少子高齢化人口減少社会で 耐性菌に立ち向かう!

- 感染症コンサルタントの挑戦-



感染症専門医/総合内科医

北海道科学大学薬学部客員教授(臨床推論)

札幌市危機管理対策室 参与

一般社団法人 Sapporo Medical Academy(代表理事)

北海道大学大学院医学院社会医学分野(PhD:<mark>感染症疫学</mark>·人口学)

岸田 直樹(MD,MPH)





メインページ コミュニティ・ポータ

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ウィキデータ項目

ページ ノート

岸田直樹

出典: フリー百科事典 『ウィキペディ



岸田 直樹 (きしだ なおき) は、総合! 医療におけるエンパワメントを推進す 療を担う医師の育成・研修医教育に力

自己紹介(キャリア)

北海道函館市生まれ



目次 [非表示]

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6 書籍(封 7 論文

8 脚注

9 外部リン

略歴 [

- 1994年
- 1995年

略歴 [編集]

- 1994年 函館ラ・サール高等学校卒業
- 1995年 国立東京工業大学理学部中退
- 2002年 国立旭川医科大学医学部医学科卒業
- 2005年 手稲渓仁会病院初期臨床研修修了
- 2008年 手稲渓仁会病院総合内科フェロー修了
- 2008年 手稲 ハワイ医学教育フェロー修了
- 2010年 静岡県立静岡がんセンター 感染症科フェロー修了
- 2010年 手稲渓仁会病院 総合内科・感染症科 感染症科チーフ 兼 感染対策室室長
- 2014年 一般社団法人Sapporo Medical Academy 代表理事
- 2017年 北海道大学医学院公衆衛生修士課程 (MPH: master of public health)
- 2017年 北海道薬科大学 客員教授
- 2018年 北海道科学大学 客員教授、北海道大学医学院公衆衛生修士課程(MPH)修了、北海道大学社会医学博士課程(人口学・感染症疫学の数理モデル)
- 2020年 札幌市危機管理対策室 参与(感染症対策担当)

沖縄県立中部病院 感染症科 成田雅史先生

国際医療研究センター大曲先生、具先生そして、藤田先生(北がん)、冲中先生(国がん東)

多摩総合医療センター 本田仁先生

京都大学社会医学 西浦先生















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WHO's first global report on antibiotic resistance reveals serious, worldwide threat to public health

New WHO report provides the most comprehensive picture of antibiotic resistance to date, with data from 114 countries

News release

30 APRIL 2014 | GENEVA - A new report by WHO-its first to look at antimicrobial resistance, including antibiotic resistance, globally-reveals that this serious threat is no longer a prediction for the future, it is happening right now in every region of the world and has the potential to affect anyone, of any age, in any country. Antibiotic resistance-when bacteria change so antibiotics no longer work in people who need them to treat infections-is now a major threat to public health.

"Without urgent, coordinated action by many stakeholders, the world is headed for a post-antibiotic era, in which common infections and minor injuries which have been treatable for decades can once again kill." says Dr Keiji Fukuda, WHO's Assistant



Print

Related links

Antimicrobial resistance: global report on surveillance 2014

Virtual press briefing

♣ Infographic: Antimicrobial resistance: global report on surveillance 2014 pdf, 653kb

Fact sheet on antimicrobial resistance

WHO's policy package to combat



北海道の耐性菌をなんとか減らされば・・・

けど感染症医が少ない・・・

ID Consultation Project in Hokkaido

"ささえる感染症"

感染症コンサルタント(感染症専門医) 一般社団法人 Sapporo Medical Academy(SMA)

岸田直樹

kiccy1975@gmail.com

MICROBIOLOGY ROUND TEAM (MRT)

→**AST**

究極の場合としてゼロベース(医師不在)を想定



"ささえる感染症"

感染症コンサルタント(感染症専門医) 一般社団法人 Sapporo Medical Academy(SMA 岸田直検 はよっに1075のペラットの





INTRODUCTION (現状の把握)

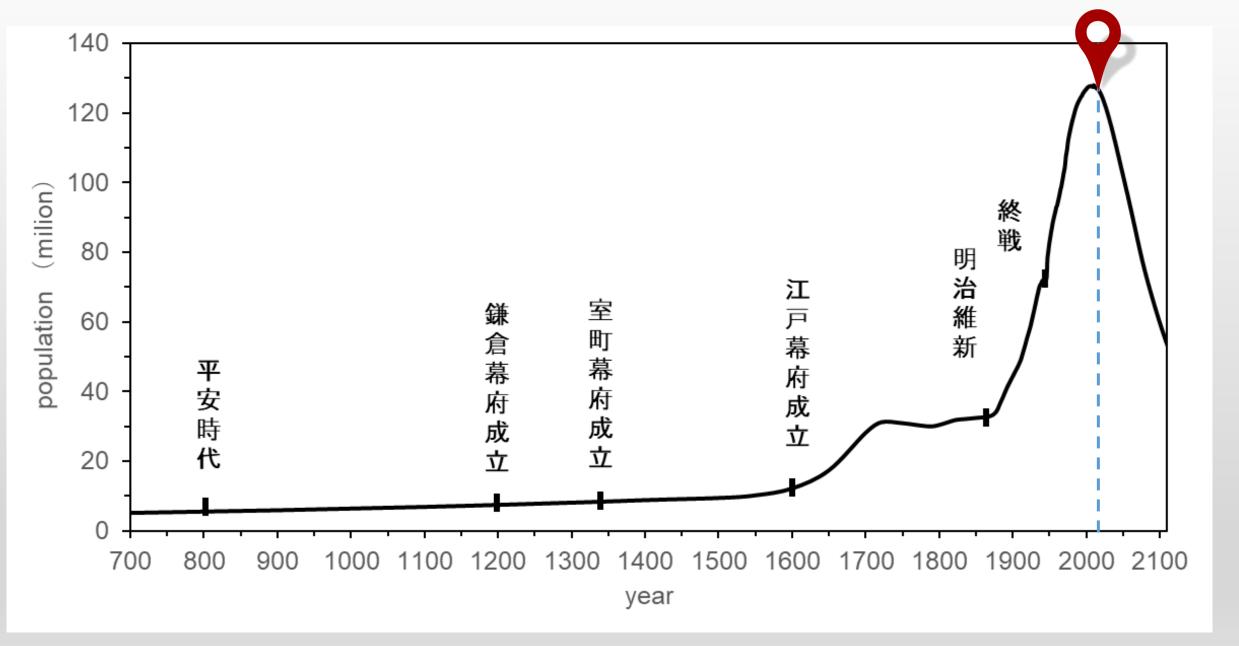
- 日本では、抗菌薬適正使用の中心を担う感染症専門医の数はとても少ない。
- ・ 300床以上の医療機関で数名の感染症専門医が常勤で勤務することが推奨されている
- 2019年現在、300床以上の施設は約1,500施設あるが、認定者数は1491人(人口10万人あたり1,2人)
- ・ 日本感染症学会は、合計で3,000~4,000人の感染症専門医が必要であることを示している

The Japanese Association for Infectious Diseases, On the desired expertise and required number of infectious disease physicians. 2019 ([Cited 7 February 2019]. Available from:

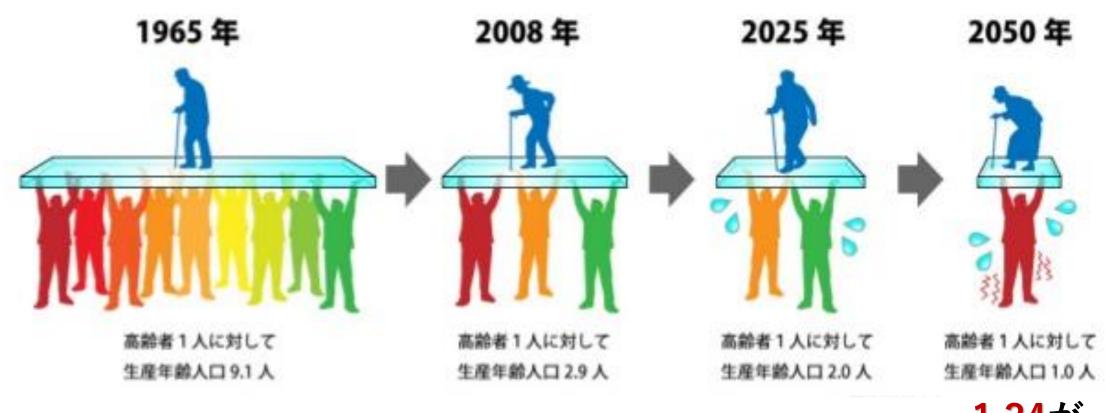
http://www.kansensho.or.ip/modules/senmoni/index.php?content_id=5.>

- ・ 感覚的なデータになるが、日本では、感染症専門医の資格を持っていても、半数程度かそれ以下しか感染症医専属として積極的に活躍しているとは考えにくい(10万人あたり0.6人未満)
- 一方米国では、2018年に感染症専門医の資格を取得している人は9102人(人口10万人あたり2.8人)
- その差は人口比で2.3倍から4.7倍:感染症専門医は非常に少ない





<総務省「国勢調査」、「人口推計」、国立社会保障・人口問題研究所「日本の将来推計人口(2017年推計)」 国土庁「日本列島における人口分布変動の長期時系列分析」(1974年)より>



1.34が 持続する

RESEARCH Open Access

Demographic supply-demand imbalance in industrial structure in the super-aged nation Japan



Naoki Kishida¹ and Hiroshi Nishiura^{1,2*}

Model-based estimate

Past

• (r_i) : baseline of $r_i(t)$, measured as the average for 2002–06

Future

- To achieve the service standard for the baseline period terms of manpower
- reflecting drastic changes in the service-recipient pop

expected demand of industry i is cal

$$M_{i,dem}(t) = \frac{N_i(t)}{r_i}$$
 (2)

Model-based estimate

- $M_{i,dem}(t_0)$: baseline measured as the average for 2002–06
- 1- $M_{i,dem}(t)/M_{i,dem}(t_0)$: relative change taking $M_{i,dem}(t_0)$ as the baseline
- W(t) : total population size of workers in year t →total supply
- $M_i(t)$ changes proportionally to W(t) because the working-age population acts as the backup supply of human resources in industry i,

expected supply of industry i is calculated as

$$M_{i,sup}(t) = W(t) \frac{M_{i,dem}(t_0)}{\sum_i M_{i,dem}(t_0)}$$
 (3)

Model-based estimate

$$q(t) = M_{i,dem}(t) - M_{i,sun}(t) \quad (4)$$

: demand > supply

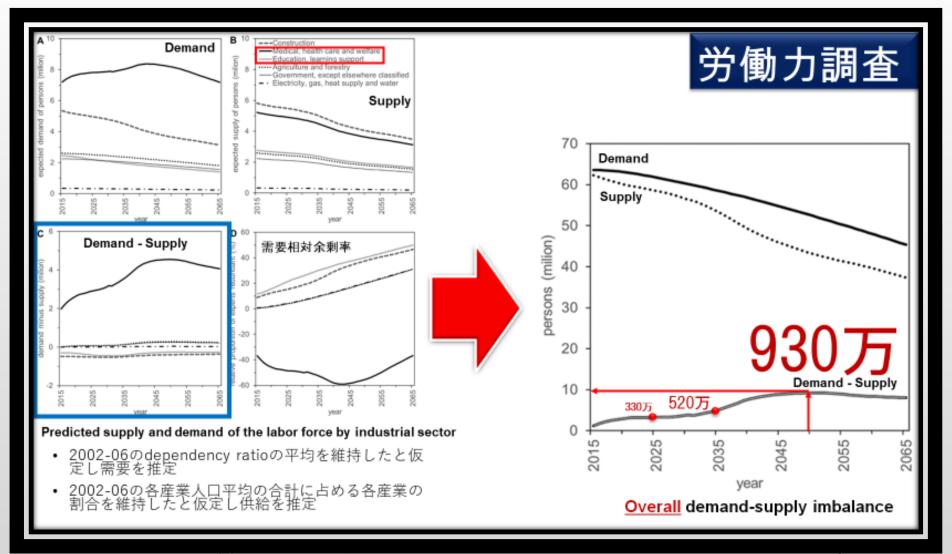
: supply > demand

Futur

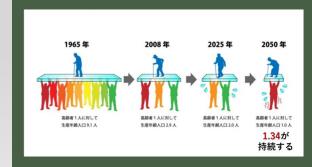
total volume of imbalance is calculated as

$$u(t) = \sum_{i} M_{i,dem}(t) - W(t) \quad (5)$$

Future



北海道の耐性菌をなんとか減らさねば… けど感染症医が少ない… 労働力人口の減少はますます加速…



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Accelerating reductions in antimicrobial resistance: Evaluating the effectiveness of an intervention program implemented by an infectious disease consultant

SOCIETY FOR INFECTIOUS

Naoki Kishida • Hiroshi Nishiura ス

Open Access • Published: January 31, 2020 • DOI: https://doi.org/10.1016/j.ijid.2020.01.051

Highlights

Abstract

Keywords

Introduction

Methods

Results

Discussion

Funding

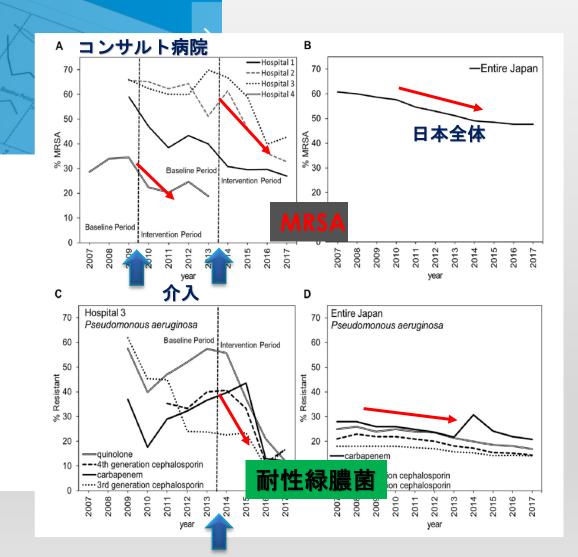
Potential conflicts of

interest

Acknowledgement

Highlights

- · A concerted infection control intervention program by an infectious disease consultant was evaluated.
- · A quasi-experimental study was conducted to detect accelerated rates of increases in drug susceptibility following the intervention.
- The decreasing rates of resistance for MRSA and drugresistant P. aeruginosa were accelerated following the intervention.
- The rate of MRSA decrease increased by 50%-150% of its original value.
- The intervention program including bedside consultation,



INTRODUCTION

人口学研究の結果からも、日本ではリソースが極めて限られるため、耐性菌を減らすために感染症コンサルタントとして感染症専門医が少ない地域に出向いてコンサルタントとして関わった

介入アプローチ:バンドルアプローチの手法を用いたプログラムアプローチ

<Saint S. Greene M.T. Krein S.L. Rogers M.A. Ratz D. Fowler K.E. et al. A program to prevent catheter-associated urinary tract infection in acute care. N Engl J Med. 2016; 374: 2111-2119>

- 感染症専門医による教育
- 症例コンサルテーション
- ASTのサポート体制など…

METHODS

Coverview of the intervention programDescription of intervention program

	Primary component				
Team organization and regular meetings	Launching a team of nurses, pharmacists, and bacteriologists who specialize in infectious diseases and organizing regular meetings; the team shares a common understanding of the necessity and purpose of each intervention program. The team aims to identify and resolve problems in implementing the program at each hospital, to detect any signature of an outbreak at an early stage, and to consider and plan interventions of additional components.				
Regular studies on clinical infectious diseases	Systematically designed lectures series on clinical infectious diseases with a focus on the appropriate use of antibacterial drugs. Monthly for 60 to 90 minutes. The audience also involves healthcare workers out of the team, including physicians/residents, pharmacists, nurses, and laboratory technicians.				
Consultation for each clinical case	Consultation service during the visit of consultant to the facility. Also, distant consultation over e-mail or telephone was offered when requested				
Decision support for microbiological testing results and for writing medical record	Supporting decision making (e.g. to judge whether the blood culture result represents contamination or true bacteremia), including advice for antimicrobial treatment (i.e. if two sets of blood cultures are positive, it is considered as a true bacteremia and an immediate response is given to the start and change of antimicrobials; even if only one set of blood culture is positive, if gram-negative bacilli are detected, yeast-like fungi are detected, etc). Writing the medical record using fixed-form sentences (e.g. in the medical chart to clearly indicate "bacteremia"). If a resistant bacteria is detected, briefly describe the necessity and method of infection control, and state in the medical chart that there is a support system to consult about the need for treatment.				
Create an antibiogram	Tabulating the drug susceptibility testing results of bacteria to systematically show how sensitive each bacterium is for different types of antibacterial agents. In addition to pre-intervention situation, the effectiveness of the intervention is also measured using the antibiogram.				
Additional components					
Report all positive blood culture by e-mail and return interpretation of culture results	All positive blood-culture cases are reported by e-mail (that appropriately cares for protecting patient identity), and the expert gives feedback including interpretations of culture results. The expert also assists to determine if it is urgent and need intervention, such as whether it is truly a bacteremia, and reply within 24 hours. In addition, it is possible to determine at an early stage whether or not the causative agent (e.g. consecutive Bacillus isolations) has led to an outbreak.				
Supporting self-study among staff members of the infection control team (and AST)	A self-study session by the full-time staff is supported. During an outbreak, it is vital to organize an urgent study session. The expert advises the most appropriate contents and presentation methods.				
In-hospital magazine on infectious diseases	Support the publication of an infectious disease magazine distributed within the hospital. It also helps create in-hospital antimicrobial guides.				

METHODS

[Overview of the intervention program]

Description of intervention program

continuously studying clinical infectious diseases

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<BMC Public Health, 2014;14:1276.>
<Clin Infect Dis, 2016;62:e51-e77.>
```

- Consultations by ID physicians
 - reduce mortality from *S. aureus* bacteremia

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<Open Forum Infect Dis, 2018;5(3). doi:.>
<Clin Infect Dis, 2015;60:1451-1461.>
```

quick and accurate reporting of microbial test results

<BMC Med Inform Decis Ma, 2011;11:19.>
</ Community Hosp Intern Med Perspect, 2018;8:321–325.>

regular emailing system as well as the use of telephone-based consultations

Description of intervention program



- primary goal
 - MRSAと耐性緑膿菌の減少スピードを加速させる

各病院はプログラムのすべての構成要素を実施したが、その介入は地域の状況に応じて柔軟に設計された

・ 継続教育の機会は全施設で定期的に行われた

METHODS [Program implementations]

Lecture titles on clinical infectious diseases

- about 50 lectures were designed and delivered, each lasting from 60 to 90 min with an active learning format as well as lecture-style sessions.
- The primary audiences included physicians, clinical residents, pharmacists, nurses, and laboratory technicians.

Begin clinical infectious diseases: the fundamental way of thinking How to use intravenous antibiolics. I. Intraduction How to use intravenous antibiolics. I. Intraduction Pritation of interpreting incrobial testing result -bacteriological testing- Gap of sepsis between ideal and the reality. I. Hading sepsis and identifying the origin of fever. Gap of sepsis between ideal and the reality. II. How to use "surviving sepsis campaign guideline". What if antibacterial drugs do not work How to use oral antibiolics. II. Intraduction How to use oral antibiolics. II. Intraduction Diagnoses of cold (that you must not have been taught by anybody) Diagnosing a disease other than cold sharing common signs and symptoms Pittals of intectious disease practice in emergency settings Cinical approach to fever in hospital, including infectious and non-infectious causes. Cinical approach to fever of unknown origin at an emergency department Lufray tractifications: Managing the most common diseases Skin soft itsue infection Pheumonic: Unsepsectedly difficult treatment decision. Appropriate use of antibiotics Community darthere acquired program to large acquired and interesting and program and interesting and interesting and program and interesting and interesting and program and interesting and interesting and interesting and an emergency department and interesting and in		[Introduction series]				
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METHODS

Statistical analysis2 steps.

- first step : Cochrane-Armitage trend test
- →statistically significant trends in antibiotic sensitivity
- second step: difference-in-differences (**DiD**) design approach
 - →detect accelerated increases in antibiotic susceptibility rates.
- Two different time periods
 - before and after intervention program
 - assumed that the decreasing rate of antibiotic resistance was proportional to the whole of Japan.
 - in introducing the program, we anticipated that the **decreasing rate of resistance would be accelerated**.

$$E(Y_{ht}^k) = \alpha_0 + \alpha_1(t - t_0) + \beta(t - t_v)(T_h^k P_t) + \gamma T_h^k,$$

RESULTS

Table 1

Trend in MRSA and the resistance rate to one of four antibiotics in *Pseudomonas aeruginosa* (rate of change per year).

Antibiotic type	Hospital 1	Hospital 2	Hospital 3	Hospital 4
Staphylococcus aureus				
All cultures	-0.053 (p < 0.01)	-0.078 (p < 0.01)	-0.052 (p < 0.01)	-0.029 (p < 0.01)
MRSA				
Rlood cultures	-0.059 (p = 0.02)	-0.047 (p = 0.04)	-0.082 (p = 0.04)	-0.044 (p = 0.35)
MRSA				
Pseudomonas aeruginosa				
All cultures	-0.046 (p < 0.01)	-0.025 (p < 0.01)	-0.035 (p = 0.03)	-0.023 (p = 0.06)
Carbapenems				
All cultures	-0.027 (p < 0.01)	-0.021 (p < 0.01)	-0.055 (p < 0.01)	-0.072 (p < 0.01)
4th generation cephalosporins				
All cultures	-0.018 (p < 0.01)	-0.018 (p < 0.01)	-0.085 (p < 0.01)	-0.026 (p = 0.01)
3rd generation cephalosporins	0.004 (0.04)	0.047 (0.04)	0.00 (0.01)	0.000 (0.00)
All cultures	-0.034 (p < 0.01)	-0.017 (p < 0.01)	-0.09 (p < 0.01)	-0.038 (p = 0.02)
Quinolones	0.050 (- 0.20)	0.010 (0.21)	0.205 (- 0.10)	(- 0.22)
Blood cultures	-0.058 (p = 0.20)	-0.018 (p = 0.34)	-0.306 (p = 0.19)	(p = 0.23)
Drug-resistant Pseudomonas				

Cochrane-Armitage trend test was employed to analyze the percentage of MRSA and antibiotic-resistant *P. aeruginosa*. The results are classified as non-blood cultures and blood cultures. The rate of change per year and p-value in parenthesis are shown. Drug-resistant *Pseudomonas* obtained from blood culture samples was defined as resistant to at least one carbapenem, cephalosporin or quinolone. In Hospital 4, the number of resistant *P. aeruginosa* blood culture submissions was small, making the rate of change not calculable.

RESULTS

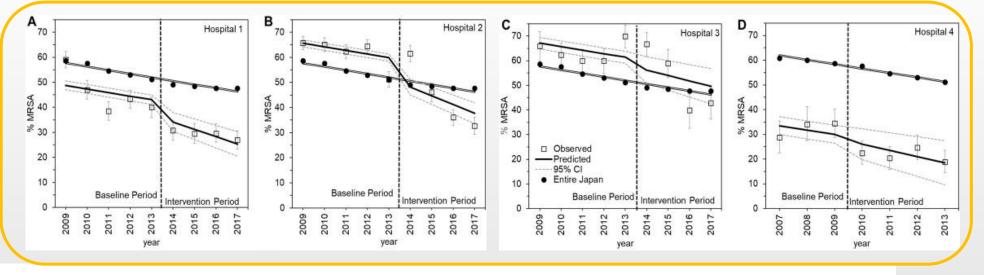


Table 2
Estimated rates of decline and acceleration for MRSA and drug-resistant *Pseudomonas aeruginosa* using the difference-in-differences design model.

	Control period (before intervention) [percent decline/year] Hospitals			Intervention period (increment only) [percent decline/year] Hospitals				
Antibiotics								
	1	2	3	4	1	2	3	4
Staphylococcus aureus								
MRSA	1.42 (1.40,	1.42 (1.40,	1.42 (1.40,	1.77 (1.72,	1.50 (1.12,	2.06 (1.73, 2.38)	0.76 (0.18, 1.35)	0.74(-1.59,
$\overline{}$	1.45)	1.45)	1.45)	1.82)	1.87)			0.12)
Pseudomonas aeruginosa								
Carbapenems	0.55 (0.52,	0.55 (0.52,	0.55 (0.52,	1.09 (1.03, 1.15)	2.01 (1.49,	0.53 (0.05, 1.01)	0.18 (-1.13,	1.04(-2.37,
	0.59)	0.59)	0.58)		2.52)		0.81)	0.30)
4th generation	1.06 (1.03,	0.70 (0.67,	1.09 (1.05, 1.12)	0.74 (0.69,	0.55 (0.07,	0.74 (0.40, 1.06)	1.77 (0.16, 3.31)	3.76 (2.30, 5.15)
cephalosporins	1.09)	0.73)		0.80)	1.01)			
3rd generation	0.57 (0.54,	0.57 (0.54,	0.57 (0.54,	0.39 (0.34,	0.49 (0.09,	0.74 (0.35, 1.11)	3.53 (2.67, 4.31)	1.37 (0.24, 2.45)
cephalosporins	0.59)	0.59)	0.60)	0.44)	0.87)			
Quinolones	1.09 (1.06, 1.12)	1.09 (1.06, 1.12)	1.09 (1.06, 1.12)	0.65 (0.59,	2.19 (1.64,	0.19 (-0.55,	1.90 (0.87, 2.90)	1.79 (0.08, 3.49)
				0.71)	2.73)	0.19)		

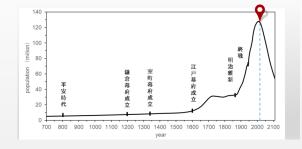
Acceleration rate for the resistance rate decline, which is considered to have been induced by the intervention program, was estimated employing a quasi-experimental study design. The percentage decrease rate per year is shown. In the absence of the intervention program, the entire country data from the JANIS system was assumed as parallel to the baseline rate of decline in all four hospitals. During the intervention period, the increment in the rate of decline (i.e. accelerated rate of decline) was estimated. Bold indicates significant results. The 95% confidence intervals are shown in parentheses.

DISCUSSION

- ・ MRSAと薬剤耐性緑膿菌の時間依存性パターンを4病院で検証
- ・バンドルアプローチの考え方を使ったプログラムアプローチにより、臨床感染症教育を体系的に行い、感染症専門医による微生物検査結果の解釈や抗菌薬の適切な使用などの臨床的意思決定を支援した
- ・傾向検定と因果推論のDIDモデルを使用
- 1) MRSAも耐性緑膿菌も期間中減少傾向を確認
- 2) 日本全体と比べてMRSAも緑膿菌も介入後に減少傾向
- 3) MRSAの減少率は50%-150%増加

私たちの知る限りでは、この研究は、医療現場で検査された薬剤耐性のS. aureusとP. aeruginosaの割合が、感染症コンサルタントによる介入プログラムによって減少を加速することを実証した最初の研究です

DISCUSSION



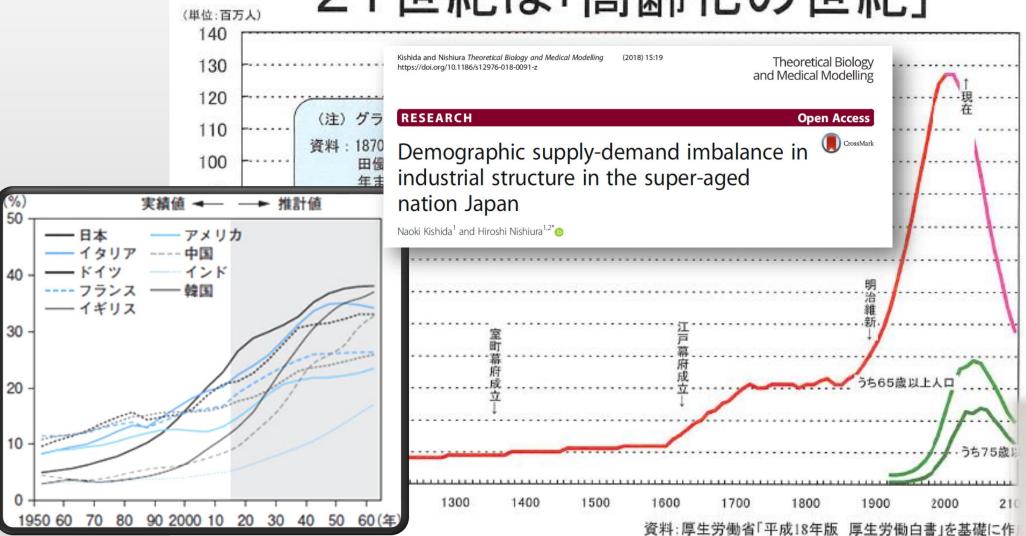
- ・ 欧米に比べて、抗菌薬の適切な使用を専門的に指示できる感染症専門医は非常に少ない
- ・ 薬剤耐性菌は世界的な公衆衛生上の脅威とされている
- 日本では、特に北海道のような人的資源の限られた環境下では、少数の感染症専門医がどのようにして有効に活用できるのかが重要となる
- 日本の少子高齢化人口減少は加速している
- ・コロナ禍でも感染症専門医はさらに少ないことが学会から指摘されている。
- ・ 我が国では、2020年を薬剤耐性菌の抑制目標達成年とし、MRSAやカルバペネム耐性P. aeruginosaなどの具体的な削減目標が定められているが、この目標を達成するためには、数少ない感染症専門医を有効に活用する手法により、定期的な介入プログラムを実施することが必要である
- ・ 系統的な教育と意思決定支援を中心とした感染症専門医による定期的な介入プログラムが、薬剤耐性菌の割合の 減少率を着実に加速させるための有力な選択肢、戦略となり得る



コロナをきっかけに さらな義局に向けて

世界に前例なき日本の現状からこれからの医療の"新しい形"を

20世紀は「人口急増の世紀」 21世紀は「高齢化の世紀」



人口学

大学院共通授業科目:社会心健康 人口学

Demograph

世界の高齢化率推移

内閣府. 平成29年版高齢社会白書 第1章高齢化の状況 第1節高齢化の 状況 5高齢化の国際的動向 表1-1-13世界の高齢化率の推移. 2017.

謃心代

厚生労働省がまとめた

2日、

分かった。

患者負

総額は40

0兆円と前年

た。増加は12年連続で、

担と保険給付を合わせた

昨年度

診療

報酬

削

減焦点

0億円増え 40兆円台に乗せるのは知 可能性は大きく広がる。

年末に与党がまとめる

に中断している。次回のと中韓の関係悪化を背景 訪中し、軍 中国は戦後

日本經濟新聞

朝刊・夕刊 ストー

テクノロジー 国際 社会・くらし

2年連続増加で過去最高 医療費、18年度42・6兆円

経済

2019/9/26 19:30

②保存 ☑共有 🖶 印刷 🍓 🚹 💆 🕴 その他▼

厚生労働省が26日発表した2018年度の概算医療費は42.6兆円で、前年度に比べ0.8%増 えた。増加は2年連続で、過去最高を更新した。75歳未満の医療費は0.2%減となった一 方、75歳以上で2.4%増となったことが押し上げた。高齢化や医療技術の発達に伴い、今 後も医療費は膨らむ見通しだ。

概算医療費は労災保険などを除いた費用で、医療費全体の98%に相当する。16年度にC 型肝炎を治療する高額薬剤の薬価を引き下げたことなどで一時的に減少したが、17年度 から再び増加に転じた。ここ数年は平均で年2%のペースで増加している。

今回は0.8%増と一見、伸び幅が緩やかになったように見える。ただ18年度の診療報酬改 定で薬価を引き下げており、「(引き下げの)影響を考慮すれば例年の伸びと同程度 で、高齢化や医療の高度化で医療費が増える基調に大きな変化は無い」(厚労省)とい う。

コロナをきっかけにさらなる難局に向けて

この前例なき日本の未来には 感染症コンサルタントという形で も立ち向かえない



Empowerment

Education

Sapporo Medical Academy

変化につながる学びの場を目指して





(社) Sapporo Medical Academy

『 「いいね!」済み 247 「いいね!」の数



(社) Sapporo Medical Academy



【セルフケアの知識を学びませんか?】 イソジンの話題で持ちきりですが セルフケアの適切な学びがあまりありません 頼りになるのは資格を持った 薬剤師や医薬品登録販売者の方 ... もっと見る

Wina液も良い代替えになります。 乾くまでしっか 5 (指聞、手首も)。ポケットやハンドバッグに入れ ァトなものもあり、携帯するとよいでしょう。見た 5悠、液水で石けんを使った手洗いです。



Sapporo Medical Academyは 医療における

「エンパワメント」

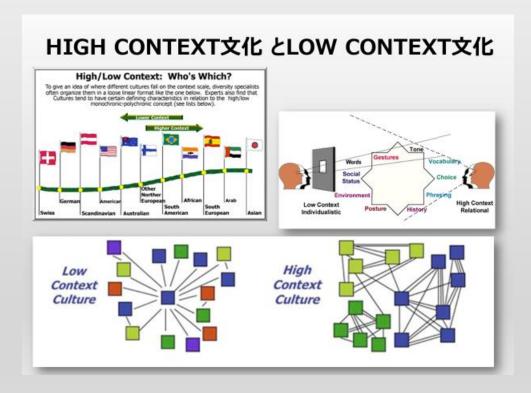
タスク・シフティング を推進します

У @kiccy7777さんをフォロー 2.95万人のフォロワー

¥ @SMAsince2014さんをフォロー 247人のフォロワー

011009 **△**WEB-STAT

"枠組み"を超えるのは日本人の得意とするところ! 役職・組織などの明確な線引きがない ハイコンテクストカルチャーの全員総力戦 が日本の強み!



コロナをも "自分たちの一部"とする

ご意見ご感想 E-mail:kiccy1975@gmail.com