移行外来
千葉県循環器病センターACHD診療部
2010年1月ー2010年12月 初診 (>15歳)

113名；　女性63名(56%)
年齢：10代30(27%)、20代52(46%)、30代13(12%)、40(4%)、50代以上13(12%)　　平均年齢28±14歳
修復術後64(57%)、姑息術後5(4%)、手術未施行44(39%)

疾患
心室中隔欠損23、ファロー四徴21、心房中隔欠損16、完全大管転位8、房室中隔欠損6、弁膜症6、単心室6、Ebstein病4、三尖弁閉鎖4、川崎病3、修正大血管転位3
(Fontan循環13、内臓心房錯位症候群7)

受診理由
管理移行57(50%)、セカンドオピニオン42(37%,県外18)、健診4(4%) ,妊娠の可否の相談 5(県外)

患者移行、移行外来について
循環器小児科 vs 循環器科 vs 成人先天性専門医

	循環器小児科	循環器科
CHDに対する知識、興味	十分	乏しい
成人の病気の知識	乏しい	十分
外来	小児科	内科
病棟	多くは小児病棟	内科病棟
標榜科に対する抵抗感	大きい	殆どない
医者の絶対数	少ない（こどもを診るだけで多忙）	多い（成人疾患で多忙）

小児科、循環器科を問わず、
成人先天性心疾患を専門とする医師、医療スタッフが不可欠

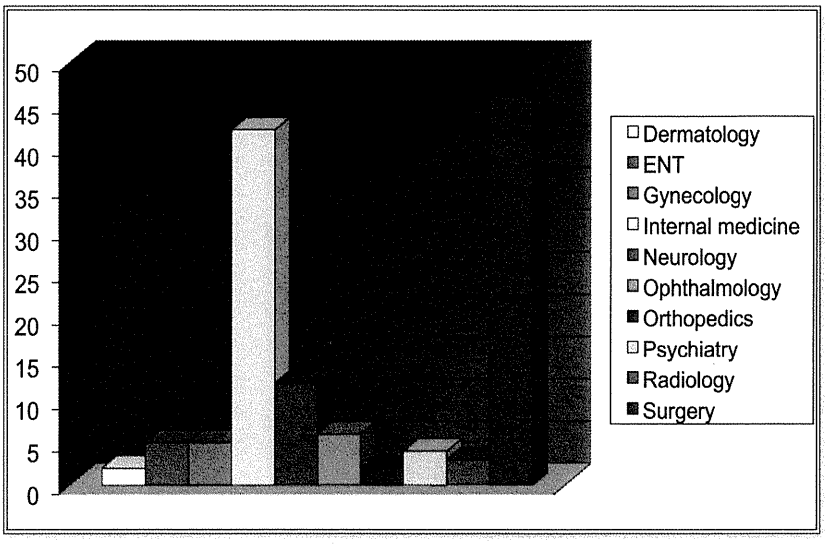
Specialization, Subspecialization, and Subsubspecialization in Internal Medicine

Christine K. Cassel, M.D., and David B. Reuben, M.D.
NEJM March 24, 2011 1169-1173.

The American Board of Internal Medicine (ABIM) is adding new subspecialties. Specifically, in the past 2 years the ABIM has launched certification in the fields of hospice and palliative care and advanced heart。
The ABIM has also approved the subspecialty of Adult Congenital heart disease to move forward to the American Board of Medical Specialties (ABMS) for final approval.

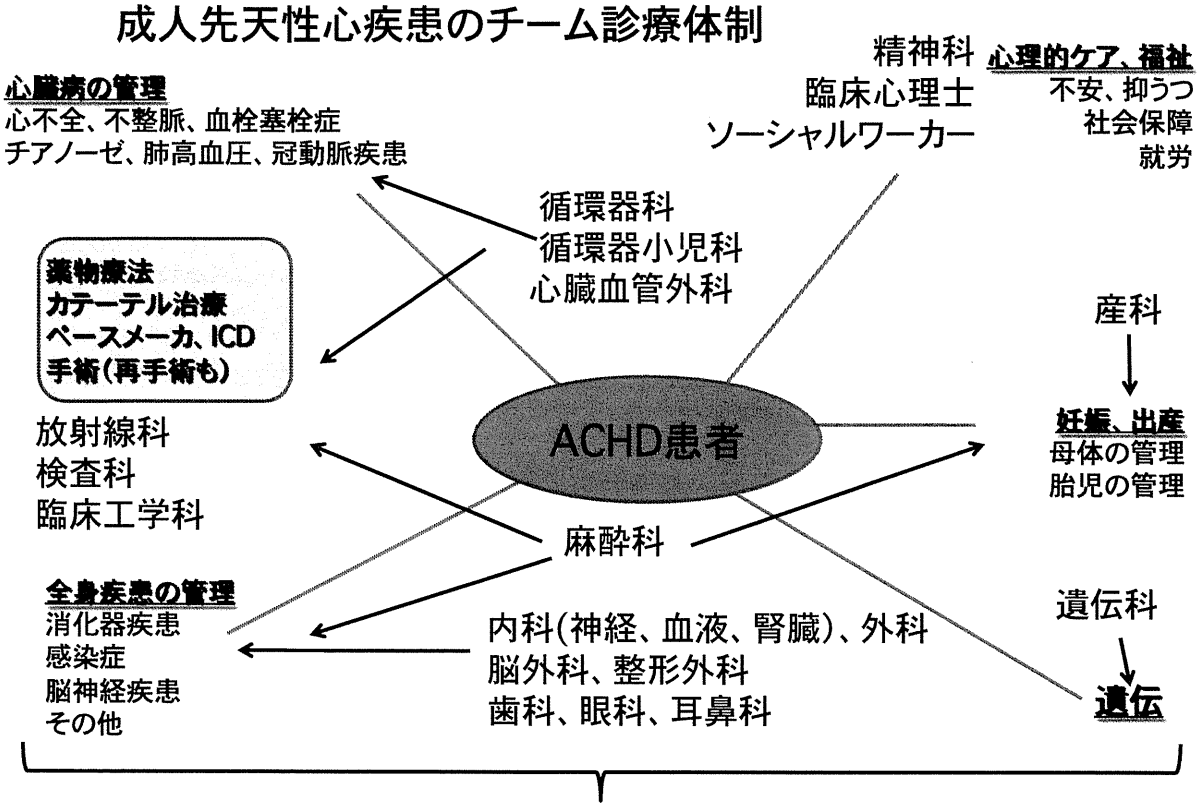
成人先天性心疾患の緊急入院と他科専門医の必要性

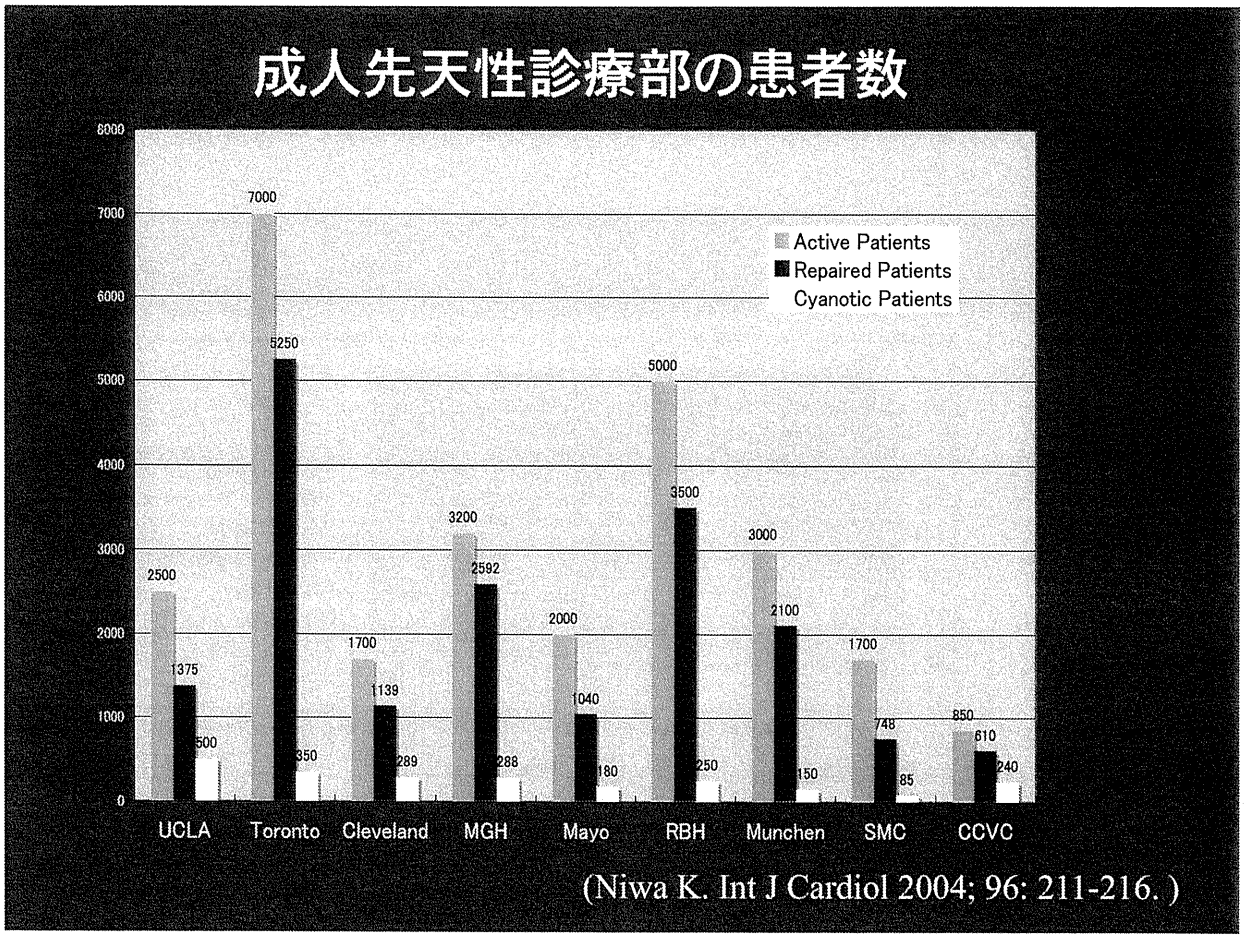
緊急入院: 95 of 201 (47 %)で他科専門医が必要



(Kaemmerere H. JSACHD 06)

成人先天性心疾患のチーム診療体制





成人先天性心疾患診療部のスタッフ

施設	UCLA	Toronto	Clevelnd	MGH	Mayo	RBH	Munch	SMC	CCVC
設立年度	1978	1959	1980	1976	1987	1975	1974	1995	1998
所属科	内科、小児科	内科	小児科	内科、小児科	内科	内科	内科、小児科	内科、小児科	成人先天性診療部
スタッフ									
循環器科医	3	7	0	1	4	3	2	2	3
小児循環器科医	1	3	4	2	0	2	4	3	4
心臓外科医	2	4	2	2	4	3	3	3	1
専任看護師	1	1	3	0	1	0	0	1	1

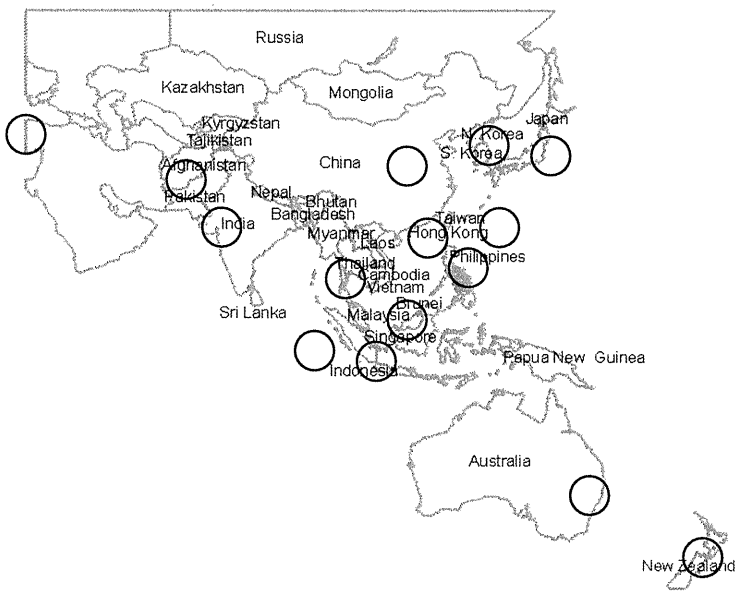
(Niwa K. Int J Cardiol 2004; 96: 211-216.)

臨床的活動内容

施設	UCLA	Toronto	Clevelnd	MGH	Mayo	RBH	Munch	SMC	CCVC
外来									
患者数/週	18-25	40-50	6-30	40-50	12-22	50	40-50	15-20	30
病棟									
	成人	成人	成人,小児	成人,小児	成人	成人	成人,小児	成人,小児	成人,小児
入院/年	350	660	100	180	300	450	500	299	80
心臓外科									
手術数/年	170	150	50	70	100	100	90	85	30
再手術	80%	35%	25%	29%	56%	60%	45%	11%	20%
手術死亡	2 %	1.5 %	2 %	1.5 %	3 %	1.5 %	3%	1.1%	2%

(Niwa K. Int J Cardiol 2004; 96: 211-216.)

アジア太平洋成人先天性心疾患学会
(15 countries)



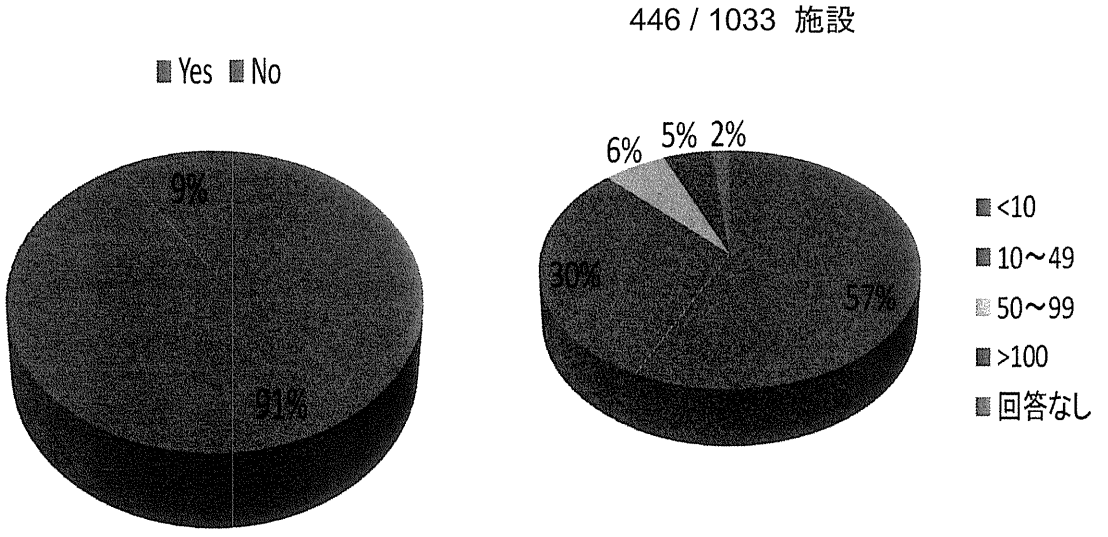
Niwa K.Jeju 2008

成人先天性心疾患診療体制　循環器ネットワーク　（八尾）

循環器内科医師によるACHD患者診療においての主な障害

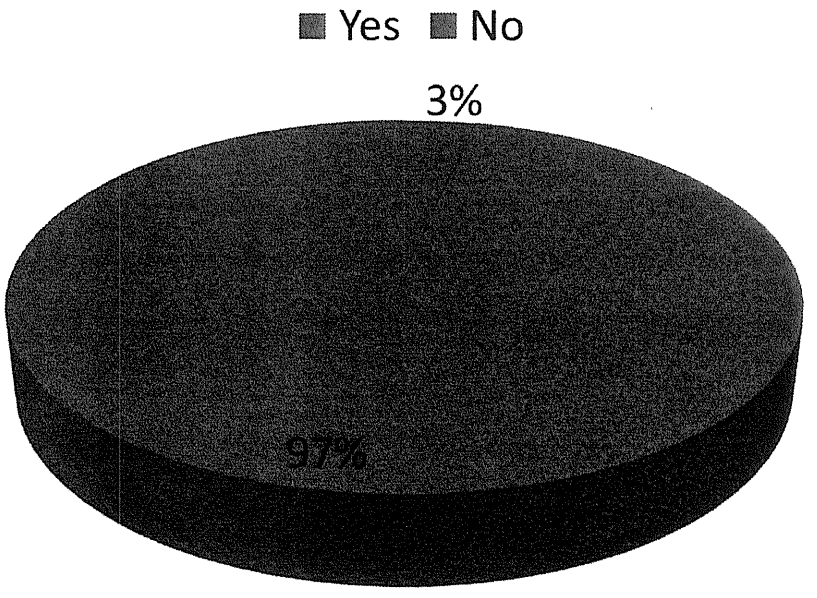
1. 先天心に対する知識や医療技術の不足
   a) 病態自体とくに（シャント、肺循環を含む）血行動態の理解
   b) 略号や呼び名
   c) 外科的治療に関する知識
   d) カテーテル検査や治療の進め方/行ない方に関する知識と技術
   e) 遺伝異常と心疾患/付随する異常に関する基本的知識
2. 小児科/小児心臓外科医師とのコミュニケーション不足
3. 小児科管理から成人医療への移行時に生じる患者教育施行に対する不安
4. ACHD患者が他の疾患および妊娠などの合併時における対応への不安
5. エビデンス不足による不十分なガイドライン

成人先天性心疾患の診療、全国調査



(Toyoda T, Niwa K. Circ J 2009; 73: 1147-1150)

成人先天性心疾患外来



(Toyoda T, Niwa K. Circ J 2009; 73: 1147-1150)

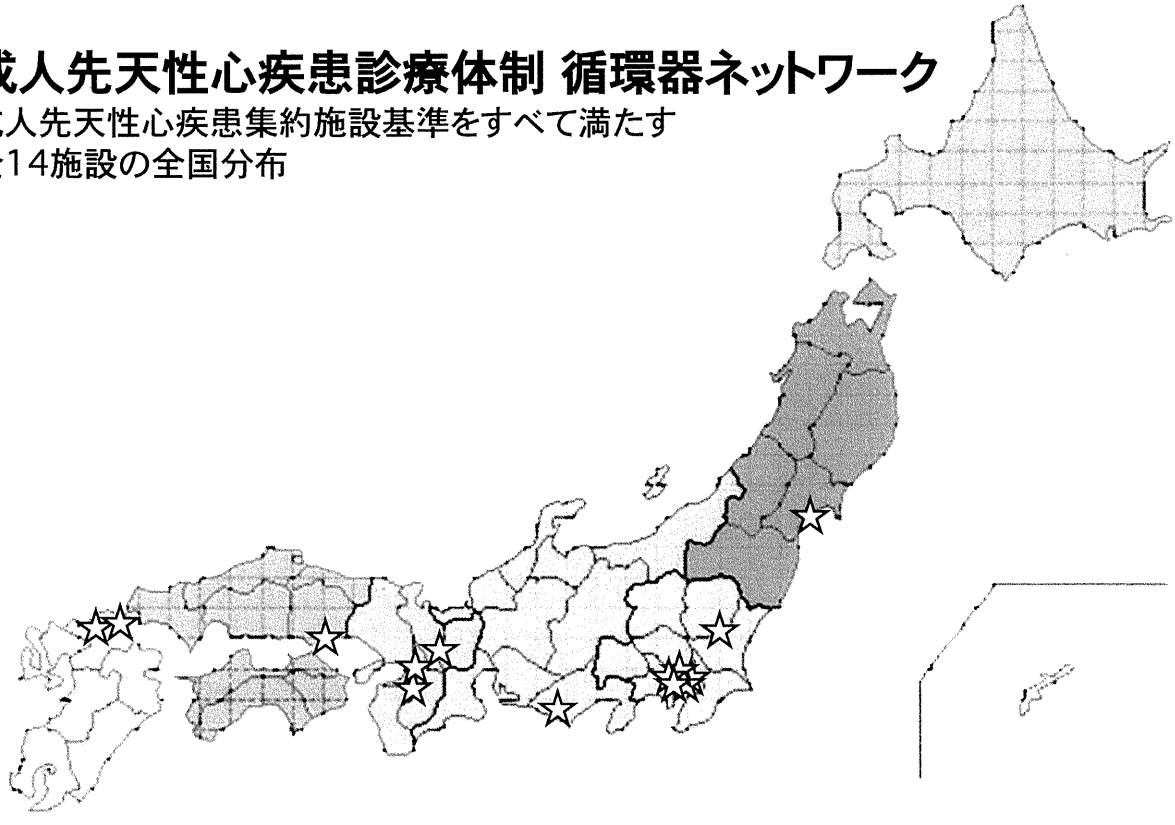
成人先天性心疾患診療体制　循環器ネットワーク（八尾、落合）

集約化施設の施設基準（Euro Heart Surveyの施設基準を改変*して使用）

1. 循環器内科が診療の意向がある
2. 小児循環器内科医が1名以上いる
3. 小児心臓血管外科医が2名以上いる
4. 現時点でACHD専門外来を有する、または設置の意向がある
5. カテ・不整脈・エコーを専門とする医師がいる
6. 成人心疾患患者に対する十分な検査・治療経験がある
7. 3DCTなど必要な設備がある
8. 産科・精神科・脳外科・ICUがある

成人先天性心疾患診療体制 循環器ネットワーク

成人先天性心疾患集約施設基準をすべて満たす
全14施設の全国分布



Ochiai R, Yao A, et al. Circ J (in press) より改変引用

成人先天性心疾患診療体制 循環器ネットワーク（八尾）

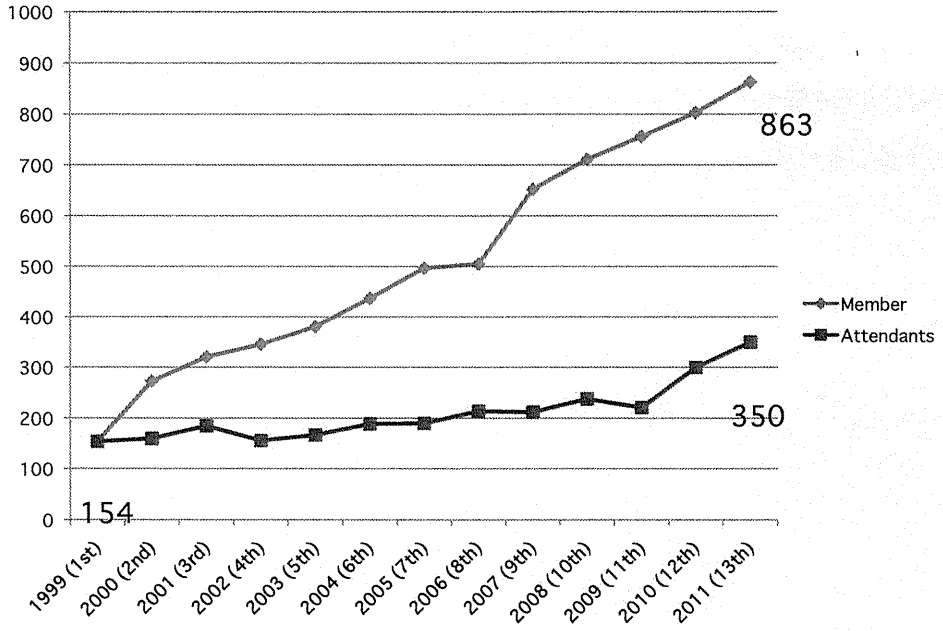
図2.ACHD診療体制の概略図

日本成人先天性心疾患学会 ホームページ

http://www.jsachd.org/

Q and A
（患者さんからの質問にお答えするコーナー）

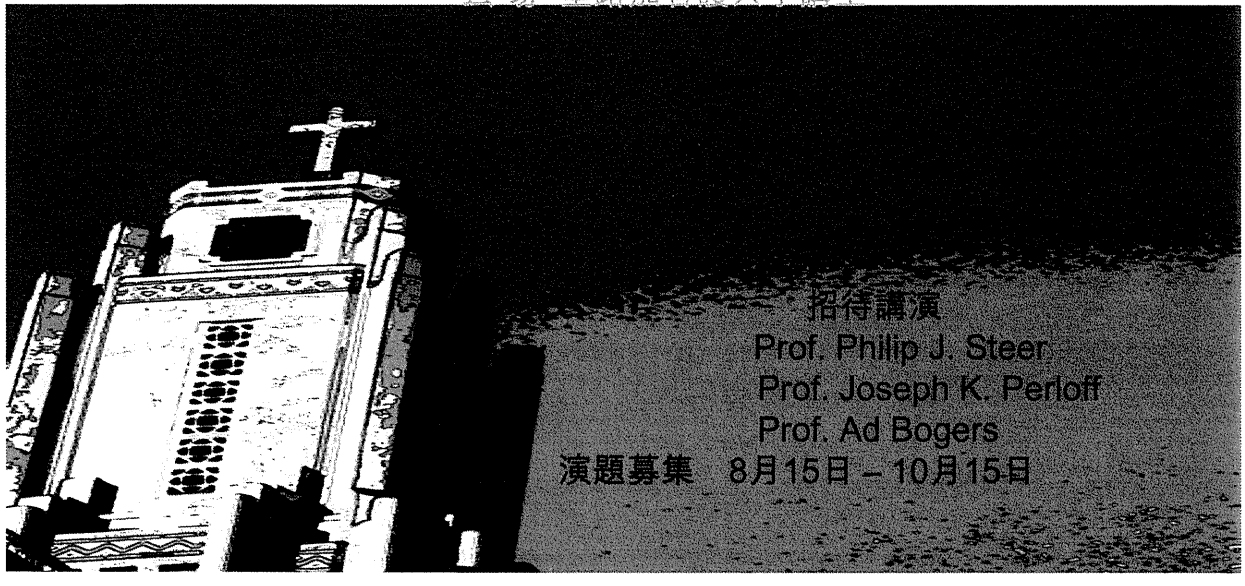
成人先天性心疾患学会の会員数と学術集会参加者数の変動



JSACHD

第14回成人先天性心疾患学会年次集会　　2012年１月14-15日,

会場 聖路加看護大学講堂



URL http://www.jsachd.org/

成人先天性心疾患
今後の方向性と問題点ーまとめー

1，先天性心疾患の管理治療の向上により、多くの患者が成人を迎えるようになったが、その多くは、生涯にわたる経過観察を要する。

2，成人先天性心疾患は、心不全、不整脈、突然死、妊娠出産、心理社会的問題、心臓病以外の手術の際の管理など成人心疾患の分野と共通した問題点が多い。

3，従って、成人先天性心疾患は、こども病院で、循環器小児科医と心臓血管外科医だけで診療の出来る疾患ではなく、循環器科医、他職種との共同診療、成人にむいた診療形態、診療施設が必要とされる。

4，成人に興味を持つ医師が中心となり成人先天性心疾患患者をみる外来、病棟、センターを確立することが必要です。

5, 専門の診療施設は、成人先天性心疾患を専門とする医師を中心として、循環器科医、循環器小児科医、心臓血管外科医、専任看護師、内科医、外科医、放射線科医、産科医、麻酔科医、臨床心理士などの専門家が参加するチーム診療が必要である，

6, 循環器科医で先天性心疾患に興味を持つ医師を育て、連携し、科を越えたセンターとすることが望まれます。

7, 循環器科医は、成人先天性心疾患センターでの研修が必要であり、循環器小児科医も、成人先天性心疾患センターでの訓練を必要とする。

成人先天性心疾患外来を開設ないし診療を行う施設
日本成人先天性心疾患学会による調査（病院のwebより）

東海

静岡県立総合病院*
聖隷浜松病院*
名古屋市立大学#
社会保険中京病院#
名城病院
あいち小児保健医療総合センター
岐阜県総合医療センター*

＊ 専門外来
 # 診療

http://www.jsachd.org/resi/index.html

成人先天性心疾患外来を開設ないし診療を行う施設
日本成人先天性心疾患学会による調査（病院のwebより）

関東

自治医科大学**
筑波大学
埼玉医科大学国際医療センター#
千葉大学#
千葉県循環器病センター**
聖路加国際病院**
日本大学
東京大学*
日本医科大学
東京女子医科大学*
東京慈恵会医科大学*
慶應義塾大学
慈恵会医科大学
東邦大学#
榊原記念病院
国立成育医療センター#
昭和大学横浜市北部病院
東京クリニック*

* 専門外来
** 専門診療部
# 診療

http://www.jsachd.org/resi/index.html

成人先天性心疾患ネットワーク

日本小児循環器学会分科会
日本成人先天性心疾患研究会
Japanese Society for Adult Congenital Heart Disease

更新日 2001/10/17
4806

HOME・新着情報
このホームページについて
成人先天性心疾患研究会
疾患について
リンク集
その他の情報
患者の方からのQ&A
症例検討

Contactas:
ADULTCHDJPN@aol.com

情報利用に際してのご注意とお願い
「医療情報の利用の手引き」

NEWS

10/17 患者の方よりの質問とお答え 修正大血管転位症とチアノーゼについて

学会情報
The 13th Annual International Symposium
on Congenital Heart Disease in the Adult Symposium を追加

10/11 患者の方よりの質問とお答え 心房中隔欠損症の手術法

学会情報
第四回 成人先天性心疾患研究会を追加

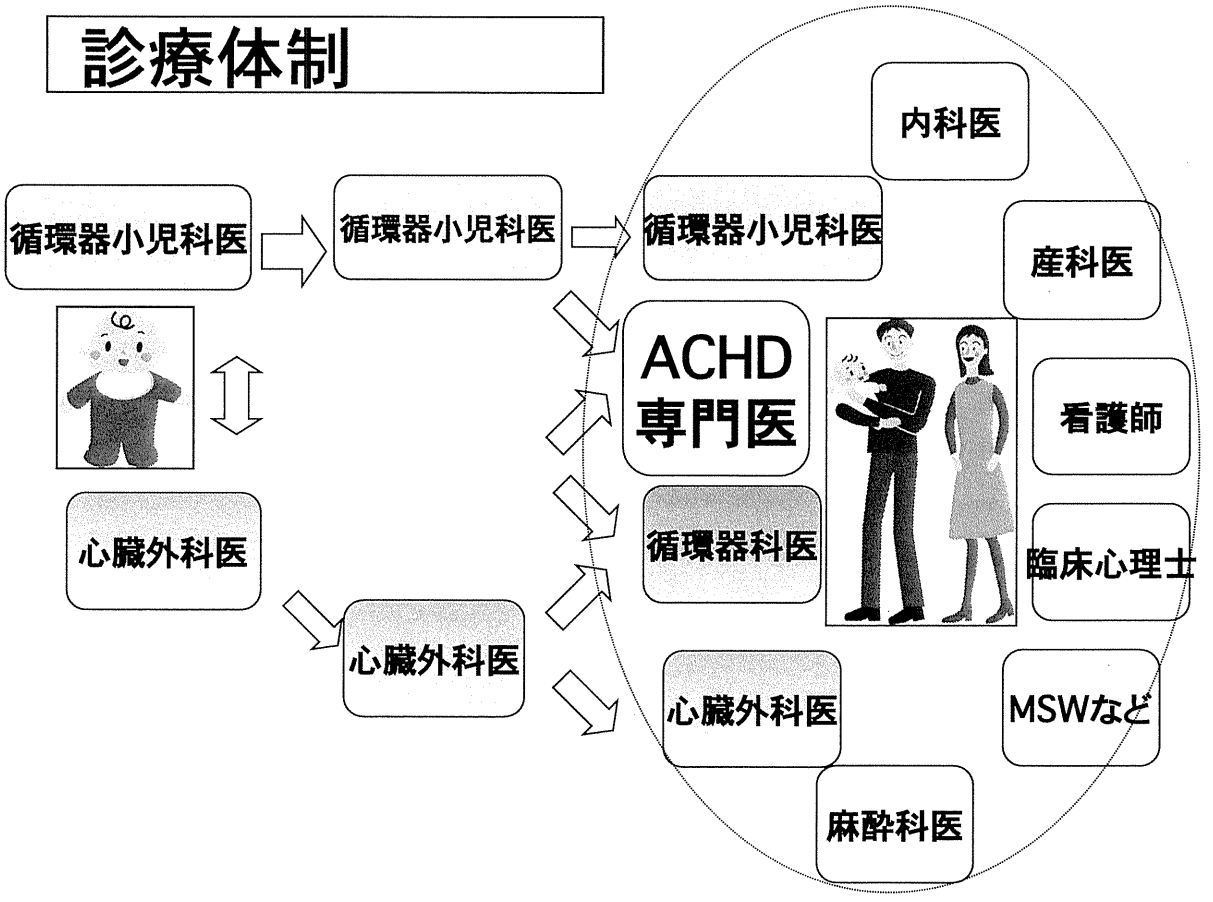
日本成人先天性心疾患研究会ホームページ協力に
千葉県循環器病センターを追加

症例についての内容を更新

9/26 患者の方よりの質問とお答え 心房中隔欠損症の長期管理
心室中隔欠損症術後の胸痛について

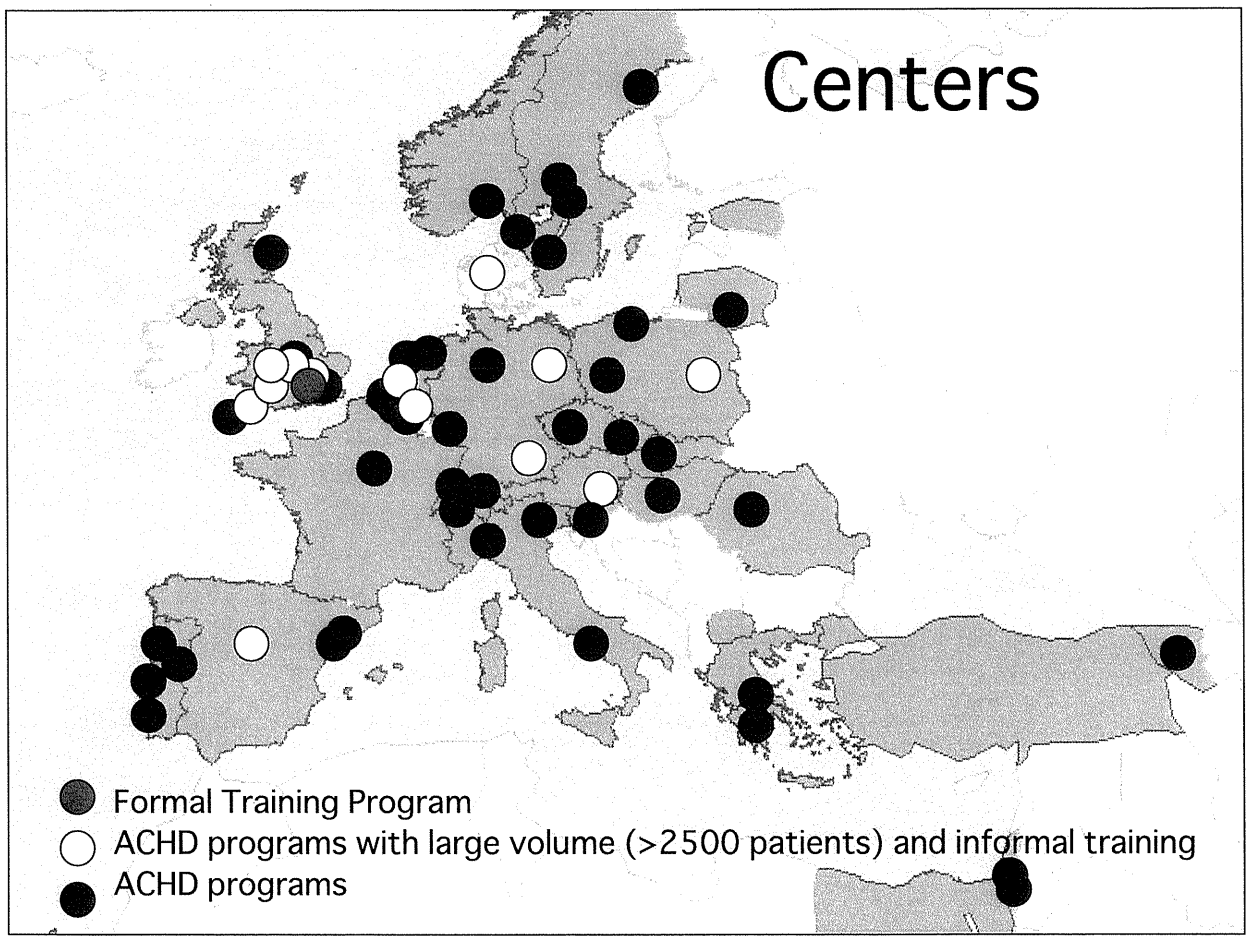
8/24 患者の方よりの質問とお答え 先天性心疾患術後の妊娠

診療体制



Centers

- Formal Training Program
- Current Trainees
- Informal training experience



結論1

1,外科治療、内科治療の恩恵を受け、先天性心疾患の多くが成人を迎えるようになりました。

2,先天性心疾患を扱う施設ではその半数以上は成人となっています。

3,成人となった先天性心疾患患者は、解決すべき問題点を多く抱えています。

4,重症先天性心疾患も成人となることが可能となりましたが、遠隔期生存率は正常と比べれば低く、不整脈、突然死、再手術など改善すべき問題を抱えています。

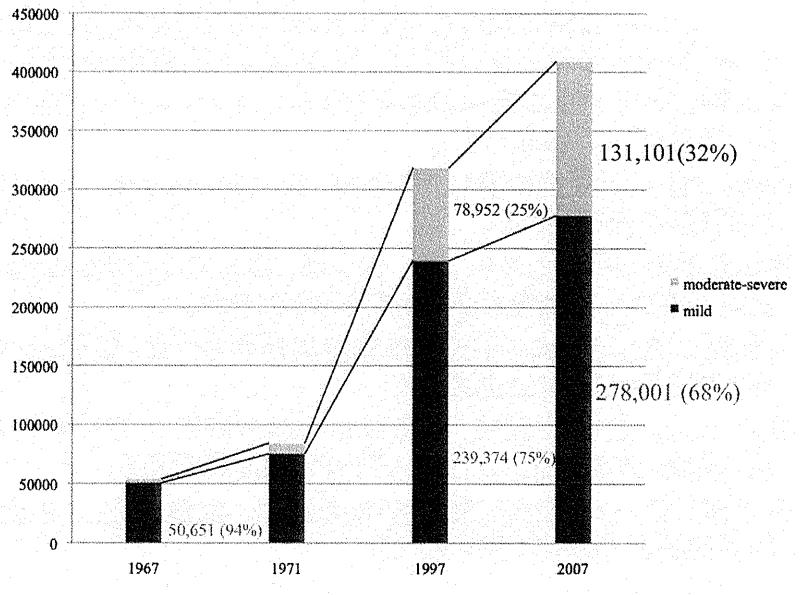
結論2

5,根治手術と考えられる先天性心疾患は少なく、多くは経過観察を必要とします。

6,成人先天性心疾患の診療体制、研修医教育体制、社会保障体制を早急に確立する必要があると考えられます。小児から成人への診療の移行の問題も大切です。また、この分野の研究の進歩も重要です。

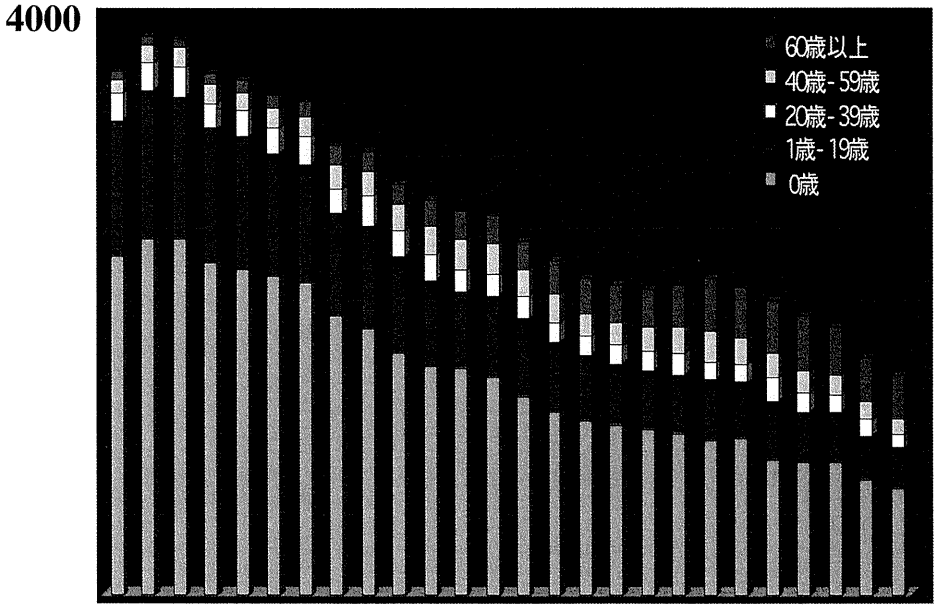
8, さらに、成人患者さんも社会的自立を確立するために、成人先天性心疾患についての正確な知識を得る必要があります。

Number of adults with CHD according to the severity of CHD from 1967 to 2007



Shina Y. IJC 2009

先天性心臓病の年齢階級別死亡件数



Terai,Niwa. 2002 Circ J

なぜ成人先天性心疾患が問題なのか。小児心疾患と何が違うのか。

1,心臓血管外科治療の発達と、内科管理の向上により、小児先天性心疾患患者の多くが成人を迎える。今では、90%以上の生産児が成人となる。

2,先天性心疾患手術の多くは経過観察が不要ないわゆる根治手術ではなく、合併症、残遺症、続発症を伴う。

3,加齢に伴い、心機能の悪化、不整脈、突然死、再手術、高血圧、冠動脈異常により病態が影響される。

4,適切な手術が行われていても、各疾患、各術式に特徴的なわずかの形態・機能異常が進展して治療を必要とする病変になる。

4,大動脈二尖弁の様に、小児期は機能異常がないが、加齢とともに、狭窄閉鎖不全が明らかになることもある。

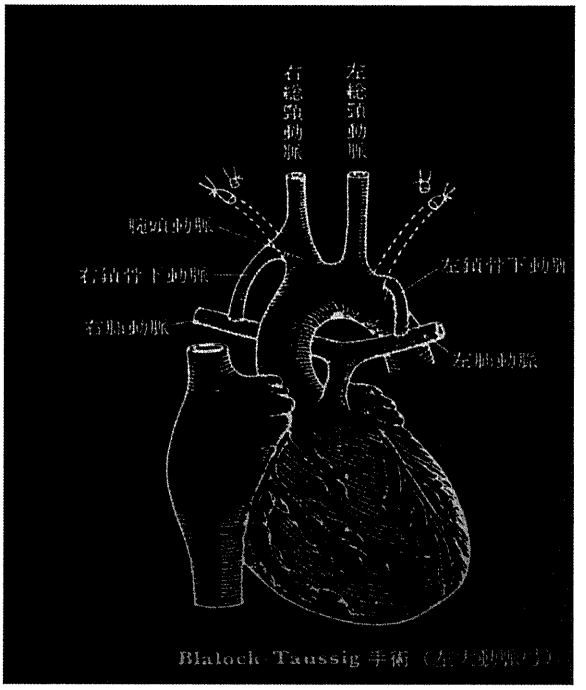
5,成人となるとともに、就業、医療保険、生命保険、心理的社会的問題、結婚、出産、喫煙、飲酒、遺伝など成人特有の問題を抱える。

6,未手術チアノーゼ型先天性心疾患患者は一定数存在し、小児期と異なり、系統的多臓器異常が広く認められる。

丹羽公一郎。小児心疾患となにが違うのか。成人の先天性心疾患診療ブック. 2008

BT Shunt (Alfred Blalock & Helen B Taussig,1944)

心内修復術:
1953年 Gibbon J (心房中隔欠損)
1955年 Lillihei CW
Kirklin JW



58歳 男性 ファロー四徴

40週, 3200g, 正常産.

生下時よりチアノーゼを指摘.

4歳. チアノーゼ増強. A病院にて、姑息的に大動脈肺動脈吻合術.

チアノーゼ軽減するが、歩行時の息切れ、発育の遅れを認めいた. 投薬は無かったが、学校では、体育は見学.

20歳. 心臓カテーテル検査. 心内修復術を受ける.

高校卒業後、就職(家具製作).

24歳 結婚. 3人子どもをもつ. 特に、病気は意識せず経過。生命、疾病保険は加入出来ず.

50歳. 息切れが強くなり来院.心拡大、心房細動f. 胸水貯留. 電気的除細動, 抗心不全、抗凝固療法. 左肺動脈低形成. 再手術の適応(-). 強心薬, 利尿薬, ACE阻害薬, Beta 遮断薬.

56歳. 妻、乳ガンにて死去. 57歳. 孫, 生まれる.

Circulation Journal
Official Journal of the Japanese Circulation Society
http://www.j-circ.or.jp

Status and Future Needs of Regional Adult Congenital Heart Disease Centers in Japan

– A Nationwide Survey –

Ryota Ochiai, PhD; Atsushi Yao, MD, PhD; Koichiro Kinugawa, MD, PhD; Ryozo Nagai, MD, PhD; Isao Shiraishi, MD, PhD; Koichiro Niwa, MD

Background: Although the prevalence of adult congenital heart disease (ACHD) in Japan continues to rise, the number and geographic distribution of facilities potentially serving as regional ACHD centers remains unknown. We examined trends in ACHD care in Japan to identify needs and to determine potential regional responses to this growing patient population.

Methods and Results: A descriptive, cross-sectional, nationwide survey was conducted to assess the status and needs of cardiology specialists related to providing ACHD care. Questionnaires were mailed to 138 cardiology departments located in 8 geographical regions throughout Japan; respondents were asked to document the status and future direction of ACHD care for each facility. Of the 109 facilities that responded, approximately one-third currently treat or plan to treat all ACHD patients. Fourteen facilities (12.8%) fulfilled all criteria for becoming regional ACHD centers. Although each regional center was projected to serve a population of 9.1 million, in 2 regions, no centers possessed the necessary care structure.

Conclusions: Our findings revealed a shortage of adult cardiologists dedicated to ACHD care. Moreover, basic as well as formal fellowship ACHD training was deemed necessary. In Japan, the number of potential regional ACHD centers has just reached international standards. However, based on the geographic gaps documented here, a strategy other than regional centralization might be required to deliver adequate ACHD care to rural areas. (*Circ J* 2011; **75:** 2220–2227)

Key Words: Adult congenital heart disease; Congenital heart disease; Physician training; Regional ACHD centers; Rural medicine

Advances in medical treatment, cardiac surgery, intensive care, and non-invasive diagnosis over the last 50 years have led to enormous growth throughout the world in the number of adults with congenital heart disease (CHD).[1–4] In Japan, it is estimated that there are at least 400,000 adult CHD (ACHD) patients; this number is expected to increase by approximately 9,000 patients annually.[5] In response to the increasing numbers of ACHD patients globally, several North American and European task forces, as well as numerous expert panels, have developed "best practice" recommendations for the management of ACHD patients.[6–15]

At the core of these recommendations, the "regional ACHD center," also called a "specialist center" in Europe, is expected to play a key role in coordination of the ACHD care delivery system.[10,13,15,16] Regional ACHD centers are large, multidisciplinary centers of excellence that are capable of meeting all potential needs of ACHD patients over their lifetimes. In Europe and North America, a regional ACHD center is usually directed by an ACHD cardiologist with an adult cardiology background.[17,18] Alternatively, in Japan, most ACHD patients are followed by pediatric cardiologists,[19] even though our previous qualitative study revealed that many Japanese physicians dedicated to ACHD care expected adult cardiologists to play the central role in treating ACHD.[20] Thus, it appears that recruiting adult cardiologists to ACHD care is

Received December 5, 2010; revised manuscript received April 1, 2011; accepted May 2, 2011; released online July 12, 2011 Time for primary review: 31 days

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ISSN-1346-9843 doi:10.1253/circj.CJ-10-1209

Table 1. Recommendations for Optimal ACHD Care[10]*

1. An ACHD referral center must employ at least 1, preferably 2, cardiologist(s) specifically trained and educated in the care of adults with CHD.
2. Specialized ACHD centers should provide care in connection with pediatric cardiology and/or congenital cardiac surgery.
3. Specialist centers† must treat sufficient numbers of patients and perform a sufficient number of procedures to be effective as well as develop and maintain high levels of performance.
4. General adult cardiac facilities and non-specialist centers should have an established referral relationship with a specialist center.
5. A minimum of 2 cardiac surgeons trained in and practicing adult and pediatric cardiac surgery are required.
6. The optimal activity for a pediatric and congenital heart surgeon is 125 operations per year. Specifically, for ACHD, a minimum of 50 operations per year is recommended.
7. A fully equipped electrophysiology laboratory staffed by properly trained electrophysiologists with experience in detecting arrhythmias inherent to CHD and with experience in pacemaker technology, ablation technology, and defibrillator implantation must available.
8. An ACHD referral center must employ at least 1 nurse specialist that is trained and educated in the care of ACHD patients.

*Complying with recommendations 5–8 is critical in achieving an optimal ACHD care program.
†For specialist centers, recommendations 1–3 should to be fulfilled.
ACHD, Adult Congenital Heart Disease; CHD, congenital heart disease.

a pressing issue in providing multidisciplinary care to ACHD patients in Japan. Moreover, the extent to which adult cardiologists in Japan are currently dedicated to ACHD care and the extent to which they are willing to participate in such care remain unknown.

Released in 2000, the "Guidelines for Management of Congenital Heart Disease in Adults" suggest the necessity of specialized regional ACHD care facilities.[21] However, although a previous nationwide survey of ACHD care facilities clarified the number of outpatient visits, admissions, cardiac surgeries, and obstetric deliveries that were related to ACHD patients in each facility,[22] the exact number and geographic distribution of facilities with the potential to provide multidisciplinary care as regional ACHD centers, have not yet been investigated. Our previous study identified the various types of facilities that could potentially serve as regional ACHD centers in Japan: general hospitals, such as university hospitals; facilities with pediatric cardiac surgeons; and facilities treating large numbers of patients.[20]

The present nationwide survey was therefore designed to investigate the current status, needs, and future direction of ACHD care in adult cardiology departments in Japan with the aim of identifying the number and geographic distribution of facilities with the potential to become regional ACHD centers.

Methods

Participating Facilities

In the present study, a descriptive, cross-sectional, nationwide survey was conducted by mailing survey questionnaires to the Directors of adult cardiology departments in 138 facilities located in 8 geographical regions throughout Japan. Directors were asked to complete the questionnaires themselves or to delegate the response to a physician who was dedicated to or interested in ACHD care in their department. The facilities selected to receive the mailing included those that met any of the following institutional criteria: (1) university hospitals; (2) facilities with ≥50 ACHD outpatients; and (3) facilities with ACHD-specialized outpatient clinics. Information on eligible facilities was provided by our previous nationwide survey, which gathered data regarding the status and function of ACHD care facilities in Japan.[22] Criterion (3) was adopted because facilities with ACHD-specialized outpatient clinics were assumed to be treating a sufficient number of ACHD patients. Because the number of pediatric cardiac surgeons employed at each facility was not available prior to the survey, we did not use this as inclusion criteria, but we did include an item about it on the questionnaire.

ACHD Care in Adult Cardiology Departments

The European Guidelines for Management of Grown-Up Congenital Heart Disease and the 32nd Bethesda Conference on Care of Adult Congenital Heart Disease state that patients requiring ACHD care can be categorized into 3 types: (1) patients with severe CHD, as represented by patients with single ventricular physiology[23] who require care provided exclusively by a specialist center; (2) patients with moderate CHD, as represented by patients with tetralogy of Fallot[24] who can receive care from appropriate general adult cardiac facilities in strong collaboration with a specialist center; and (3) patients with mild CHD, as represented by patients with isolated congenital aortic valve disease who can be managed by non-specialist centers that have access to specialized care if needed.[6,10]

To document the current status and future direction of ACHD care in adult cardiology departments in Japan, we asked participating facilities to what extent these 3 types of patients were currently being treated and to what extent they would be treated in the future. We also asked participating facilities whether they had an ACHD-specialized outpatient clinic directed by an adult cardiologist and whether they intended to participate in or send a trainee to a formal ACHD fellowship training program, if available. Furthermore, we conducted a "needs assessment" pertaining to the needs and barriers perceived by cardiology specialists involved in the care of ACHD patients. We asked participants about educational as well as organizational enhancements that would promote the optimal delivery of ACHD care. Responses to each item related to the education and organization of the healthcare system and were rated via a 5-point Likert-type scale ranging from "very much necessary" to "not necessary at all."

Definition of Facilities With the Potential to Become Regional ACHD Centers

To identify facilities with the potential to become regional

Table 2. Background of Responding Facilities

	n or means	% or ±SD
Regions		
Hokkaido	4	3.7
Tohoku	4	3.7
Kanto	48	44
Chubu	13	11.9
Kinki	16	14.7
Chugoku	9	8.3
Shikoku	3	2.8
Kyusyu & Okinawa	12	11
Types of facilities		
University hospitals	83	76.1
General hospitals	20	18.3
Cardiovascular centers	6	5.5
Age of responding physicians*	48.4	6.4
Board-certified member of the Japanese Circulation Society	100	91.7

N=109. *n=107.

ACHD centers, we assessed the structure of each participating facility. Based on the definitions for optimal ACHD care structure established by previous studies (see Table 1 for details),[18,25] we adopted the following criteria to delineate potential regional ACHD centers: having an adult cardiology department that plans to treat all ACHD patients, including patients with severe CHD; employing at least 1 pediatric cardiologist; employing at least 2 pediatric cardiac surgeons; currently possessing an ACHD-specialized outpatient clinic or planning to establish one in the near future; having a sufficiently staffed and equipped electrophysiology laboratory; and having other supportive services, such as obstetrics and psychiatry, available for patients.

Because the purpose of this study was to assess the potential of each facility to provide multidisciplinary care as a regional ACHD center, we did not include the presence of an ACHD cardiologist in our definition (although it was included in the definition established by previous studies).[18,25] Instead, we considered the presence of either an adult cardiologist planning to treat all ACHD patients or a pediatric cardiologist as a candidate future ACHD cardiologist. Another difference between the criteria adopted in this study and those in our previous study is that we substituted the criterion of either the presence of an ACHD-specialized outpatient clinic or a plan to have one in the near future for the number of annual ACHD outpatient visits. We made this change because we felt it would be difficult for adult cardiologists in Japan to know the total number of ACHD outpatients followed in their facilities because, in most facilities, the majority of ACHD patients are followed by pediatric cardiologists. In addition, we did not include the presence of nurse specialists in our definition because such specialists are very scarce in Japan at present, and almost none of the facilities were expected to employ them.

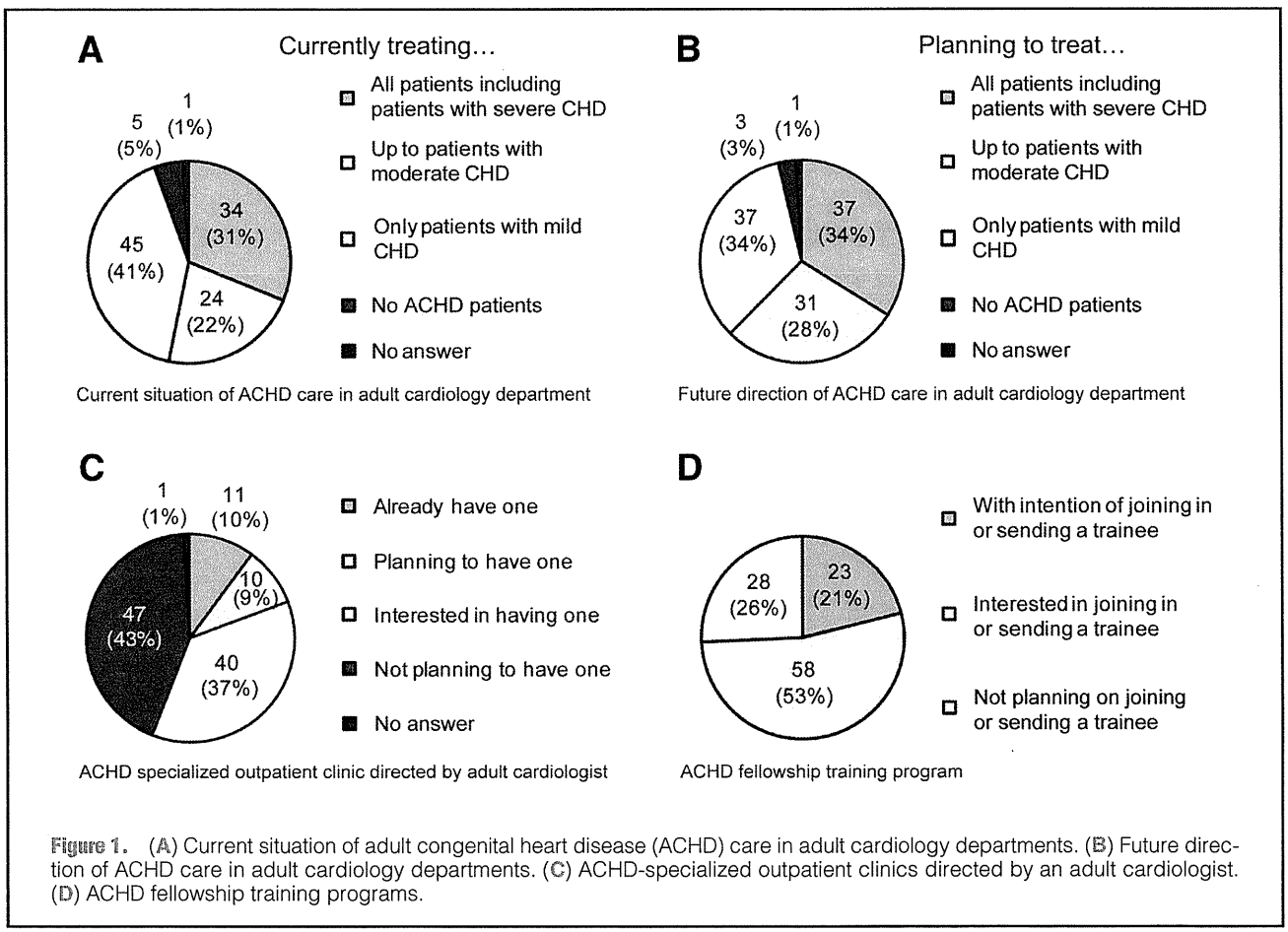

Figure 1. (A) Current situation of adult congenital heart disease (ACHD) care in adult cardiology departments. (B) Future direction of ACHD care in adult cardiology departments. (C) ACHD-specialized outpatient clinics directed by an adult cardiologist. (D) ACHD fellowship training programs.

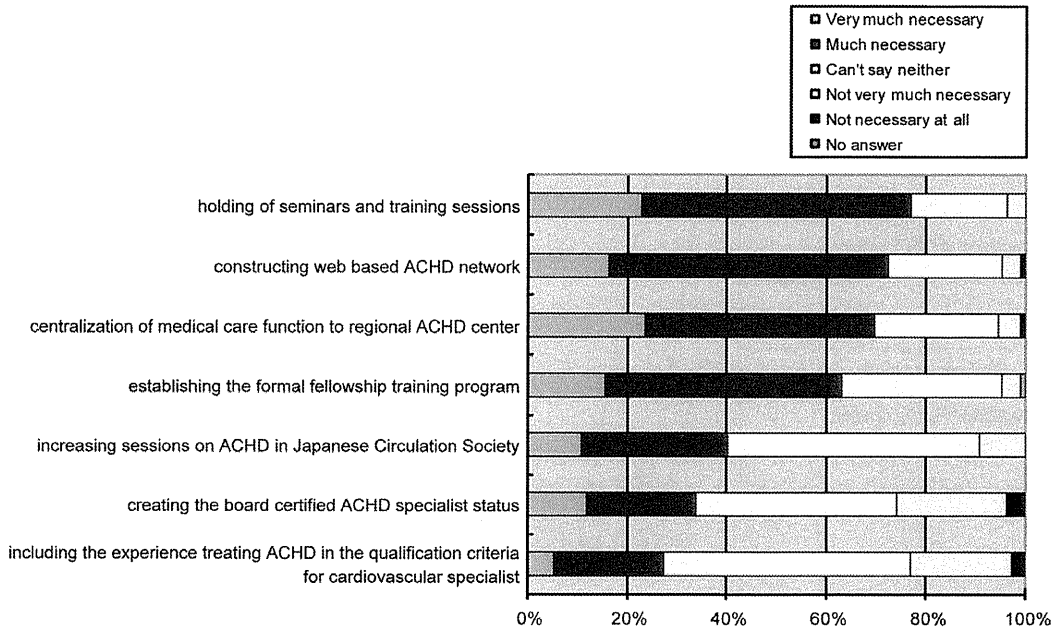

Figure 2. Educational needs of health-care professionals and organizational requirements for medical care systems related to adult congenital heart disease (ACHD).

Table 3. Criteria for Facilities With the Potential to Become Regional ACHD Centers

	No. of facilities meeting this criterion	
	N	(%)
Health-care professionals		
Adult cardiology department planning to treat all ACHD patients, including severe patients	37	33.9
≥1 pediatric cardiologist	74	67.9
≥2 pediatric cardiac surgeons	41	37.6
ACHD-specialized outpatient clinic		
ACHD-specialized outpatient clinic	29	26.6
Planning to have ACHD-specialized outpatient clinic directed by an adult cardiologist	10	9.2
Sufficiently staffed and equipped electrophysiology service		
≥1 adult cardiologist specializing in cardiac catheterization	108	99.1
≥1 adult cardiologist specializing in arrhythmias	100	91.7
≥1 adult cardiologist specializing in echocardiography	88	80.7
≥500 cardiac catheterizations per year*	83	76.1
≥20 ablations per year*	87	79.8
≥20 pacemaker insertions per year*	100	91.7
≥10 implantable cardioverter defibrillator implantations per year*	76	69.7
CARTO, EnSite system available	81	74.3
Magnetic Resonance Imaging available	87	79.8
3-dimensional computer tomography available	99	90.8
Other supportive service available		
Intensive care unit	106	97.2
Cerebral surgery	103	94.5
Obstetrics	100	91.7
Psychiatry	95	87.2
No. of facilities with optimal ACHD care structure		
No. of facilities fulfilling all the criteria	14	12.8

*Total number of procedures conducted in an adult cardiology department (not specific to ACHD).
Abbreviations see in Table 1.
N=109.