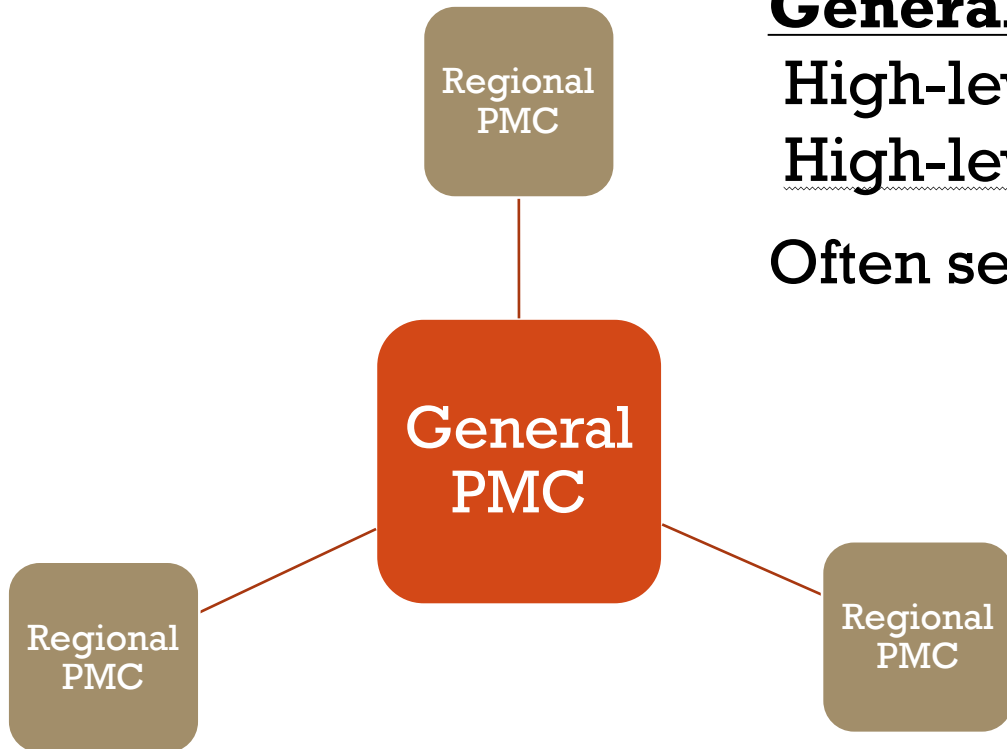
General Perinatal Medical Center

High-level intensive **neonatal** care &

High-level intensive **obstetric maternal-fetal** care

Often serve as obstetric/neonatal coordinate center

Standalone children's hospital without obstetric unit cannot be designated as general PMCs

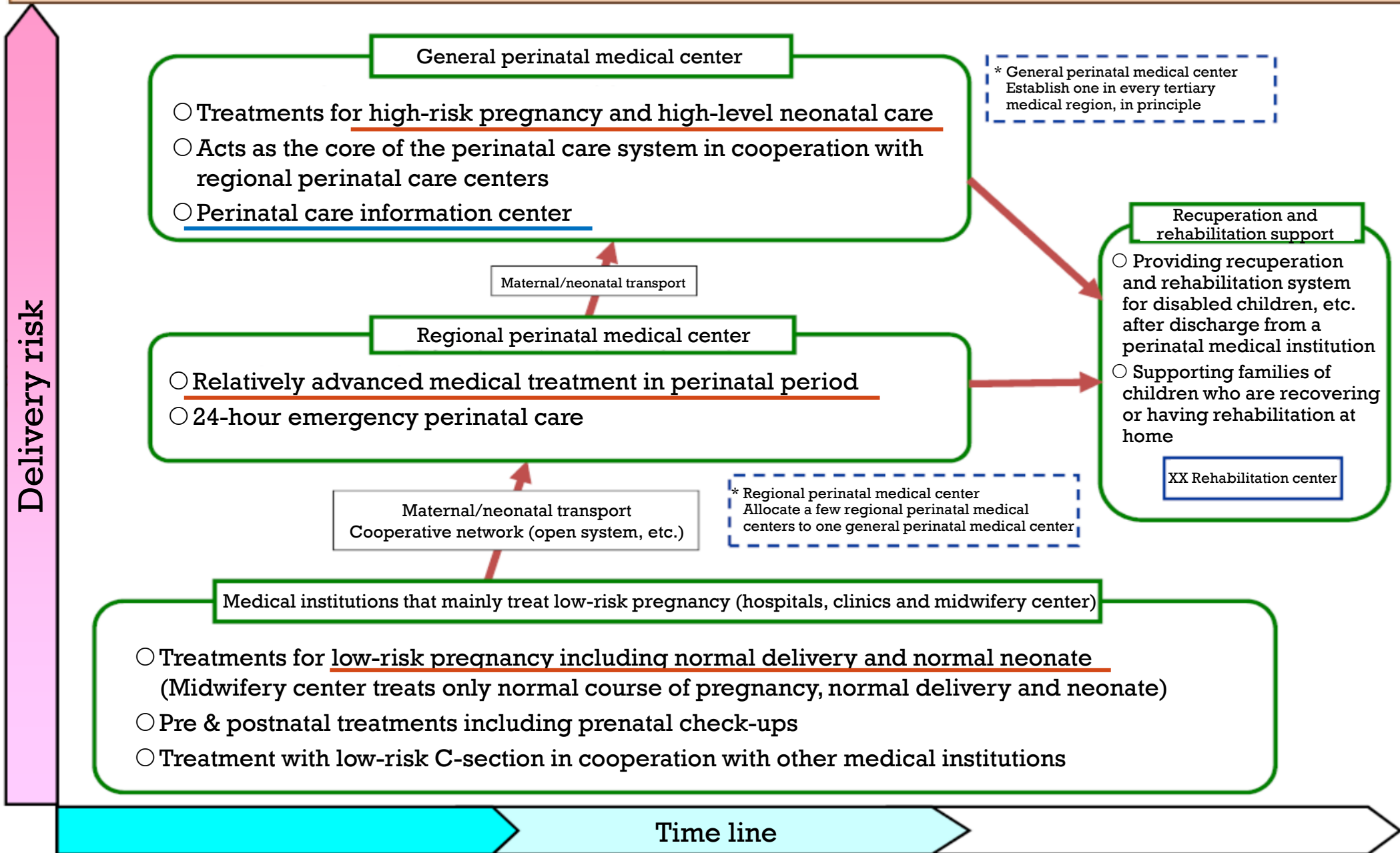


Now **108** general PMCs in Japan
300 regional PMCs (2019)

Improved perinatal care system may explain the decline of neonatal transfer ratio in Japan.



Perinatal Care System

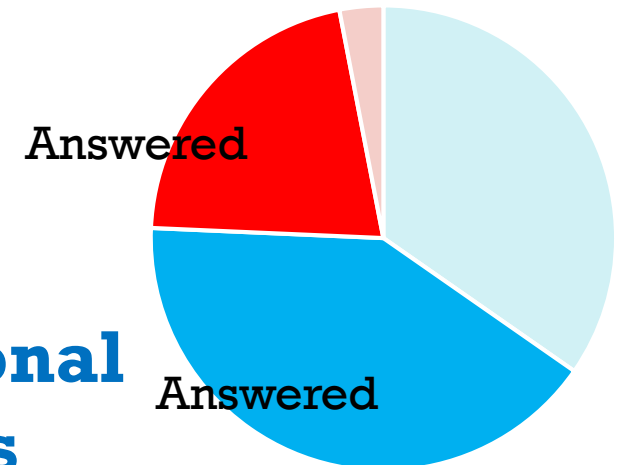




Brief Report

Nationwide survey of neonatal transportation practices in JapanTakehiko Hiroma,¹ Hiroyuki Ichiba,² Kazuko Wada,³ Jun Shiraishi,⁴ Hiroshi Sugiura⁵ and Tomohiko Nakamura^{1,6}¹*Division of Neonatology, Nagano Children's Hospital, Azumino,* ²*Division of Neonatology, Osaka City General Hospital, Osaka,*³*Department of Pediatrics, Osaka University Hospital General Perinatal Medical Center, Suita,* ⁴*Department of Neonatal Medicine, Osaka Medical Center and Research Institute for Maternal and Child Health, Izumi,* ⁵*Division of Neonatology, Seirei Hamamatsu General Hospital, Hamamatsu,* and ⁶*Division of Neonatology, Department of Pediatrics, Shinshu University School of Medicine, Matsumoto, Japan*

Survey conducted in 2012

Response rate **62.3 % (246/395 centers)**High response rate from general PMCs**2001/2765 (72.8%)** NICU beds were included**General PMCs****Regional PMCs**

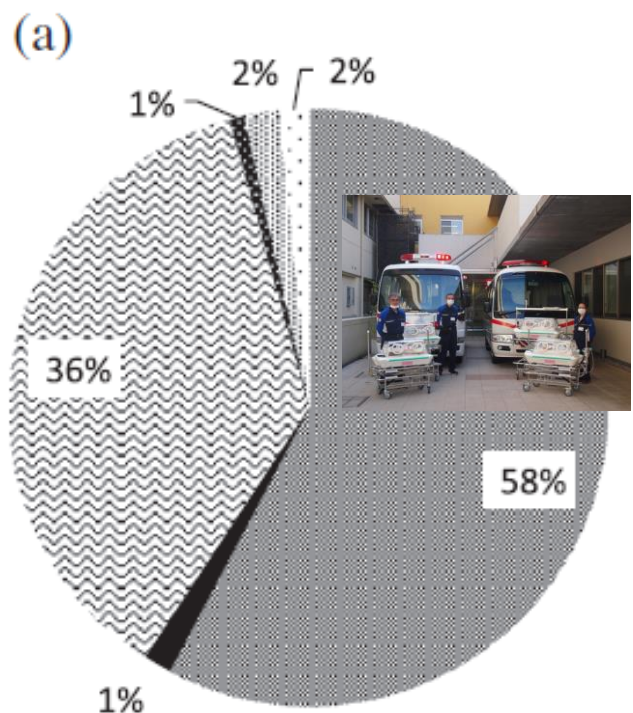
HOW MANY NEONATES ARE TRANSFERRED IN JAPAN?

From the survey, **11818/55331 (20.5%)** were transferred to the medical centers from other institutions.

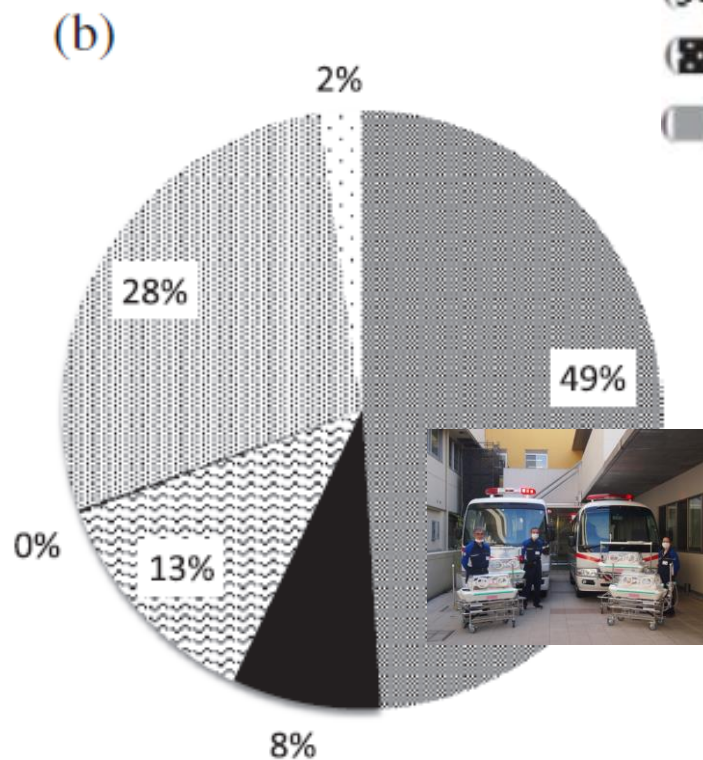
- Approximately **15,000 newborns are estimated to be transferred** each year in Japan! (2012)

DETAILS OF EMERGENCY VEHICLES USED IN NEONATAL TRANSFER

- Specialized ambulance for neonatal transfer;
- hospital ambulance;
- ☞ fire department ambulance;
- ☒ medical helicopter;
- other; (∴) unknown.



**Sick newborns
(n=8016)**



**Back transfer
(n=1746)**

Even in Japan, ambulance not specialized for neonatal transfer (e.g. fire department ambulance) is widely used in neonatal transfer.

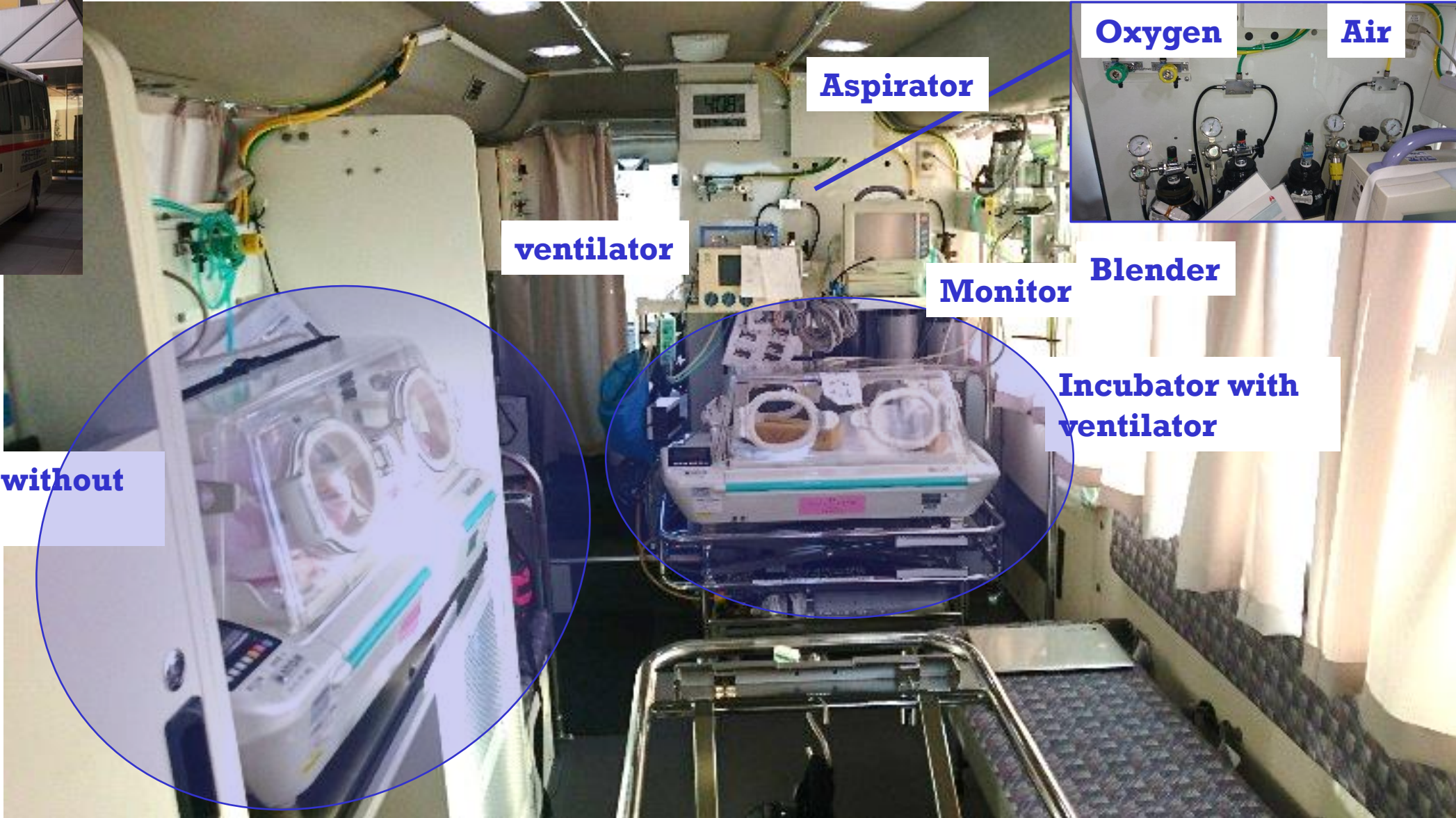
SPECIALIZED AMBULANCE FOR NEONATAL TRANSFER



SPECIALIZED AMBULANCE FOR NEONATAL TRANSFER



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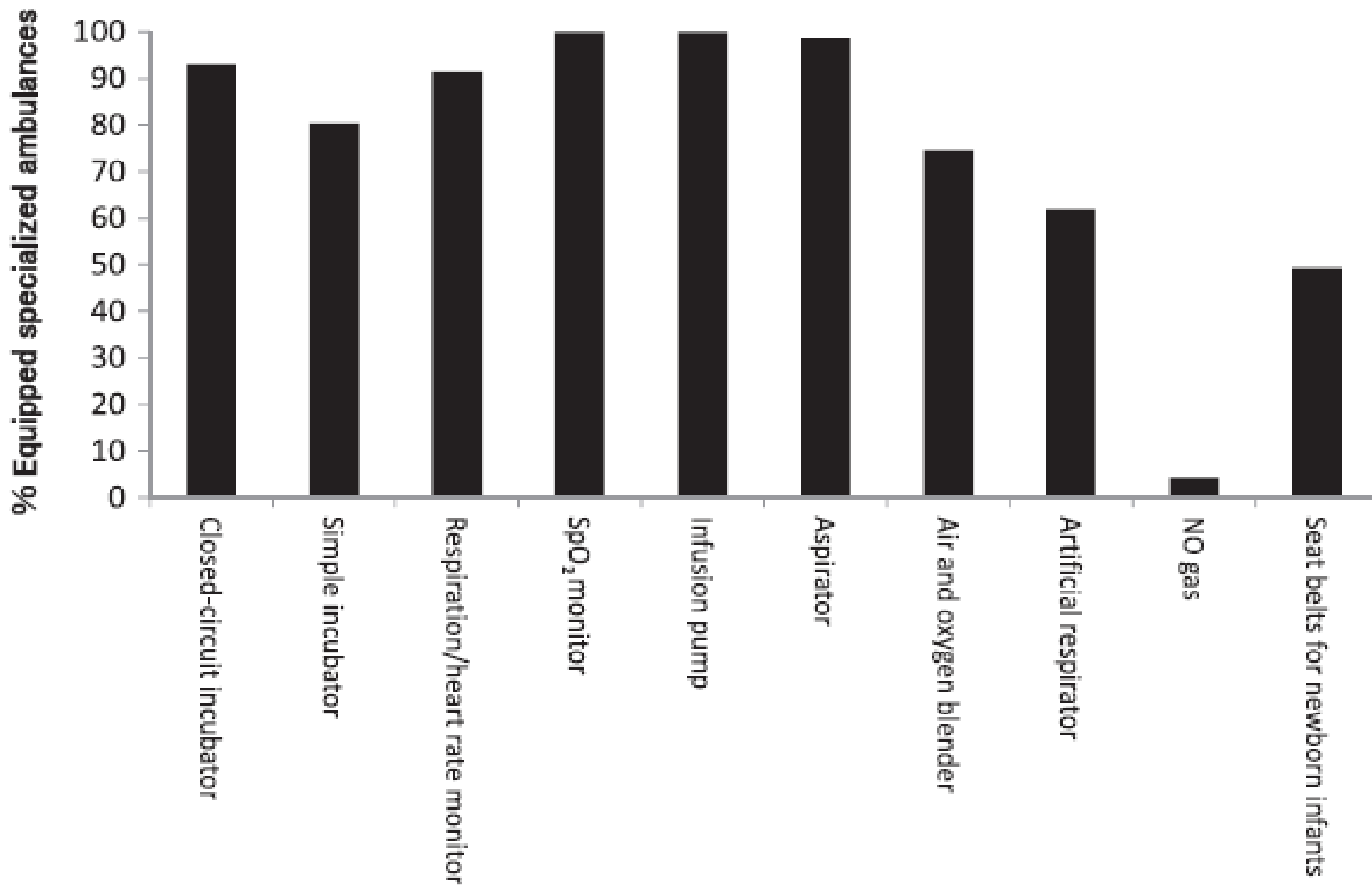


Fig. 2 Proportion of specialized neonatal transport ambulances carrying specific equipment.

TODAY'S TOPICS

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NEONATAL TRANSFER IN OSAKA



Osaka Prefecture

Population: 8,800,000 (2018)

66,000 birth/year (2017)

Neonatal transfer 700-800/year

Maternal transfer 2000/year



COMPARISON OSAKA & FINLAND



6 general PMCs
- 2 Coordinate institute
23 regional PMCs

Osaka Prefecture

Population: 8,800,000 (2018)
66,000 birth/year (2017)

1,905 km²



X180 in size



5 Level III perinatal centers
17 Level II hospitals
1 Level I hospital

Finland

Population: 5,500,000
50,000-60,000 birth/year

338,000 km²

Infant mortality 1.9/1,000 (2017)





COMPARISON OSAKA & FINLAND



Figure 1 Annual rate of very preterm infants (gestational age <32 weeks) born alive in level 3 hospitals in Finland 1987–2017.

5 Level III perinatal centers
17 Level II hospitals
1 Level I hospital

Infant mortality 1.9/1,000 (2017)

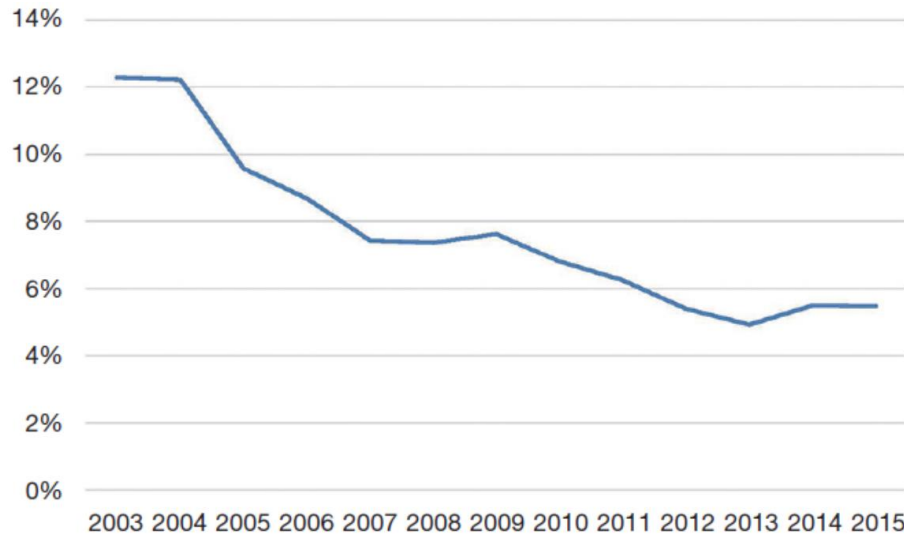
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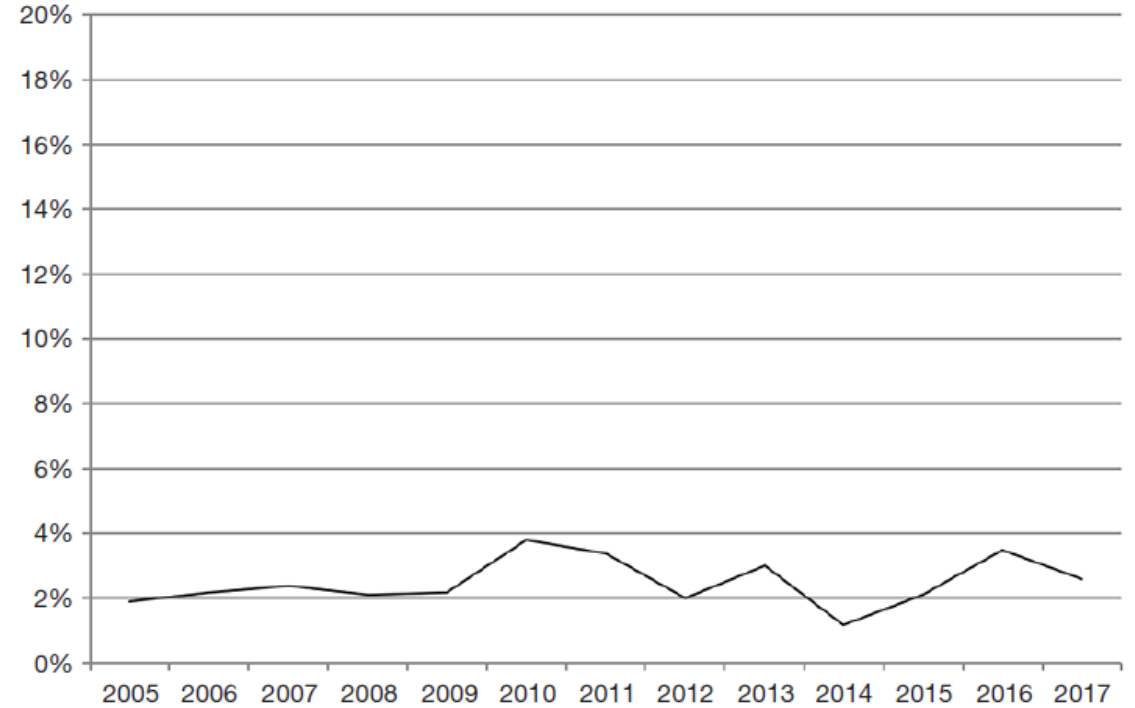


COMPARISON OSAKA & FINLAND

Neonatal transfer ratio of VLBWIs



Japan



Finland

Population: 5,500,000
50,000-60,000 birth/year



NEONATAL MUTUAL CO-OPERATIVE SYSTEM

Osaka regional neonatal transfer network

Since 1977-present

Osaka is a pioneer of neonatal transfer system in Japan !!

We provide neonatal transfer 700-800/year

- 6 general PMCs
- 2 Coordinate institute
- 23 regional PMCs

About 150 clinics/hospitals handle delivery in Osaka



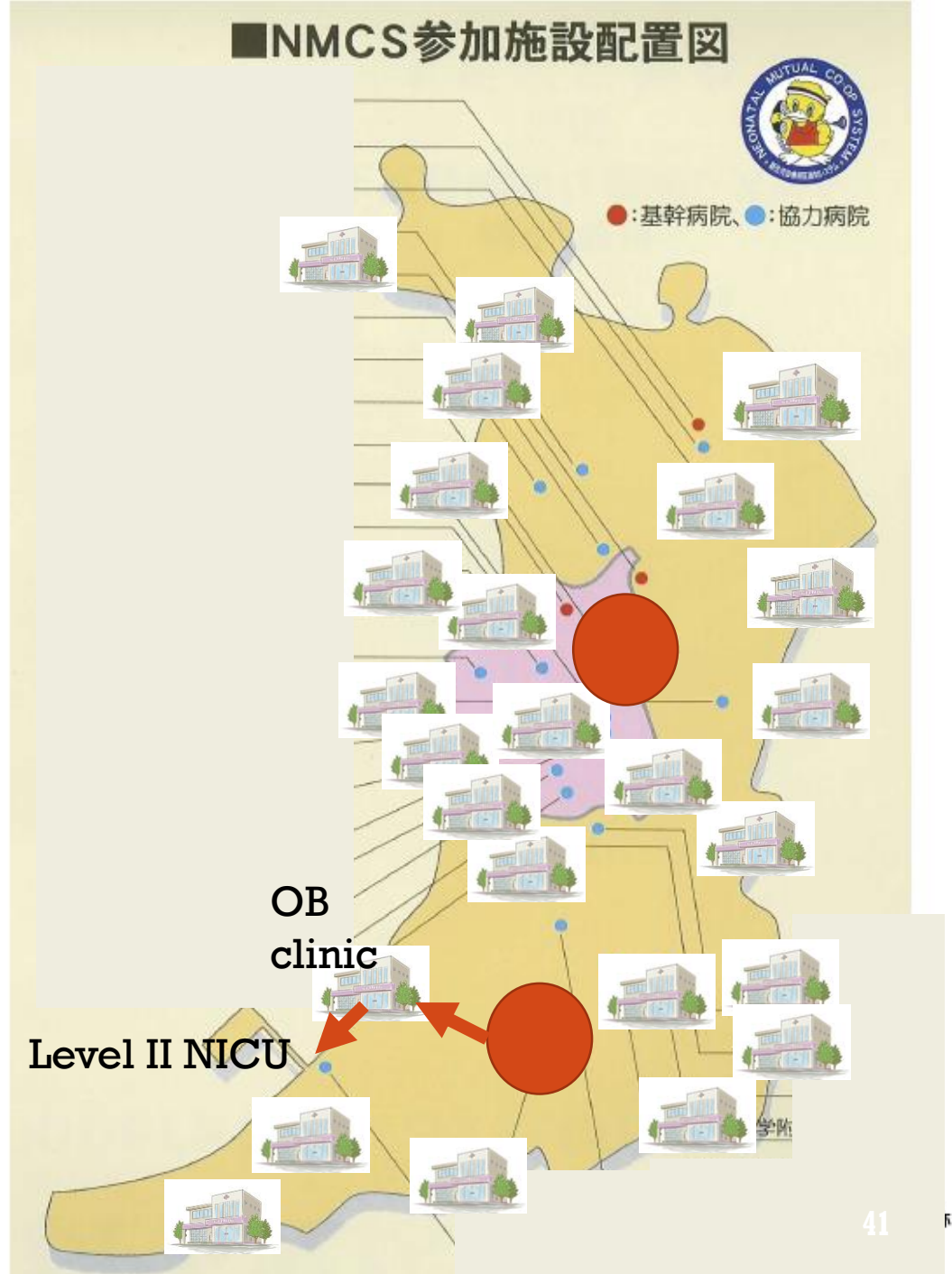
NEONATAL MUTUAL CO-OPERATIVE SYSTEM

Includes **all** obstetric clinics, hospitals and NICUs in Osaka

A clinic **contacts a coordinate institute** when they require a neonatal transport

A neonatologist visits a clinic by EMS vehicle for first response if a neonate requires medical attention.

The neonate is **transferred to appropriate NICU** if NICU admission is required



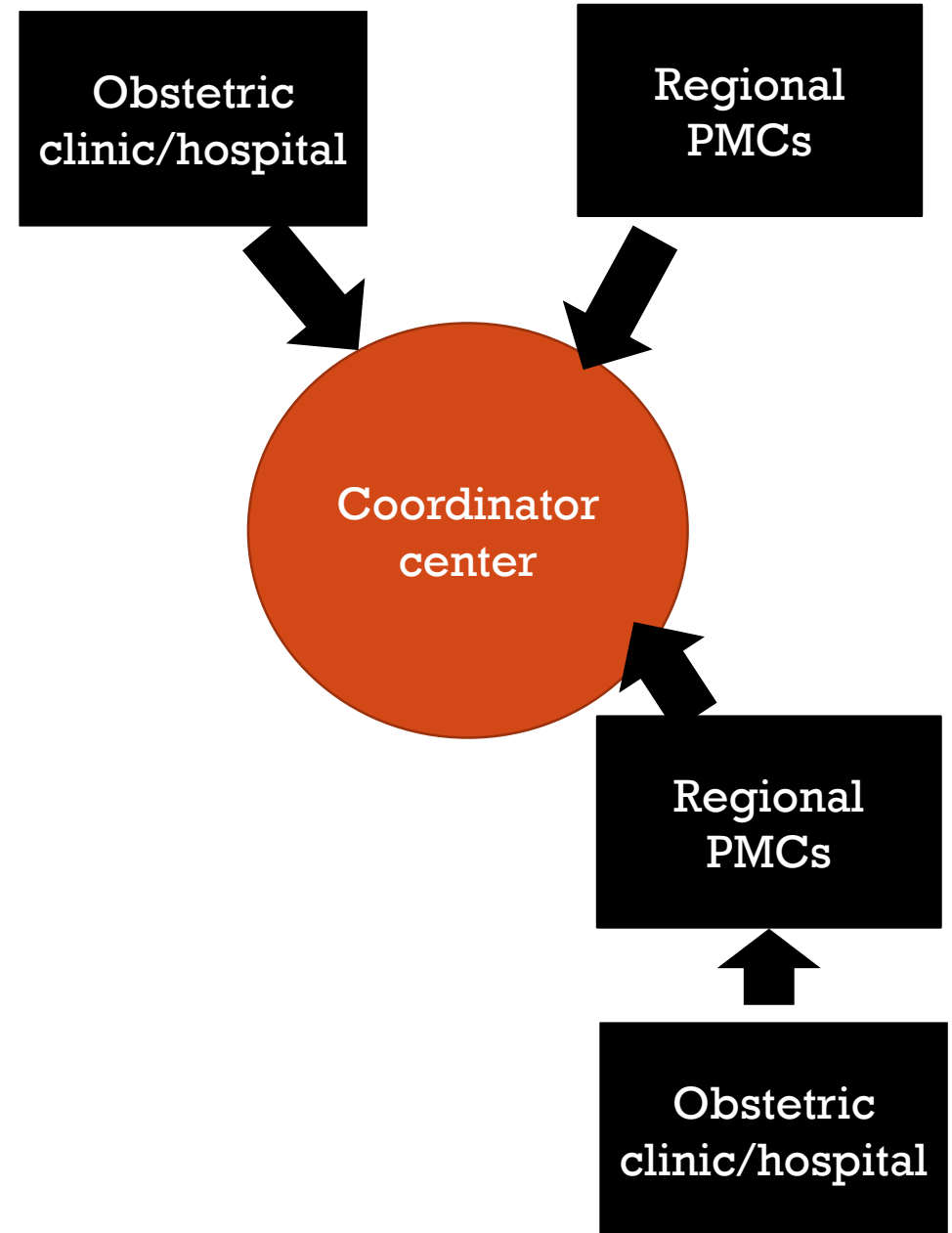
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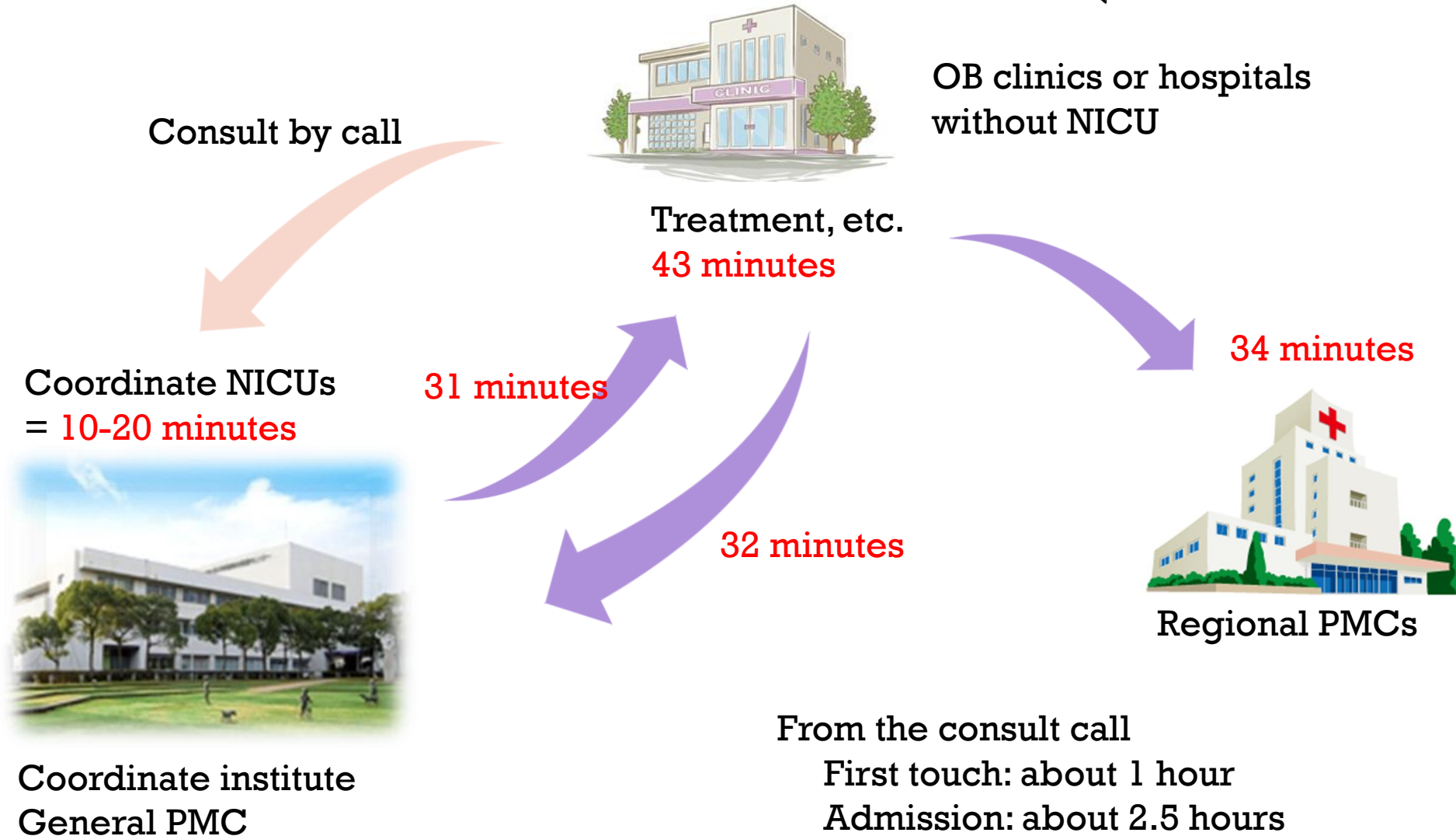
A clinic **contacts a coordinate institute** when they require a neonatal transport

A neonatologist visits a clinic by EMS vehicle for first response if a neonate requires medical attention.

The neonate is **transferred to appropriate NICU** if NICU admission is required



TIME REQUIRED FROM NEONATAL TRANSFER REQUEST TO NICU ADMISSION (NMCS OSAKA)



ONLINE INFORMATION SYSTEM

Online sharing of data on preparedness of each institute

Update every day

周産期情報システム						空床情報照会																						
Neonatal Mutual Co-operative System											Obstetric & Gynecologic Cooperative System																	
facilities	Beds	入院	a呼	b確保	入院可		Cardiac surgery	Pediatric surgery	Brain surgery	NMCS				陰圧個室	備考	更新日時	昼間		夜間		循環器疾患	脳疾患	感染症	交通事故	救命救急	在胎週数	推定体重 (g)	備考
					要	不要				NO吸入療法	ECMO	dialysis	hypothermia				新生児関連	母体救急	新生児関連	母体救急								
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箕面市立病院							○	○	○	○						○	○	×	×	×	×	×	×	×	36	2,000	時間外は37週以降	
愛仁会 高槻病院	48	49	8	1	1	1	×	○	○	○	○	○	○	19/09/09 07:37	○	○	○	○	○	○	△	×	×	×	22	500	産婦人科ホットライン 01288-0624 *	
大阪医科大学附属病院	15	16	4	2	0	0	○	○	×	○	○	×	○	19/09/10 07:25	○	○	○	○	○	○	○	○	○	○	23	400	* 周産期ホットライン -684-6791 or 代表 072-683-1	
関西医科大学附属病院	27	20	3	1	1	1	○	○	○	○	×	○	○	19/09/09 18:17	○	○	○	○	○	○	○	○	○	○	22	500	産科緊急搬送用直通電話 072-804-2604	
八尾市立病院	6	6	0	1	0	0	×	×	×	×	×	×	×	19/09/10 17:50	×	×	×	×	×	×	×	×	×	×	28	1,000	*	
市立東大阪医療センター	6	6	0	1	0	0	×	×	×	×	×	×	×	19/09/09 09:46	×	○	×	○	×	×	×	×	×	×	30	1,500		
大阪府済生会 野江病																												

メニューへ戻る

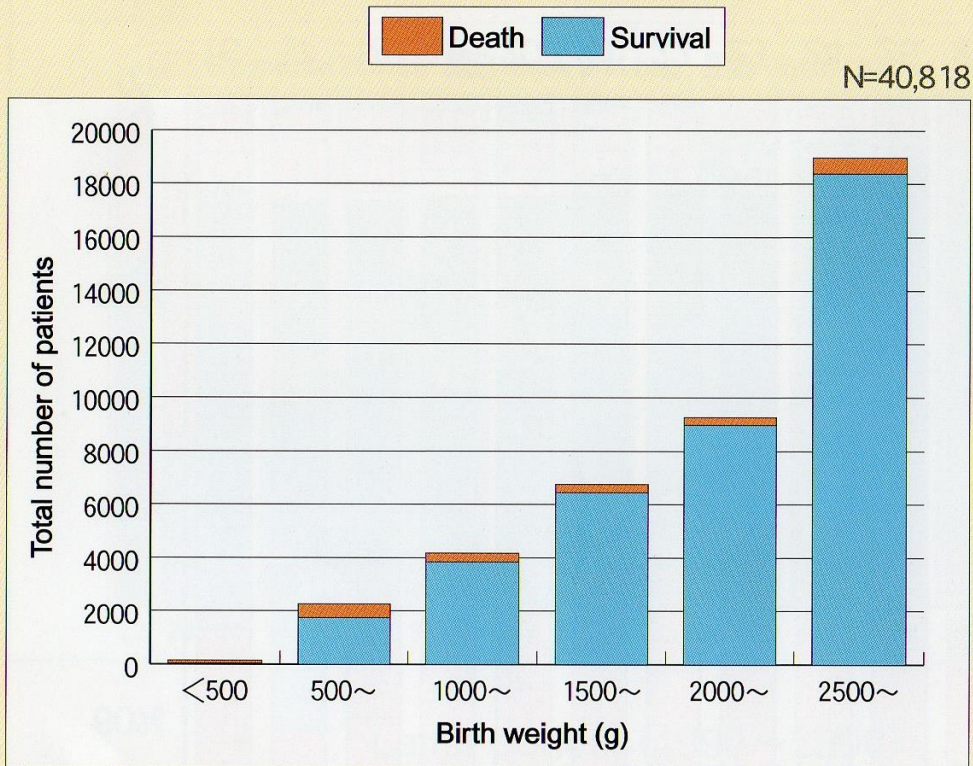
▼ 更新してください。

- 最終更新時より、12時間未満が経過
- 最終更新時より、12時間以上~24時間未満が経過
- 最終更新時より、24時間以上が経過

NMCS、OGCSの各情報の入力、更新日付欄の情報入力をクリックしてください。

NMCS OSAKA DATA (1980-2000)

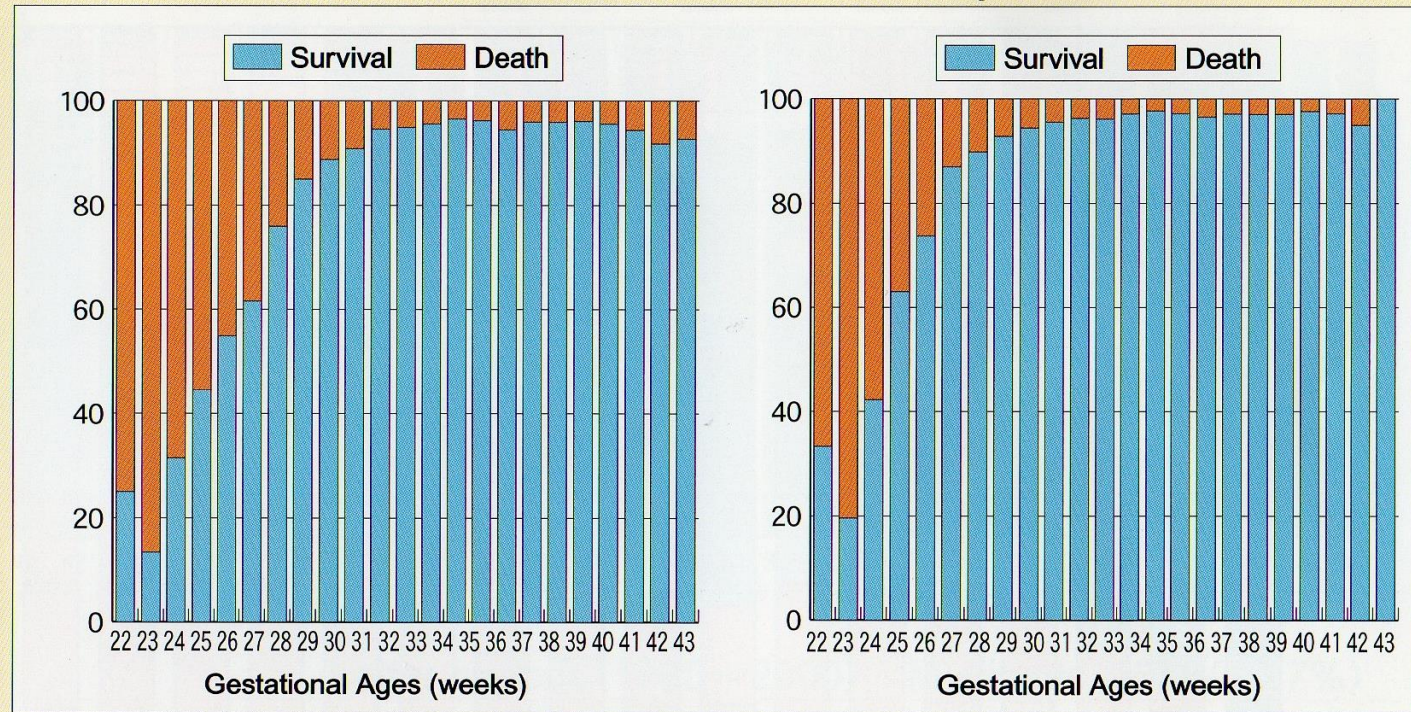
Mortality / Classified by Birth weight



Changes in Survival Rate
- Classified by Gestational Age -

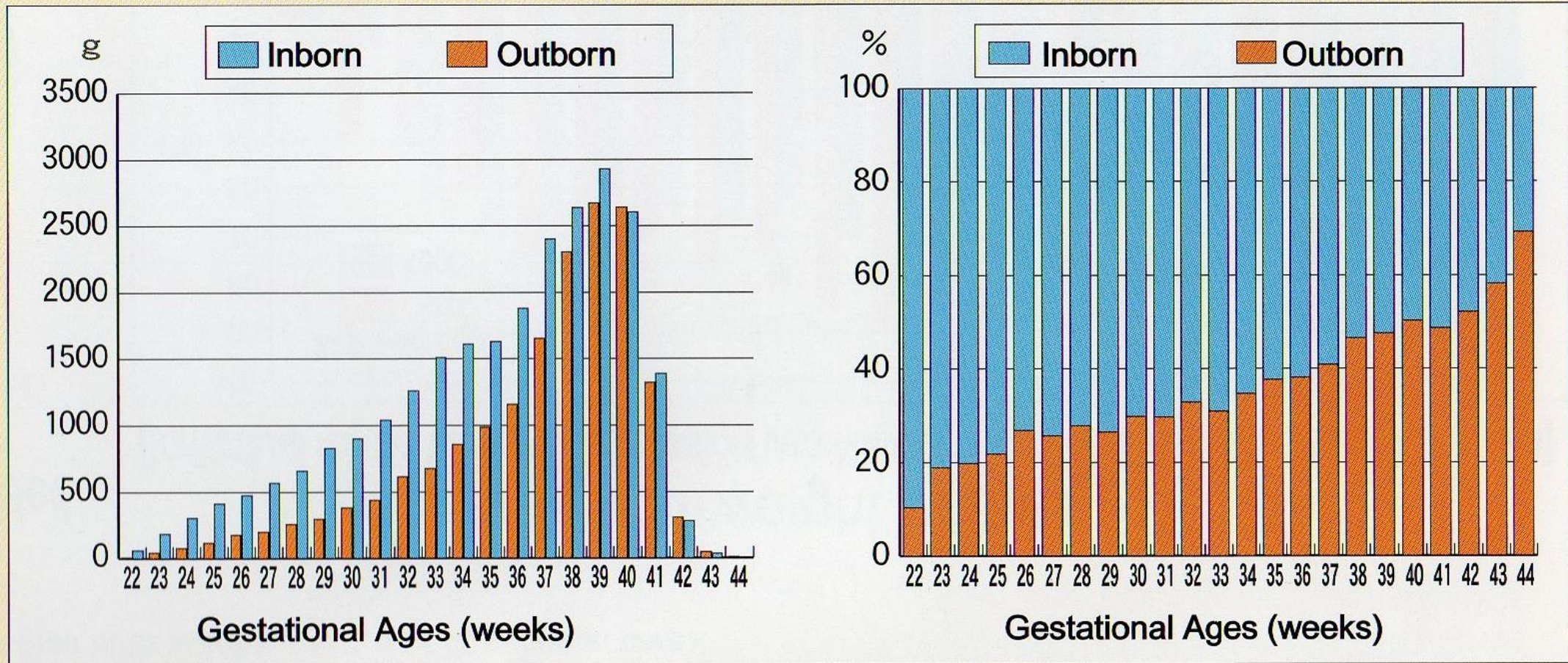
Former period (1980~89)

Latter period (1990~2000)



When the former and latter periods are compared, the survival rate has been improved for all gestational ages lower than 30 weeks. In the past 10 years, the survival rate is over 60% for 25 weeks and over 90% for 28 weeks.

- Classified by Gestational Age - NMCS Osaka data (1980-2000)



These graphs show that the shorter the gestational age, the greater the number and percentage of inborn and that the pregnant women with threatened premature delivery are likely to be transferred to the department of obstetrics of the NMCS hospitals. It is a problem to be solved in the future that about 20% of very premature delivery is still performed outside the NMCS hospitals.

→ Nowadays, we seldom experience outborn delivery of VLBWIs

Obstetrical and gynecological mutual cooperative system



1987~

Accept all emergency-transported pregnant women and other obstetric and gynecological patients

- ① Cardiopulmonary arrest or a loss of consciousness of the mother
→ emergency medical assistance immediately
- ② Maternal body rescue
→ OGCS institute combined with critical care center
- ③ Fetus emergency
→ OGCS institute which received the call
If not acceptable, coordinator institute will seek the hospital

Resolve within 15 minutes!

**CENTRALIZATION (AS IN FINLAND) MAY BE THE
BEST,
BUT NOT EASY TO ACHIEVE.**

**IMPROVED NEONATAL TRANSFER SYSTEM (AS IN
JAPAN) MAY BE THE SECOND BEST PLAN**

TODAY'S TOPICS

- Introduction of neonatal transfer
- Neonatal transfer in Japan
- Neonatal transfer in Osaka
- **How to establish neonatal transfer system**

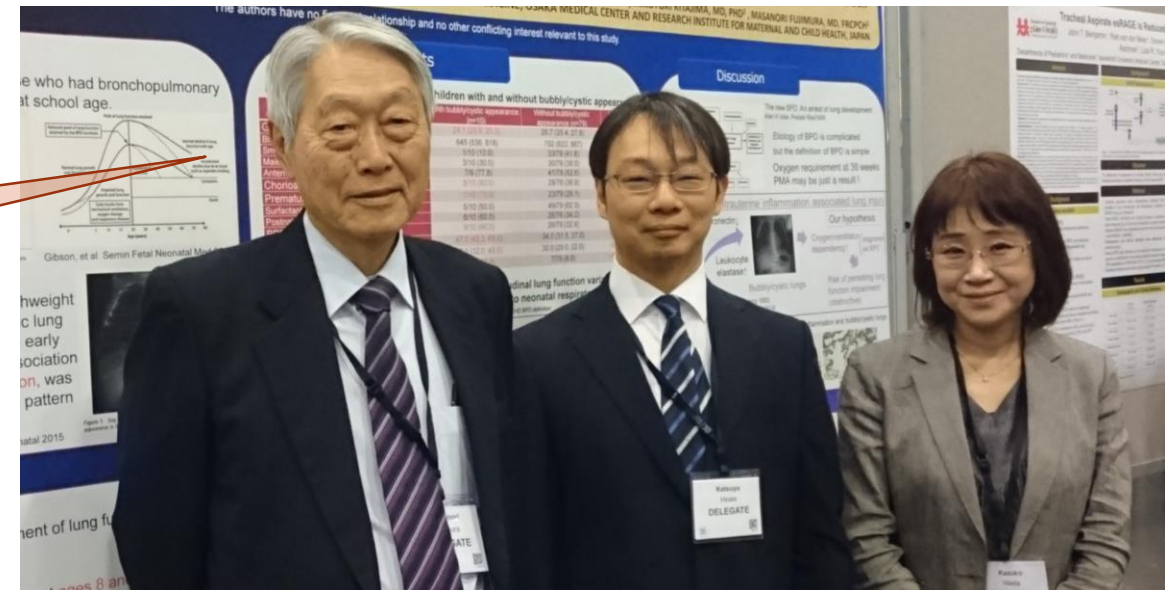
WHY ESTABLISH NEONATAL TRANSFER SYSTEM?

Because...

Not all high-risk deliveries can be predicted and maternal transport is not always possible in some situations, postnatal transport of neonatal patients cannot be totally avoided.

Be prepared!

By Prof. Masanori Fujimura



Original Article

Duration of inter-facility neonatal transport and neonatal mortality: Systematic review and cohort study

Report from NMCS Osaka

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Results: Systematic review: only one cross-sectional study conducted in an urban area in India was identified. That study showed that neonates with a long duration of transport had 79% higher odds of death than those transported for a short duration after adjusting for the confounding effects. For the cohort study, among 16 429 subjects, full data were available for 4966 neonates. There was strong evidence that those transported for >90 min had more than twice the rate of neonatal death (rate ratio [RR] 2.26, 95% confidence interval [CI]: 1.26–4.04), and some evidence that those transported for between 60 and 89 min had an 80% higher rate of neonatal death (RR 1.81, 95%CI: 1.07–3.06), both compared with those transported for between 30 and 59 min, after adjusting for the confounding effects. A sensitivity analysis on missing values also supported the results.

A long duration > 1 hr of transport is a risk !

Impact of Time to Neonatal Transport on Outcomes of Transient Tachypnea of the Newborn

Report from Osaka Women's and Children's Hospital

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**In case of TTN in
outborn term neonates,
earlier intervention by
neonatologists is
preferable!**

Objective To assess effects of neonatal transport on transient tachypnea of the newborn (TTN) in outborn term neonates.

Study Design This retrospective cohort study included 66 term neonates diagnosed with TTN and transported to the Osaka Women's and Children's Hospital neonatal intensive care unit between January 2003 and March 2018. A multivariate logistic regression analysis identified perinatal and neonatal transport factors associated with adverse short-term outcomes defined as mechanical ventilation >48 hours, continuous positive airway pressure >72 hours, pulmonary hemorrhage, and requirement for inhaled nitric oxide, thoracentesis, or surfactant replacement therapy.

Results A lower gestational age (GA) (37.7 [37.2, 38.3] vs. 39.6 [37.8, 40.3] weeks, $p = 0.002$), longer time to neonatal transport (10.0 [4.3, 25.5] vs. 5.5 [2.7, 9.7] hours, $p = 0.01$), and higher respiratory rates during transport (70 [60, 85] vs. 60 [55, 78.8] breaths/min, $p = 0.04$) were significantly associated with adverse short-term outcomes. After adjusting for GA, sex, cesarean section, and time to neonatal transport, GA (odds ratio [OR], 0.37; 95% confidence interval [CI], 0.24–0.87) and time to neonatal transport (OR, 1.07; 95% CI, 1.01–1.13) were significantly associated with adverse outcomes.

Conclusion Short-term adverse prognosis of TTN is strongly associated with a lower GA and longer time between birth and neonatal transport.

COSTS OF NEONATAL TRANSFER

- **Labor costs**

In-house driver, nurses, on-call allowance for doctors attending transport

- **Equipment costs**

Ambulance (lift alteration, electric generator), respirator, infant incubator, monitor

- **Maintenance costs**

Fuel, insurance, vehicle inspection/repair

Estimation: 300,000 yen/transport

REGULAR ARTICLE

Report from Italy

Evaluation of neonatal transport in a European country shows that regional provision is not cost-effective or sustainable and needs to be re-organised

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Acta Paediatrica 2018

Few reports focused on cost-effectiveness of neonatal transport

ABSTRACT

Aim: There are three dedicated and 41 on-call neonatal emergency transport services (NETS) in Italy, and activity levels vary dramatically. We examined the cost-effectiveness of a hub-and-spoke NETS by looking at the costs and activity levels in the Liguria region and established the financial needs for improving NETS across Italy.

Methods: The cost of running NETS in the Liguria region from 2012 to 2015 was evaluated and analysed, and three different models determined the transports needed each year to provide the best organisational model.

Results: The average number of NETS transports in the Liguria region during the study period was 234, and the models indicated that 200–350 transports per year were the optimal amount of activity that was needed to achieve good financial performance and for the personnel to acquire a suitable skill set. Only five of the 41 on-call Italian NETS and the three dedicated services carried out more than 200 transports a year. Of the rest, 26 carried out up to 100 and 10 carried out 101–200.

Conclusion: Italian NETS, which are managed on the basis of regional decisional autonomy, are expensive and no longer sustainable in this era of limited financial resources. A complete overhaul is urgently needed.

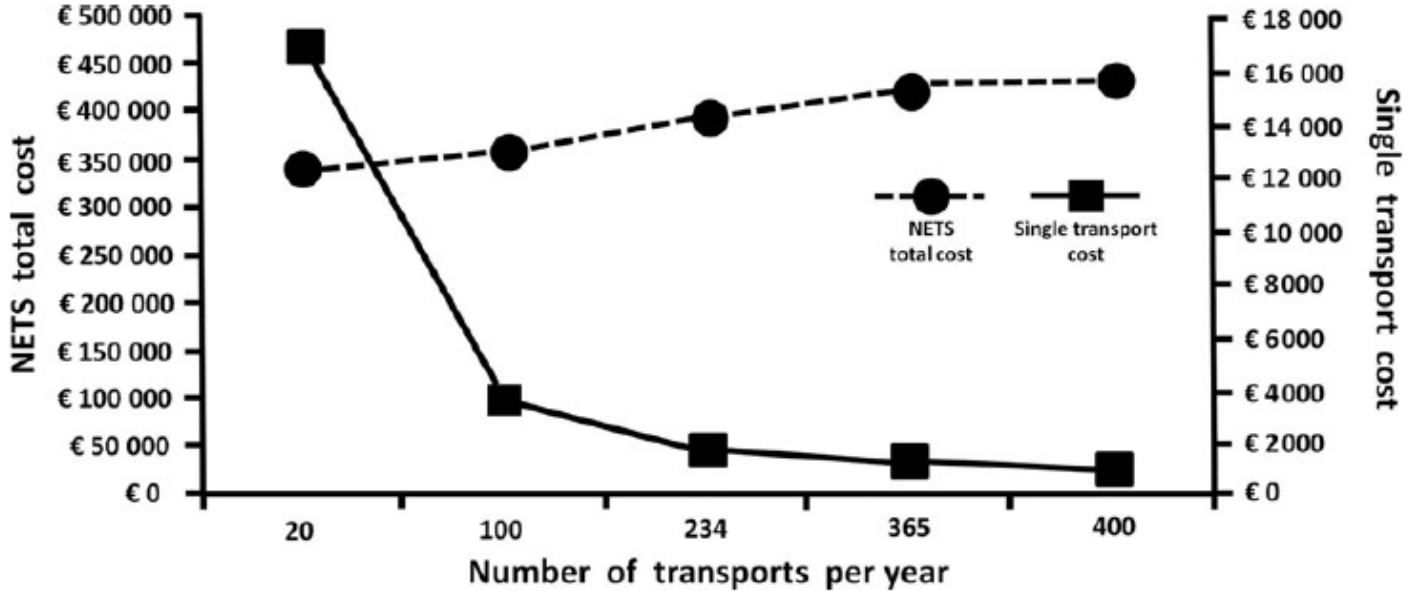


Table 1 NETS' average fixed and variable costs between January 2012 and December 2015

Cost description	€/year
Gaslini Children's Hospital	
Fixed costs	
Healthcare professionals	150 000
Purchase of transport devices (one-fifth)	60 000
Utilities	2500
Personnel updating	15 000
Variable costs	
Drugs and disposables	23 950
Medical gas cylinders	7550
Consumables	2808
Laundry	19 890
Private provider	
Fixed costs	
Personnel	65 000
Ground ambulance purchase (one-fifth)	26 500
Ground ambulance insurance	3000
Ground ambulance maintenance	2000
Variable costs	
Total annual fuel consumption	4200
Government	
Occasional (calculated as fixed)	
Helicopter use	10 000

- Financial reason
 - Maintain adequate levels of staff levels
- Ideal neonatal transport = 200-350/year

Better allocate as many NETSs as possible to one provider

HOW TO ESTABLISH NEONATAL TRANSFER SYSTEM?

- Planned allocation of general PMCs and coordinating centers
 - ✓ A transport is to be available within 60 minutes
 - ✓ Coordinating centers aim to maintain 200 – 350 transports per year
- Establish a communication system for close communication between institutions (online information sharing system)
- Allocate ambulances specialized for neonatal transport
- Create a database on transports
- Require financial support from the central government and local governments

SUMMARY

- Approximately 20% of neonates admitted to NICUs in Japan were transferred from other hospitals.
- Neonatal transport of VLBWIs are decreasing because of increased maternal transport.
- Outborn preterm birth is associated with adverse outcomes.
- Duration of intra-hospital transfer is associated with adverse outcomes.
- Planned allocation of general and regional PMCs and establishment of appropriate maternal/neonatal transfer system are essential.



多謝!

Hope to see you in Japan!



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