Behavioral Medicine Applications in Patient Centered and Precisions Oncology Care

患者中心のがんプレシジョン診療における行動医学の応用

JAPANESE SOCIETY OF BEHAVIORAL MEDICINE

日本行動医学会

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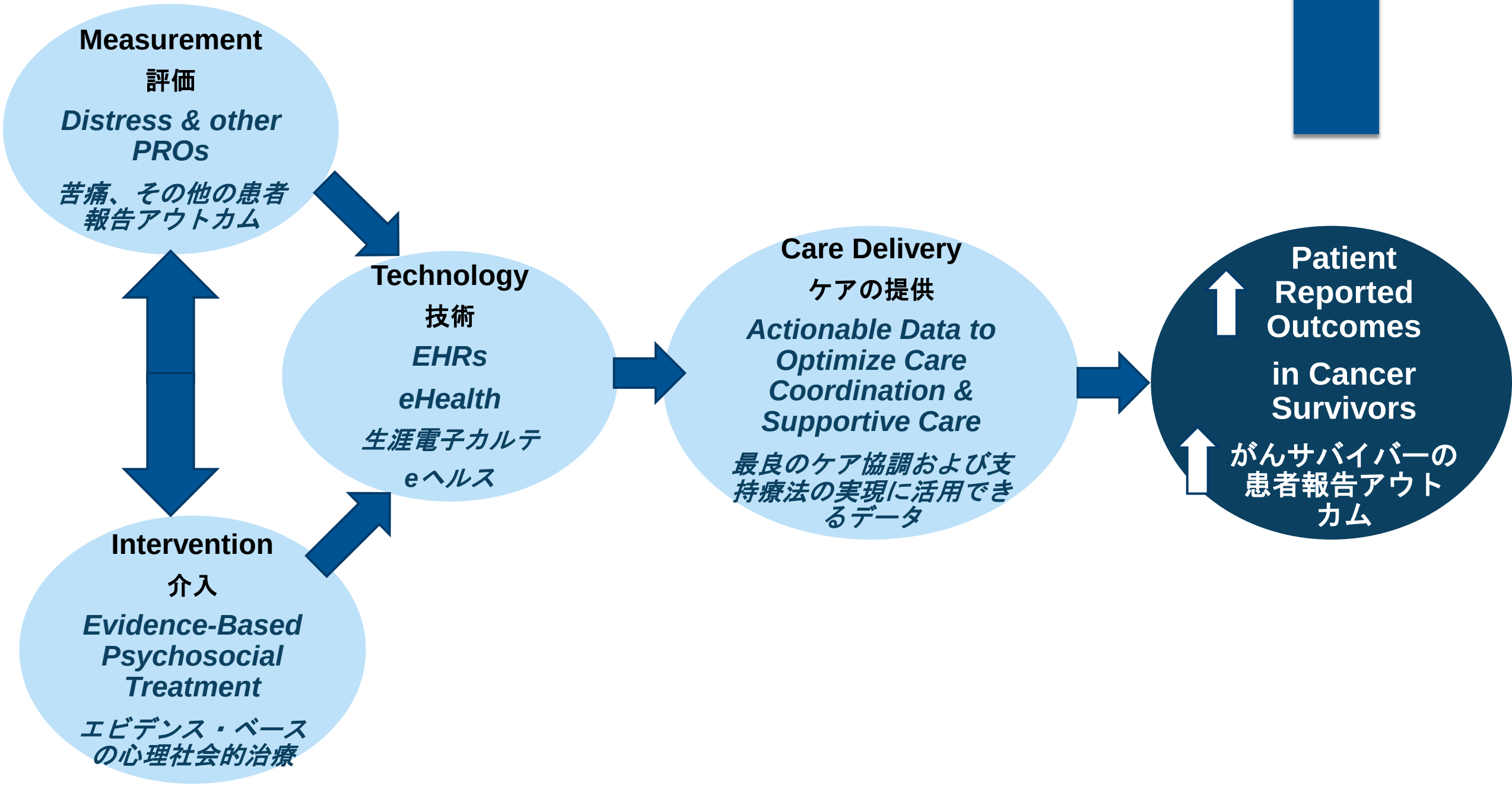
Northwestern Medicine | Robert H. Lurie Comprehensive Cancer Center of Northwestern University

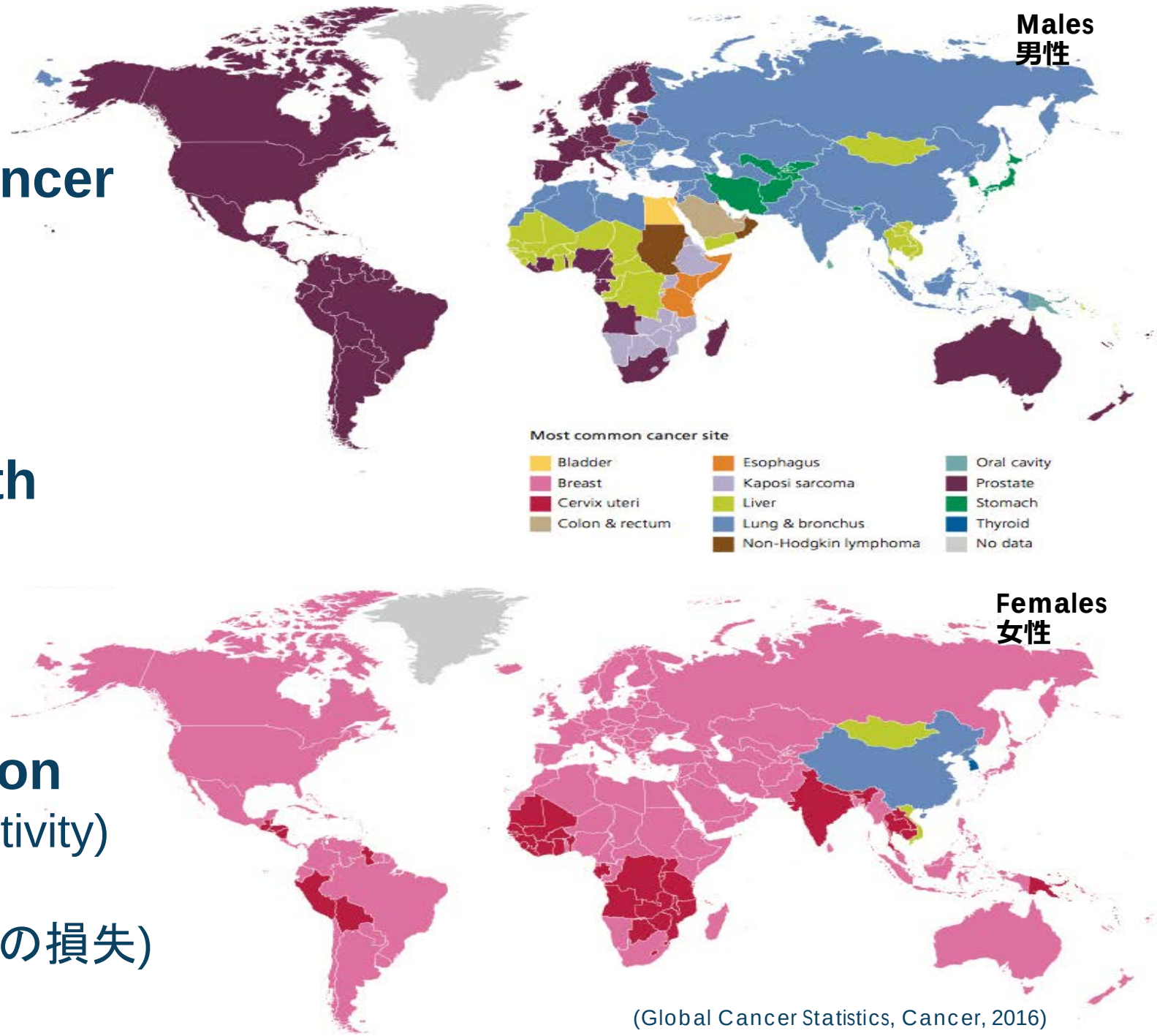
Cancer Survivorship Institute
Enhancing Life Beyond Cancer

ISBM International Society of Behavioral Medicine


Measurement
評価
Distress & other PROs
苦痛、その他の患者報告アウトカム
Technology
技術
EHRs
eHealth
生涯電子カルテ
eヘルス
Intervention
介入
Evidence-Based Psychosocial Treatment
エビデンス・ベースの心理社会的治療
Care Delivery
ケアの提供
Actionable Data to Optimize Care Coordination & Supportive Care
最良のケア協調および支持療法の実現に活用できるデータ
Patient Reported Outcomes in Cancer Survivors
がんサバイバーの患者報告アウトカム

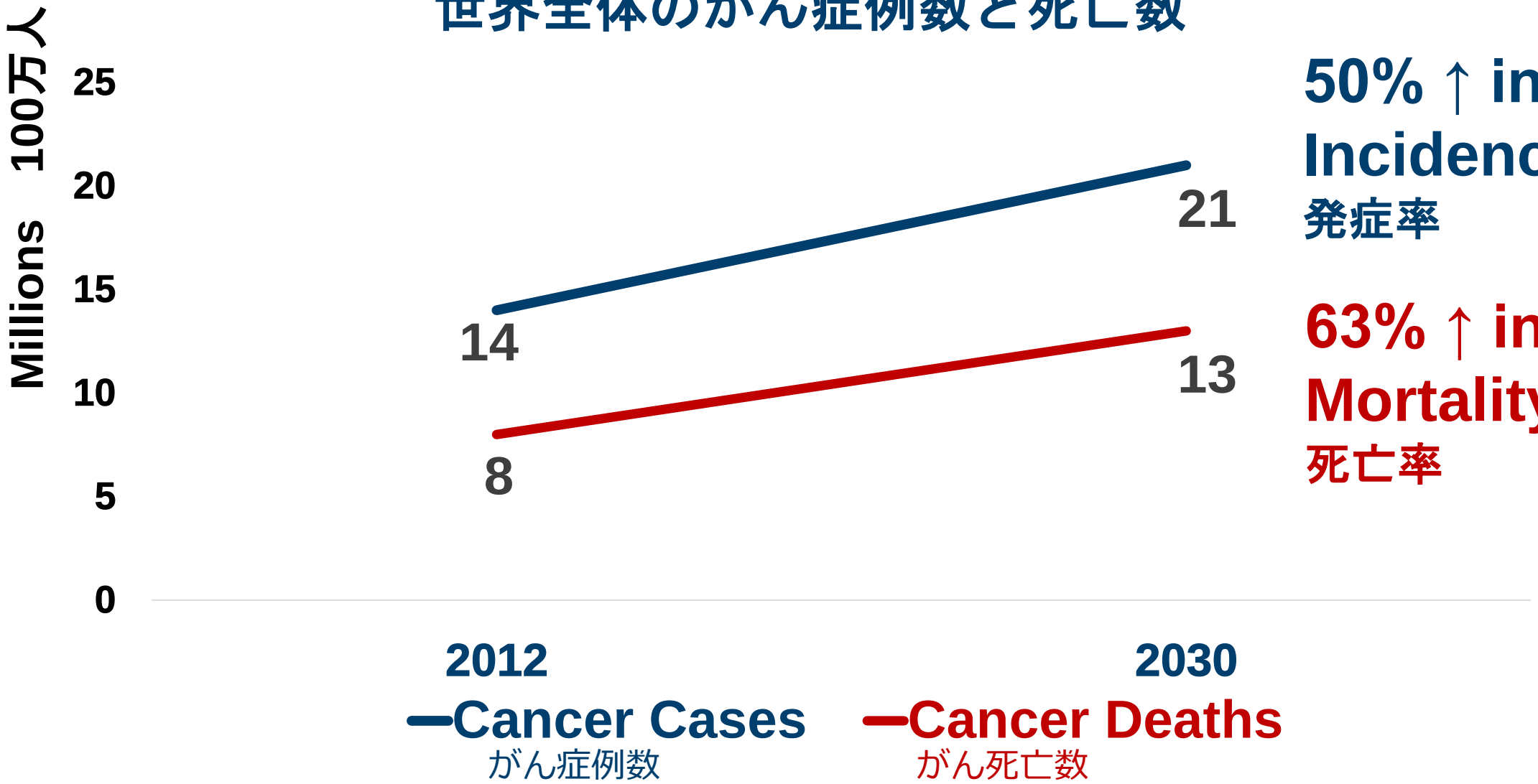
Worldwide Burden of Cancer
世界におけるがんの負担

- **1 in 2 men; 1 in 3 women**
  男性2人中1人、女性3人中1人
- **2nd leading cause of death**
  死因の2位
- **Leading cause in Japan**
  日本では死因の1位
- **Costliest chronic condition**
  ($900B—Tx cost & lost productivity)
  最もコストの高い慢性疾患
  (9000億ドル — 医療費と生産性の損失)



(Global Cancer Statistics, Cancer, 2016)

Worldwide Cancer Cases & Deaths
世界全体のがん症例数と死亡数



50% ↑ in Incidence
発症率

63% ↑ in Mortality
死亡率

ACS Global Statistics, 2016

Table 2. Estimated Number of New Cancer Cases and Deaths by World Area, 2012*

	Cases			Deaths		
	Male	Female	Overall	Male	Female	Overall
Eastern Africa	116,800	170,500	287,300	92,400	116,100	208,500
Middle Africa	30,300	43,800	74,100	25,600	31,200	56,900
Northern Africa	105,800	114,800	220,600	77,000	66,500	143,400
Southern Africa	39,900	43,000	82,900	25,100	25,900	51,000
Western Africa	69,200	112,900	[illegible]	57,800	73,600	[illegible]
Eastern Asia	2,431,500	1,713,500	4,145,000	1,756,100	1,002,200	2,758,200
South-central Asia	711,800	802,300	[illegible]	533,000	490,400	[illegible]
South-eastern Asia	382,900	403,500	786,400	290,200	238,300	528,500
Western Asia	168,700	148,900	317,600	110,100	79,200	189,400
Caribbean	48,300	42,500	90,800	29,500	23,700	53,200

Eastern Asia has almost as many cancer cases and deaths as North, Central and South America, and Europe combined.

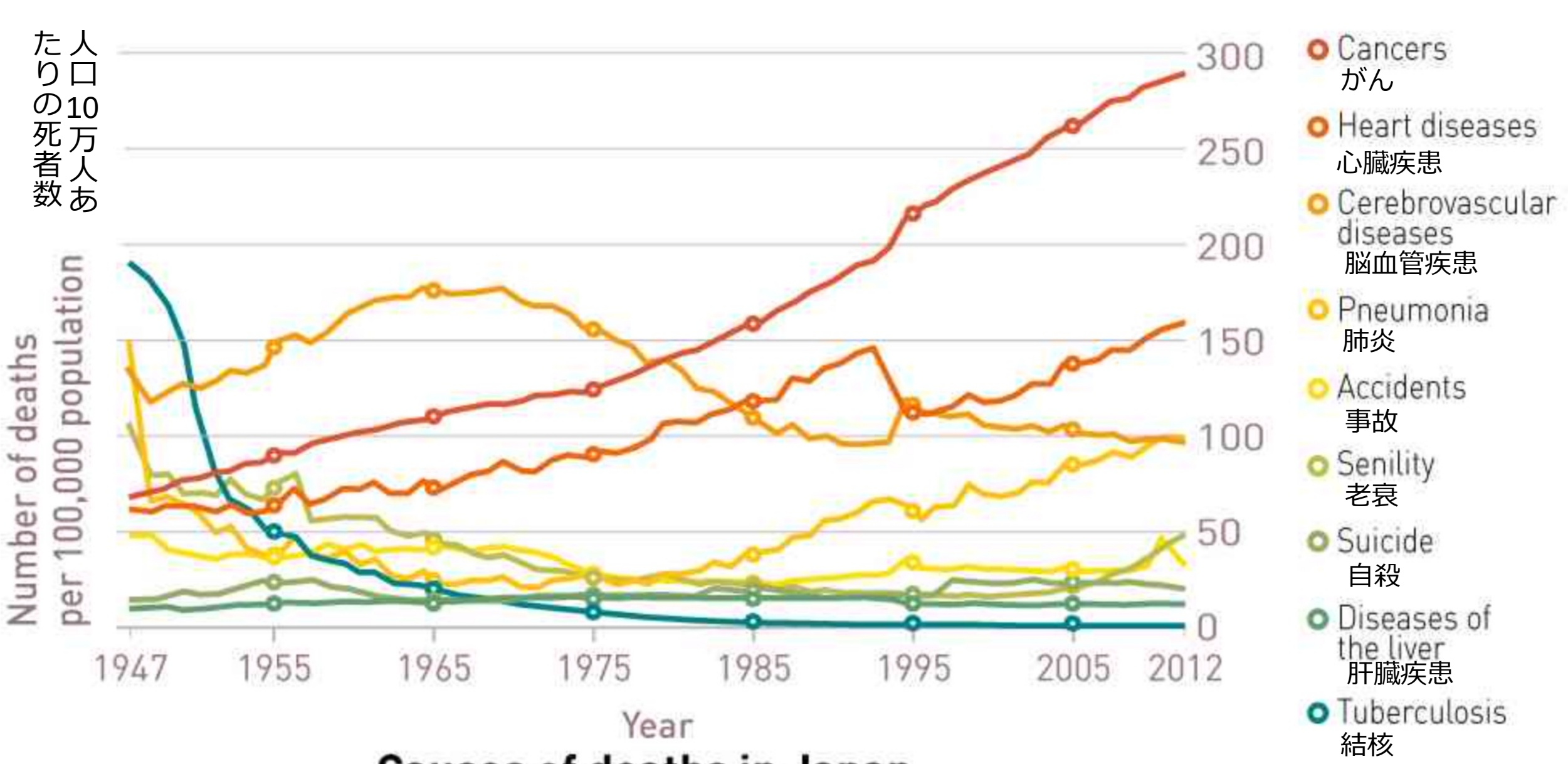
東アジアのがん症例数と死者数は北・中央・南アメリカと欧州の合計にほぼ匹敵。

Southern Europe	430,500	338,700	769,200	227,600	162,800	390,500
Western Europe	614,700	495,700	1,110,300	268,700	213,900	482,600

Cancer is the leading cause of death in Japan despite lower incidence rates in most common cancers.

日本では一般的ながんの発症率はおおむね低いものの、がんが死因の第1位。

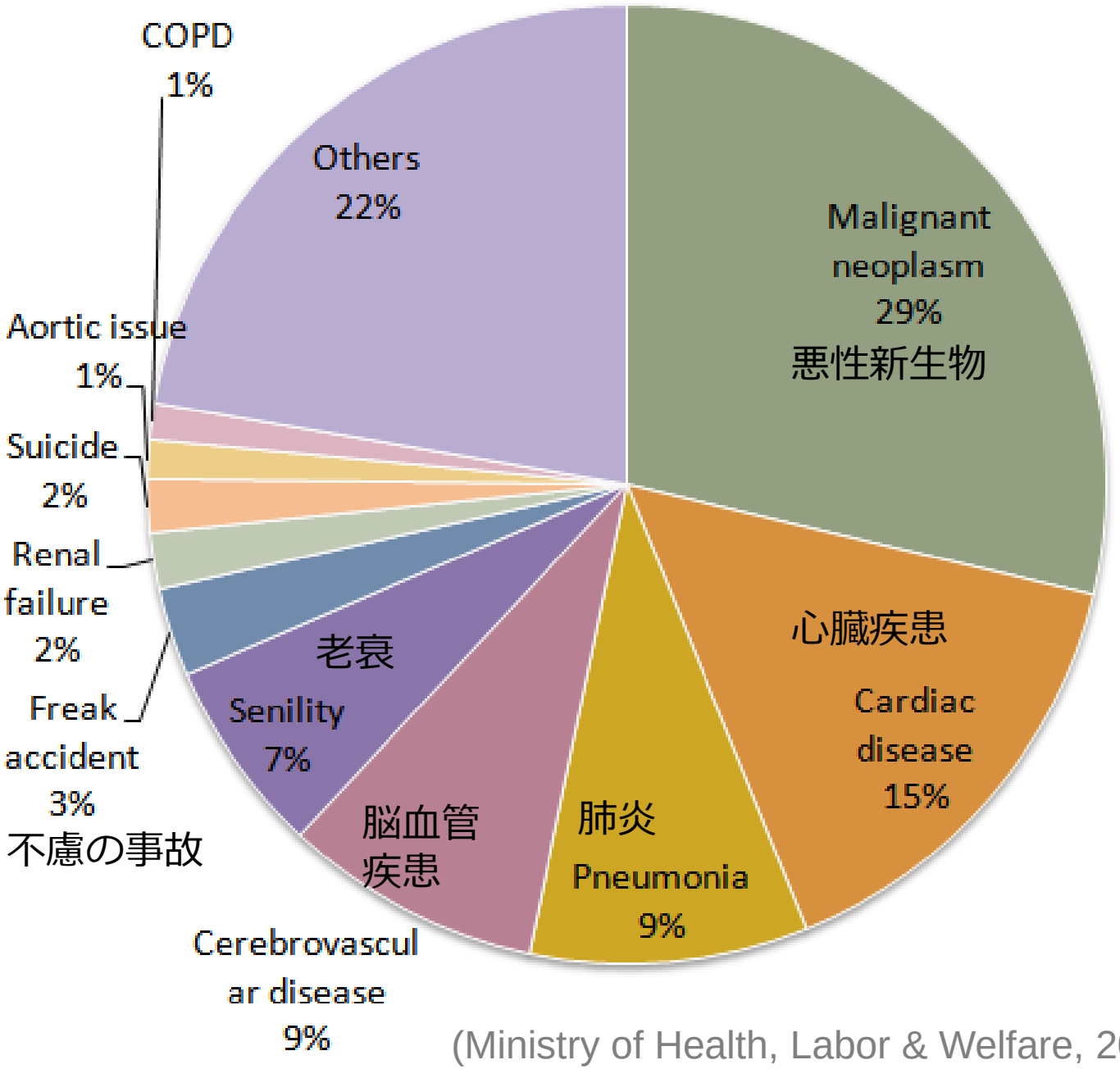
Source: GLOBOCAN 2012.



Causes of deaths in Japan

日本人の死因

(Ministry of Health, Labor & Welfare, 2016; Globacan, 2016)



(Ministry of Health, Labor & Welfare, 2016)

It is estimated that about 371,000 Japanese died from cancer in 2015, corresponding to over 1016 cancer deaths on average per day.

2015年には約37万1000人（1日平均1016人）の日本人ががんで死亡したと推定される。

Japanese Cancer Society, 2016

がんのタイプ	Cancer Type	USA Rate	Japan Rate
前立腺	Prostate	**83.8**	22.7
肺	Lung	**42.1**	24.6
乳	Breast	**76**	42.7
大腸	Colorectal	29.2	**31.5**
黒色腫	Melanoma	**14.3**	0.5
非ホジキンリンパ腫	Non-Hodgkin lymphoma	**13.7**	5.1
膀胱	Bladder	**12.7**	4.8
腎臓	Kidney	**12.1**	4.9
甲状腺	Thyroid	**9.9**	3.1
白血病	Leukaemia	**9.9**	4.3
脾臓	Pancreatic	7.0	**7.9**
肝臓	Liver	4.5	**11.2**
胃	Stomach	5.7	**31.1**
合計	Overall	**335.0**	201.1

What accounts for differences in cancer incidence - USA vs. Japan?
がん発症率の差の原因 — 日米比較

- Shorter height, less weight (e.g., BMI of 30 or >; 26% in USA but only 4% in Japan
  低身長、低体重（BMIが30以上の人は 米国が26%だが日本はわずか4%）
- Differences in fruit/vegetable intake (same fruit intake but Japan > vegetable intake)
  野菜・果物の摂取量の差（果物は同等だが野菜は日本のほうが多い）
- Much lower red meat intake in Japan/more fish intake
  日本は赤肉の摂取量が米国よりはるかに少なく、魚の摂取量が多い
- Generally darker skin/UV protection
  一般に皮膚の色が濃いので紫外線の影響が少ない
- In US, cigarettes have > amounts of carcinogens
  米国のタバコのほうが発がん物質量が多い

But:しかし

- **Greater salt intake—Japanese diet is high in sodium/stomach cancer**
  塩分摂取量が多い — 和食はナトリウム量が多く、胃がんにつながる
- **Greater H. Pylori infection—GI tract/stomach cancer**
  ピロリ菌感染率が高い — 胃腸のがん
- **Greater Hepatitis B & C—liver cancer**
  B型・C型肝炎感染率が高い — 肝臓がん

Leading Cancer Sites in Japan and Associated Risk Factors: Most have documented modifiable risks

日本人に多いがん部位および関連危険因子：ほとんどに変更可能な危険因子あり

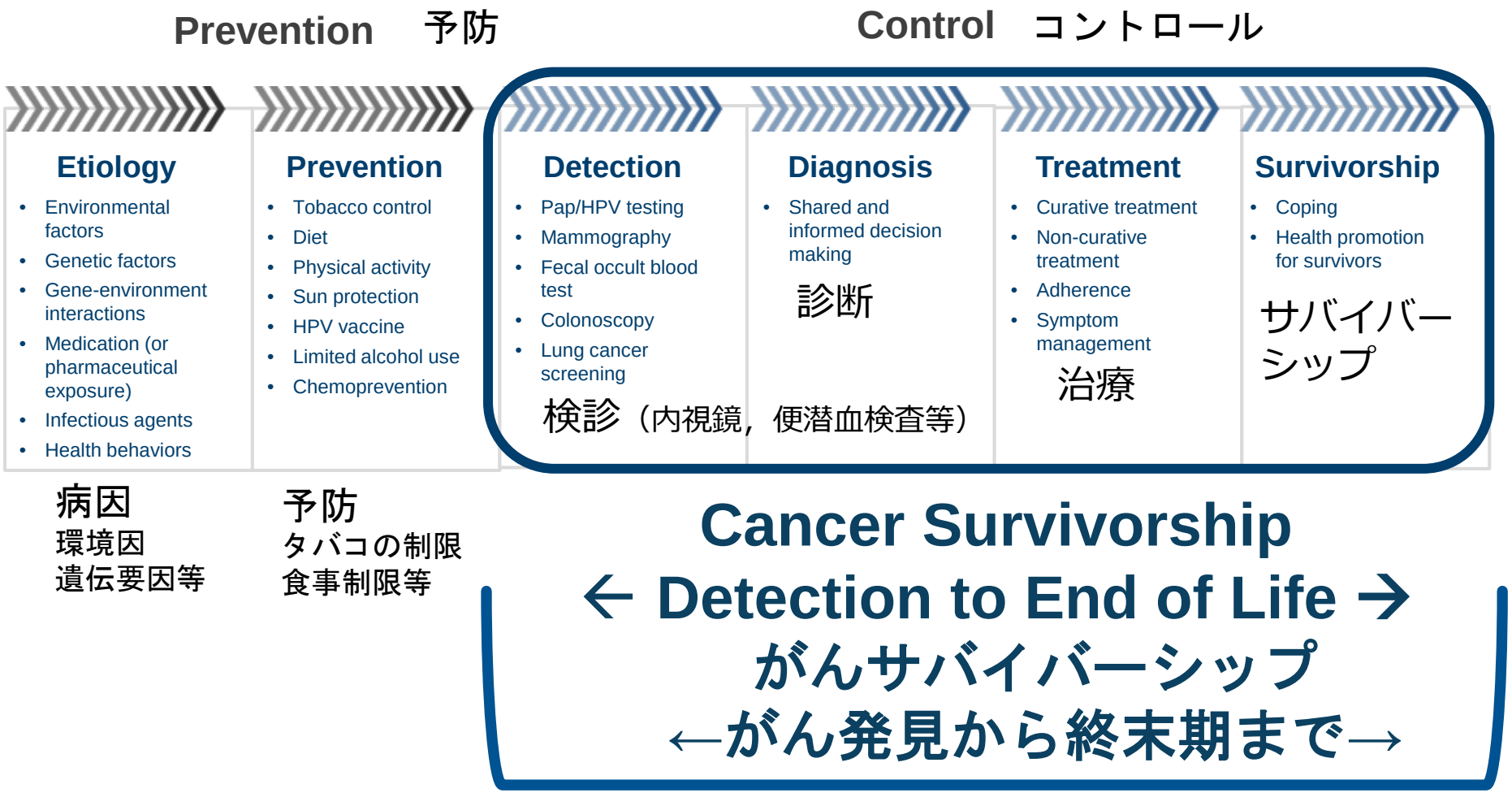
	Organ	Death rate	Risk factor
肺	Lung	49.2	Smoking 喫煙
胃	Stomach	39.9	H. pylori, Smoking, Salt, ピロリ菌，喫煙，塩分摂取
大腸	Colorectum	32.4	Alcohol drinking, Smoking, Overweight, Physical activity, 飲酒，喫煙，太りすぎ，身体活動
肝	Liver	27.2	HCV, HBC, Alcohol drinking, Smoking, C型肝炎ウイルス，C型肝炎ウイルス，飲酒，喫煙
膵臓	Pancreas	18.2	Smoking 喫煙
乳	Breast	16.6	Alcohol, Overweight 飲酒，太りすぎ
前立腺	Prostate	15.0	
膀胱・胆管	Bladder, bile duct	13.1	
腎臓・尿道・膀胱	Kidney,Urater, Urinary bladder	9.6	Smoking, Overweight, 喫煙，太りすぎ
子宮	Uterus	8.3	HPV ヒトパピローマウイルス
食道	Esophagus	8.9	Smoking, Alcohol drinking 喫煙，飲酒
卵巣	Ovary	6.9	
口腔・咽頭	Oral cavity, Pharynx	4.5	Smoking, Alcohol drinking 喫煙，飲酒

All are modifiable risk factors

すべて変容可能な因子

Cancer Survivorship in the Cancer Prevention & Control Research Continuum

がん予防･対策研究の流れの中のがんサバイバーシップ



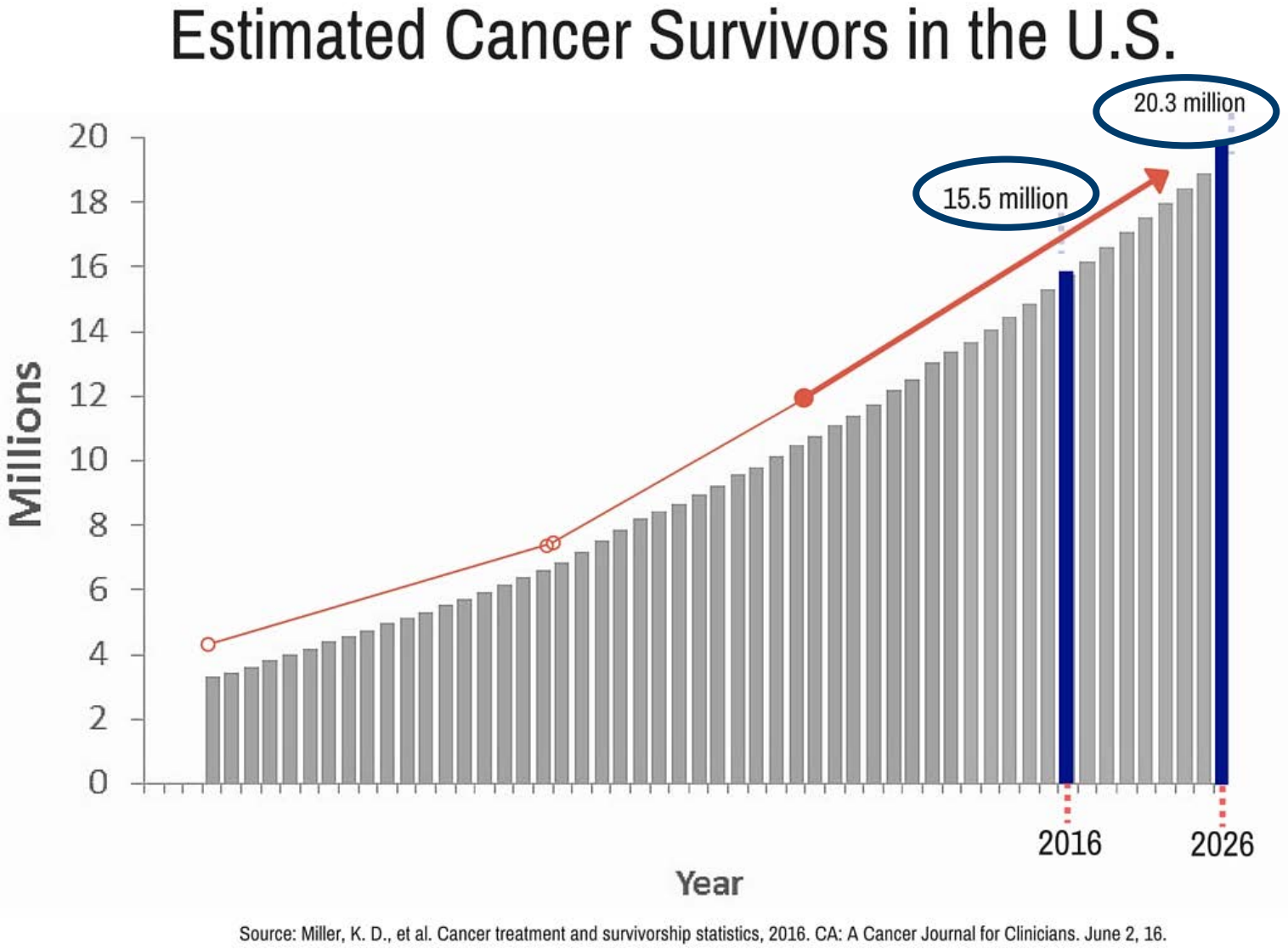
Advances in early detection & treatment have led to a growing number of cancer survivors…

早期発見・早期治療の進展により、がんサバイバーが増加

In U.S.:
1970: ~50% 5-year survival
2016: ~70% 5-year survival
2017: ~65% in Japan

Global Survivors:
2016: 32 million globally
2022: 37 million globally

アメリカにおける、がんサバイバーの推定数

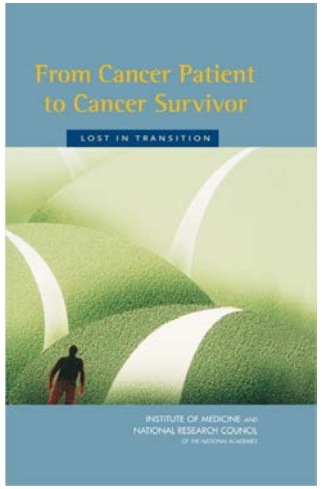


de Moor et al. Cancer survivors in the United States, Cancer Epidemiology, Biomarkers, and Prevention, 2013
ACS 2014 Facts and Figures

(Global Cancer Statistics, Cancer, 2016; Japan National Cancer Center, 2017)

Survival Benefit Offset by Challenges?
生存に伴う利益を打ち消す問題?

- Treatment side effects – chronic & debilitating
  治療の副作用 — 慢性・消耗性
- Functional limitations & interpersonal disruption
  機能の制限、人間関係の崩壊
- Uncertain disease course & ongoing monitoring
  不透明な疾患経過、経過観察の継続
- Comorbidities & age-related declines further compromise QoL
  併存症と加齢性機能低下によるQoLのさらなる低下
- Care is complex, expensive & often fragmented
  治療は複雑で高額、しばしば断片的
- Limited attention to survivors' needs (phys & emot, care coord, training)
  サバイバーのニーズ（身体・感情、ケア協調、指導）に対し十分に目が向けられない



(IOM, 2005, 2008; ACS, 2012; NCI, 2012)

Standards of Care
標準ケア

AMERICAN COLLEGE OF SURGEONS
Inspiring Quality:
Highest Standards, Better Outcomes

Commission on Cancer®

STANDARD 3.1
Patient Navigation Process
A patient navigation process, driven by a community needs assessment, is established to ***address health care disparities and barriers to care*** *for patients.* ***Resources to address identified barriers may be provided either on-site or by referral to community-based or national organizations****.*

標準ケア3.1
患者ナビゲーションプロセス
医療格差と診療への障壁に取り組む。見つかった障壁に取り組むためのリソースは、受診医療機関にて、または地域組織か全国組織への紹介により提供。

Expected Compliance:

100%

STANDARD 3.2
Psychosocial Distress Screening
The cancer committee develops and implements a process to integrate and monitor ***on-site psychosocial distress screening and referral*** *for the provision of psychosocial care.*

標準ケア3.2
心理社会的苦痛のスクリーニング。受診医療機関での心理社会的苦痛のスクリーニングと紹介

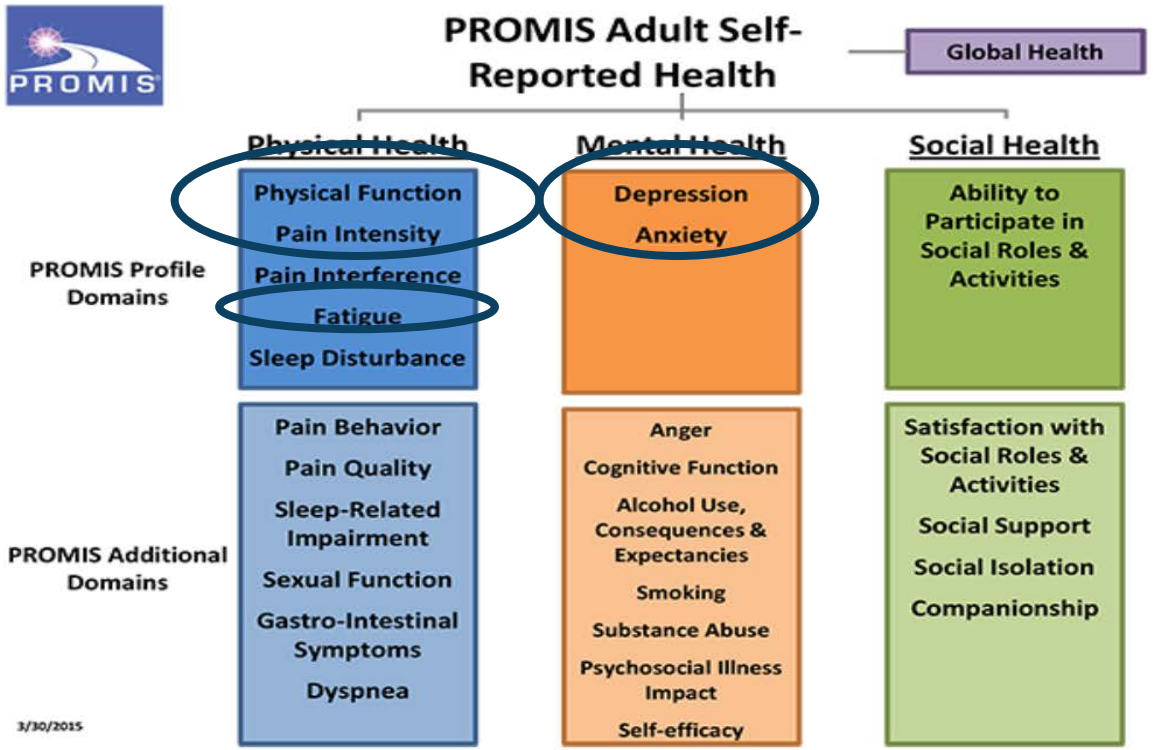
100%

標準ケア3.3
サバイバーシップケア計画
がん治療の完了に近づいた患者に、包括的なケア概要とフォローアップ計画を伝える。

STANDARD 3.3
Survivorship Care Plan
The cancer committee develops and implements a process to disseminate a ***comprehensive care summary and follow-up plan to patients with cancer who are completing cancer treatment****. The process is monitored, evaluated, and presented at least annually to the cancer committee and documented in minutes.*

2016 –25%
2017 –50%
2018 –75%
2019 –all

Lurie Screening Initiative: Evidence Based Measurement
ルリー・スクリーニングイニシアチブ：エビデンス・ベースの評価法



- IRT-based
  項目反応理論に基づく
- Brief
  短い
- Precise
  正確である
- Clinical Valid
  臨床的に妥当である
- Domains of relevance to Ca survivors

がんサバイバーに関わる領域である

Lurie Screening Initiative
(Prior to a visit)

ルリー・スクリーニングイニシアチブ
(受診前)

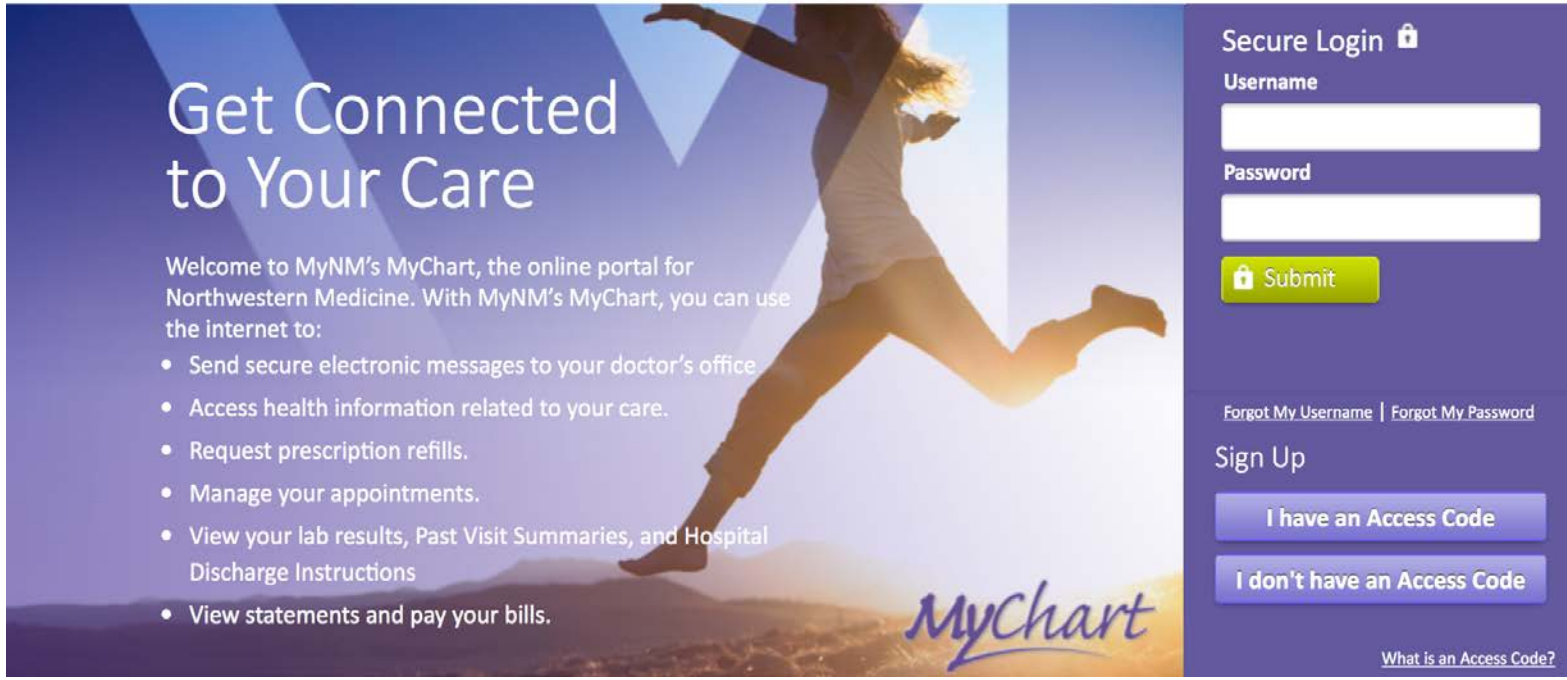
Northwestern Medicine

Bookmark This Page

1-855-HLP-MYNM
(1-855-457-6966)

PROMIS Computer Adaptive Testing:

- Pain 痛み
- Fatigue 疲労
- Physical function 身体機能
- Depression 抑うつ
- Anxiety 不安



Practical Needs & Other Concerns:

- Social work needs ソーシャルワークのニーズ
- Informational needs 情報のニーズ
- Nutritional status 栄養状態

Total Length: ~ 40 items (8-10 min.)
Frequency: Once every 30 days (max.)

全体の長さ：最大で40項目（8−10分）

頻度： １ヶ月に１度（最大で）

(Wagner et al., 2014; Pearman et al. 2016; Penedo & Cella, 2016)

PROMIS Computer Adaptive Test (CAT): Physical Functioning

PROMISコンピュータ適応型テスト(CAT): 身体機能

5マイル走ることができますか？
2マイル走るかジョギングできますか？
平坦な場所で１ブロック歩けますか？
歩いて別の部屋に移れますか？
１分間バランスを崩さずに立っていられますか？
自分で寝起きできますか？

- **Answer 1 item from pool**
  （項目プールから1項目回答）
- **Next item is based on response**
  （次の項目は前の回答による）
- **Process repeats**
  （プロセスを繰り返す）

- **SE <2**
  （標準誤差<2となるまで）
- **4-6 items**
  (4-6項目で完了)

Clinically Elevated PROMIS Scores & Stated Concerns Triaged in Real Time

PROMISスコアの臨床的上昇と、明示された問題に対するリアルタイムの優先順位

Depression, Anxiety
抑うつ、不安

→ **Psychology & Social Work**
心理学・ソーシャルワーク

Pain, Fatigue, Physical Functioning
疼痛、倦怠、身体機能

→ **Treating MD, RN Message**
治療MD、RNメッセージ

Other Concerns
その他の問題
Social work, Nutrition, Oncofertility, Financial, Informational, etc
ソーシャルワーク、栄養、がん生殖医学、経済、情報提供など

→ **Social Work, Nutrition, Health Educator, Financial Counselor Consult Initiated**
ソーシャルワーク、栄養、保健指導員、経済カウンセラーによる相談開始

Medical Team Triage Notification
医療チームによる優先順位通知

Real Time
EPIC Alert
即時アラート

Results

CC PATIENT SYMPTOM ASST (Order 75418233)

Result Information

Exam Date and Time	Status	Result Date and Time
5/20/2012 12:00 AM	Final result -- Abnormal	5/20/2012 9:25 PM

Assessment Results

Question	Response
In the past 7 days How often did you have to push yourself to get things done because of your fatigue?	5-Always
In the past 7 days How run-down did you feel on average?	5-Very much
In the past 7 days How fatigued were you on average?	5-Very much
In the past 7 days What was the level of your fatigue on most days?	4-Severe
Fatigue bank score	73.94-Severe
In the past 7 days how much did pain interfere with your day to day activities?	3-Somewhat
In the past 7 days how much did pain interfere with your ability to participate in social activities?	5-Very much
In the past 7 days how much did pain interfere with your enjoyment of social activities?	3-Somewhat
In the past 7 days how much did pain interfere with work around the home?	3-Somewhat
Pain Intensity bank score	63.09-Moderate
Does your health now limit you in doing two hours of physical labor?	1-Cannot do
Are you able to do chores such as vacuuming or yard work?	1-Unable to do
Are you able to carry a shopping bag or briefcase?	1-Unable to do
Does your health now limit you in walking about the house?	2-Quite a lot
Physical Function bank score	23.47-Severe

Severe Fatigue
激しい疲労

Moderate Pain Int.
通常程度の痛み

Severe Phys. Func.
重度の身体機能低下

Lab and Collection

CC PATIENT SYMPTOM ASST (Order#75418233) on 5/20/12 - Lab and Collection Information

Result History

CC PATIENT SYMPTOM ASST (Order#75418233) on 5/20/12 -

Orders/ Disposition
指示/処置

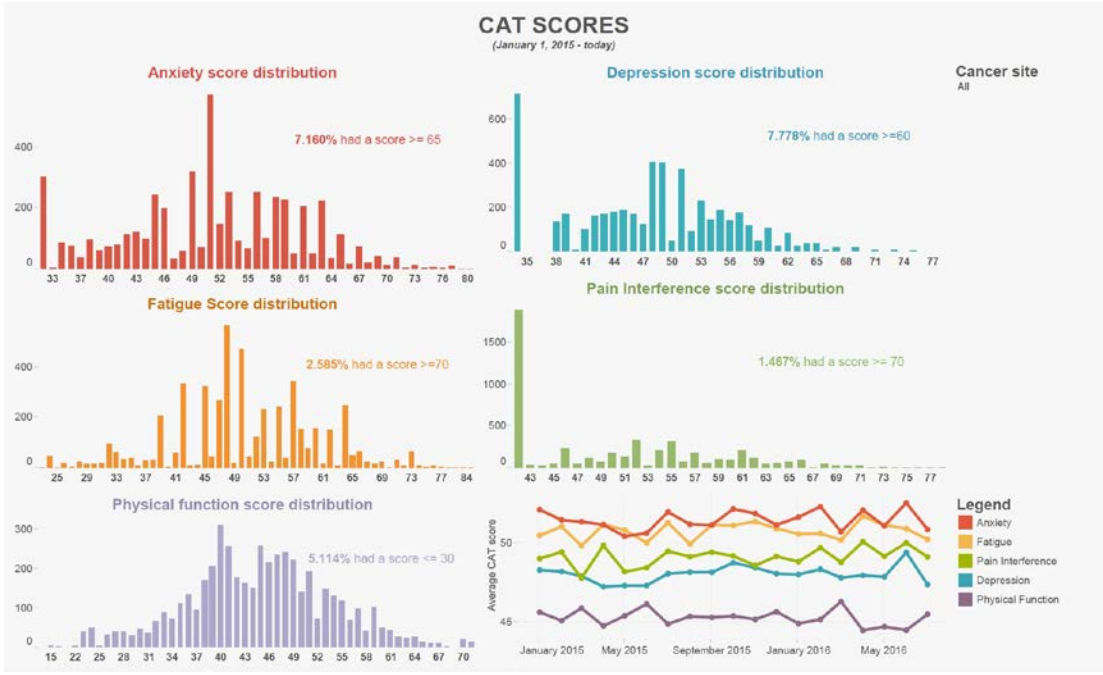
Reviewed by List

ANDERSON APN, NANCY on Mon May 21, 2012 7:34 AM
BERRY MD, EMILY on Mon May 21, 2012 8:09 AM

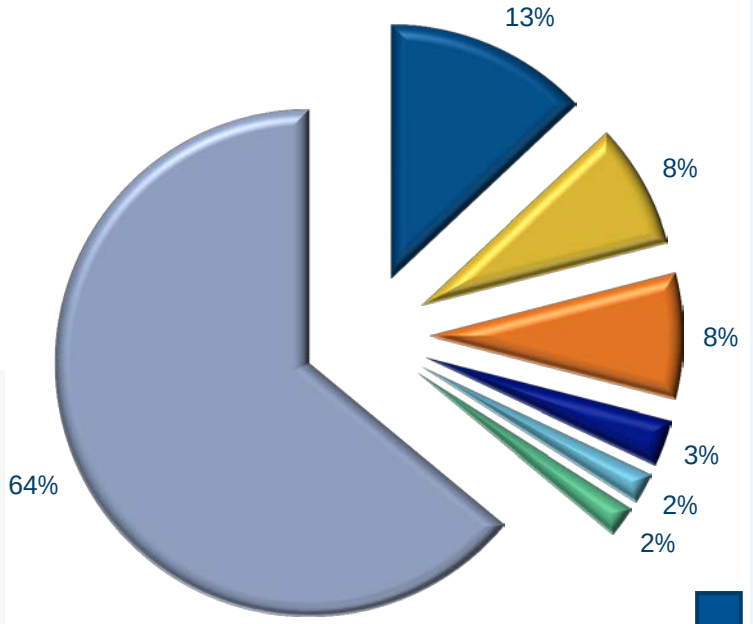
Reviewers
評価者

Psychosocial Concerns
心理社会的問題

36% social work triage
36%は心理社会的支援が必要



I could use support in the following areas:
利用可能な支援



- **Managing stress**
  ストレスの対処
- **Coping with cancer diagnosis**
  がん診断の受け止め
- **Getting information on support groups**
  支援グループに関する情報収集
- **Communicating with my medical team**
  医療チームとのコミュニケーション
- **Communicating with children about cancer**
  がんに関する子どもとのコミュニケーション
- **Communicating about my cancer with others (family, friends, employer)**
  家族、友人、勤務先とのコミュニケーション
- **No needs at this time**
  現時点では特に必要としていない

Behavioral Medicine
Psychosocial Intervention
行動医学・心理社会的介入

(Wagner et al., 2013; Penedo & Cella, 2016)

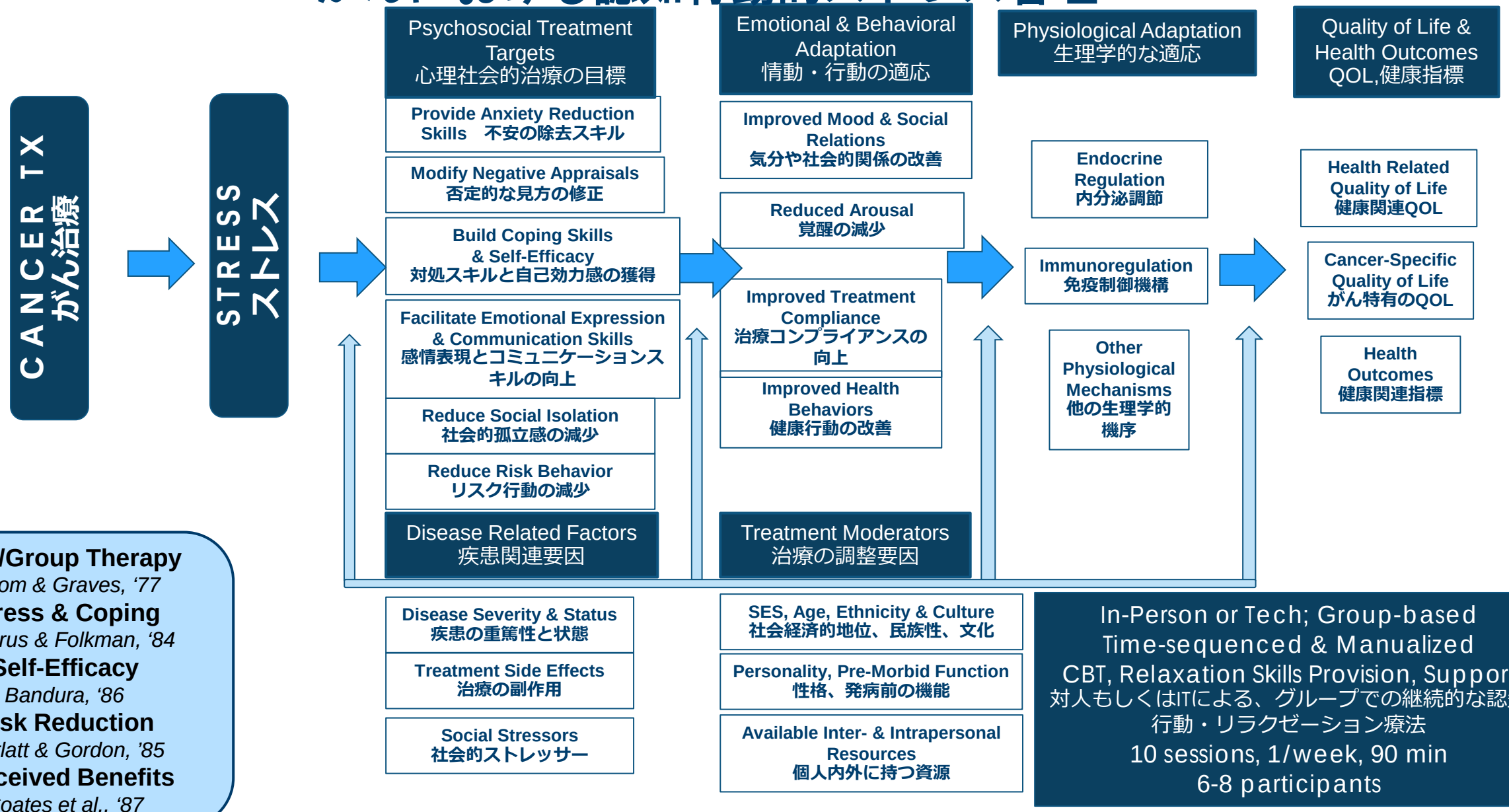
Behavioral Medicine Interventions & Cancer
行動医学的介入とがん

Psychosocial interventions have been shown to:
心理社会的介入には以下の効果が認められている：

- Reduce risk behavior
  危険行動の減少
- Improve mood, QoL, reduce distress
  気分とQoLの改善、苦痛の軽減
- Facilitate post-treatment adjustment
  治療後の適応の促進
- Improved physical functioning
  身体機能の改善
- Improved endocrine & immune function, signaling
  内分泌、免疫機能、信号伝達の改善
- Survival—limited evidence
  生存 — エビデンスは限られている

(e.g., Meyer & Mark, 1995; Carlson & Bultz, 2003; Cunningham, 1995,2000; Antoni et al., 2002; Penedo et al., 2004, 2007, 2008)

COGNITIVE BEHAVIORAL STRESS MANAGEMENT IN CANCER
がんにおける認知行動的ストレス管理

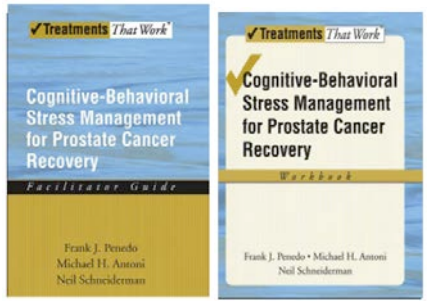


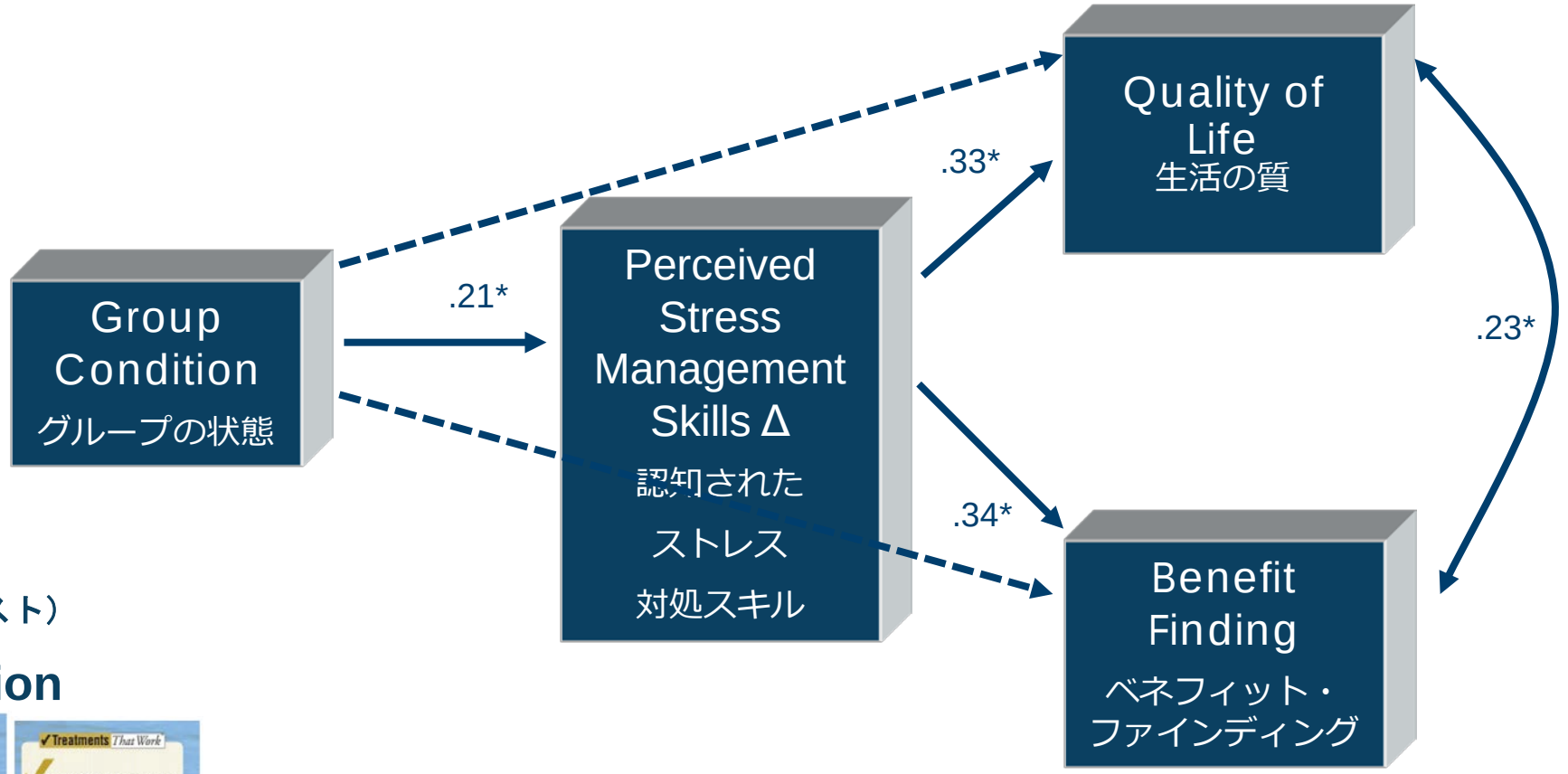
CBT/Group Therapy
Yalom & Graves, '77
Stress & Coping
Lazarus & Folkman, '84
Self-Efficacy
Bandura, '86
Risk Reduction
Marlatt & Gordon, '85
Perceived Benefits
Coates et al., '87

(Benedict & Penedo, 2013; Penedo, Antoni & Schneiderman, 2008; Antoni et al., 2006)

Cognitive Behavioral Stress Management (CBSM)
Effects on HRQoL & Benefit Finding in Localized Prostate Ca
限局性前立腺がんにおける認知行動的ストレス管理(CBSM)による健康関連QoLへの効果と利益

- **Manualized**（マニュアル化された）
- **Group-based**（グループ）
- **In-person**（対面）
- **10-weeks**（10週間）
- **Relax/CBT vs. UC**
- **N=260**（対象者数260名）
- **Racial/Ethnic diversity**
  （多人種・多民族）
- **Pre-post; 6- & 12-mos.**
  （6か月および12カ月でのプレ・ポスト）
- **10% Accept/80% Retention**
  （10%が承諾し、
  80%が継続）

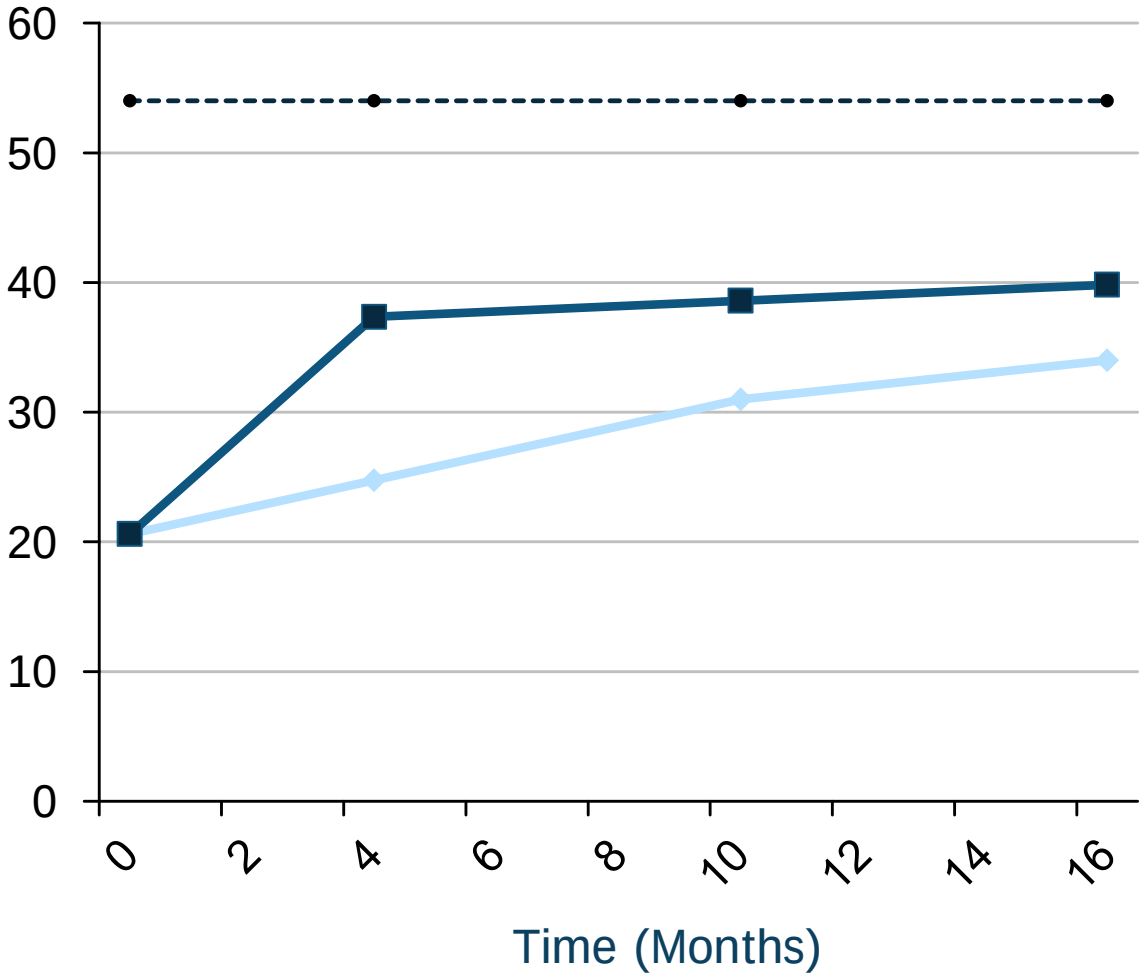




$X^2 = 2.05$, p=.36; CFI = 1.00, RMSEA = 0.01
(adjusting for age, tx, time since tx, SES, race/eth, sexual aids)

(Penedo et al., 2006)

CBSM Effects on Sexual Function: Among High anxiety Participants
性機能に対するCBSMの効果：高不安の参加者



Control (+ SI) コントロール群

CBSM (+ SI) CBSM介入群

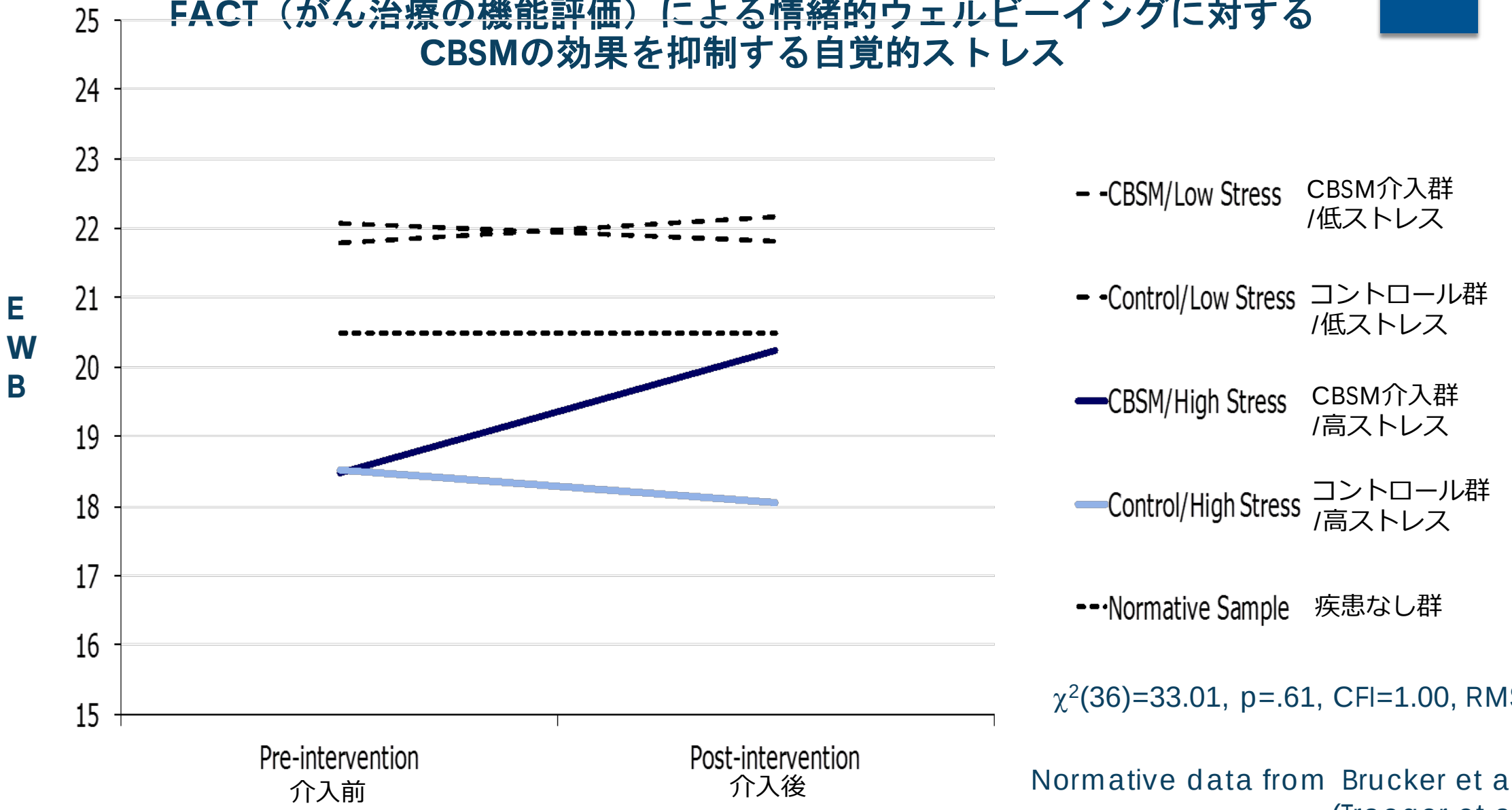
Healthy* 疾患なし群

*Based on a sample of healthy, age-matched men w/o PC (Litwin, 1999)

(Siegel et al., 2006)

Perceived Stress as a Moderator of CBSM's Effect on FACT Emotional Well Being

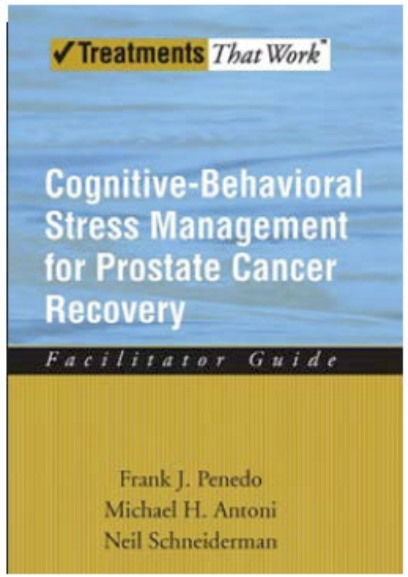
FACT（がん治療の機能評価）による情緒的ウェルビーイングに対するCBSMの効果を抑制する自覚的ストレス

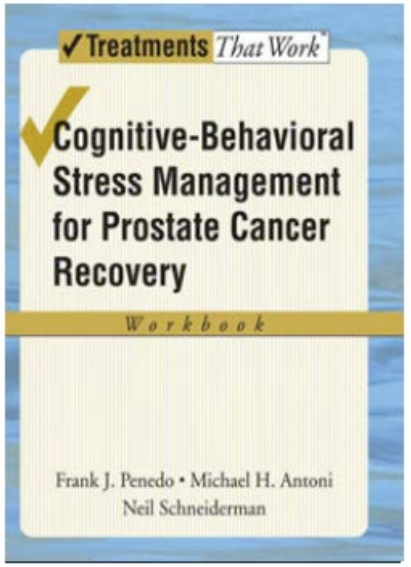


$\chi^2(36)=33.01$, $p=.61$, CFI=1.00, RMSEA<.01

Normative data from Brucker et al. (2005) (Traeger et al., 2012)

In-Person Group-Based Cognitive Behavioral Stress Management (CBSM) in Localized PC
限局性前立腺がんにおけるグループベースの対人的認知行動的ストレス管理(CBSM)





- Improvements：改善点
  - HRQOL　健康関連QOL
  - Stress management skills　ストレス対処スキル
  - Coping, Mood　コーピング、気分
  - Benefit finding　ベネフィット・ファインディング
- Clinically significant improvements in：
  - 臨床的に有意な改善がみられた点
  - sexual function 性機能
  - emotional well-being 情緒的ウェル・ビーイング
  - (for anxious, socially inhibited & stressed　不安、社会的抑制、ストレス)
- Some evidence of improved immunoregulation 免疫制御機構改善の兆候

N=260; Acceptance Rate ≈ 10%; Attendance & Retention > 80%

(e.g.; Penedo et al., 2004, 2006; Molton et al., 2008 ; Traeger et al., 2011)

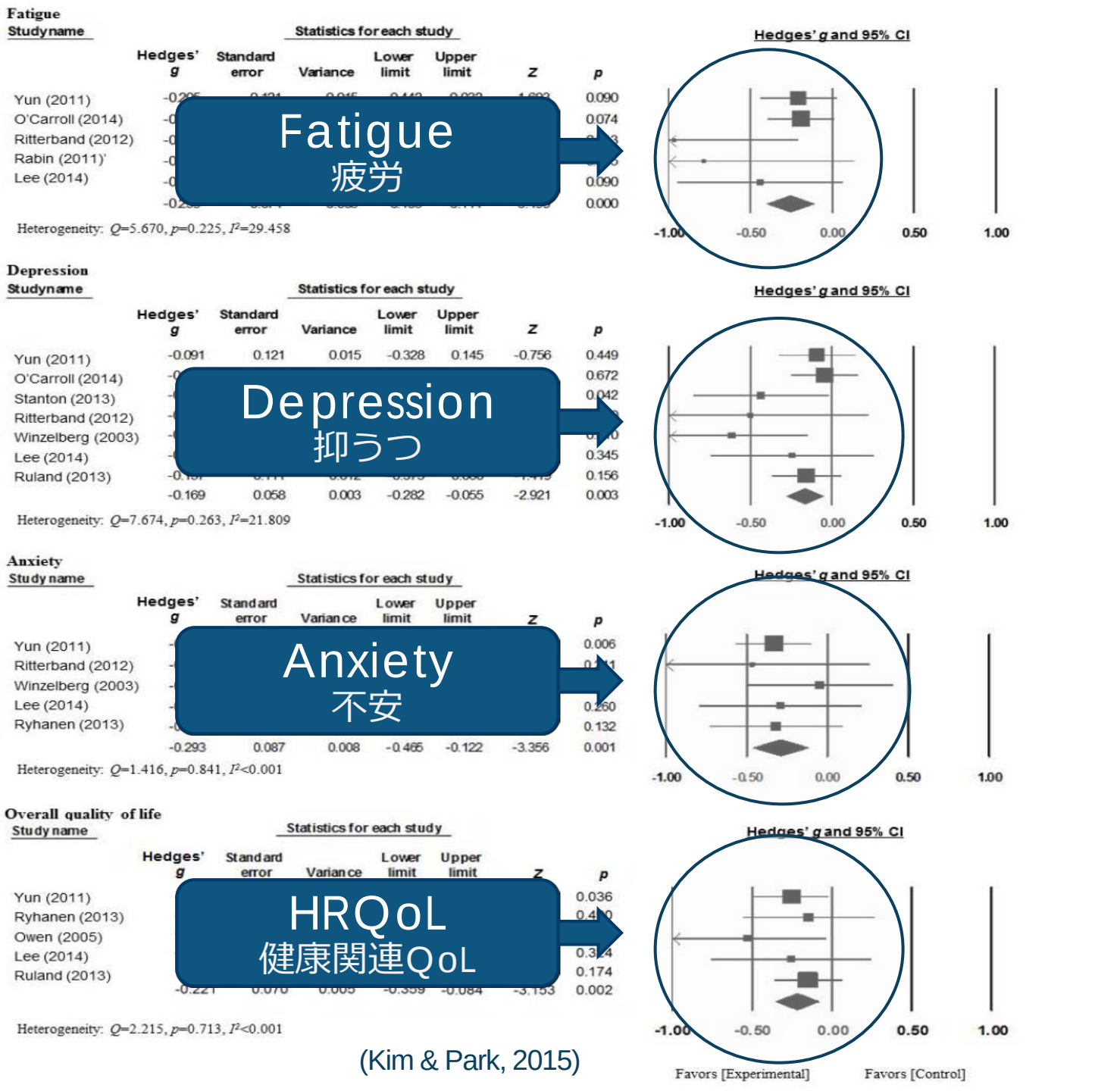
eHealth Interventions in Oncology
がん治療におけるeヘルス介入

- ~70% seek information & ~30% seek support
  約70%が情報を求め、約30%が支援を求める
- eHealth educational and support programs growing
  eヘルスによる教育・支援プログラムが増えている
- Most are self-directed
  大半は自主的なもの
- Self-management, peer-to-peer support & education
  自己管理、ピアツーピアによる支援と教育
- Evidence that eHealth can favorably impact PROs
  eヘルスが患者報告アウトカムに良好な影響を与えるというエビデンス

(Kim & Park, 2015)

eHealth Programs for Cancer Survivors
がんサバイバーのための eヘルスプログラム

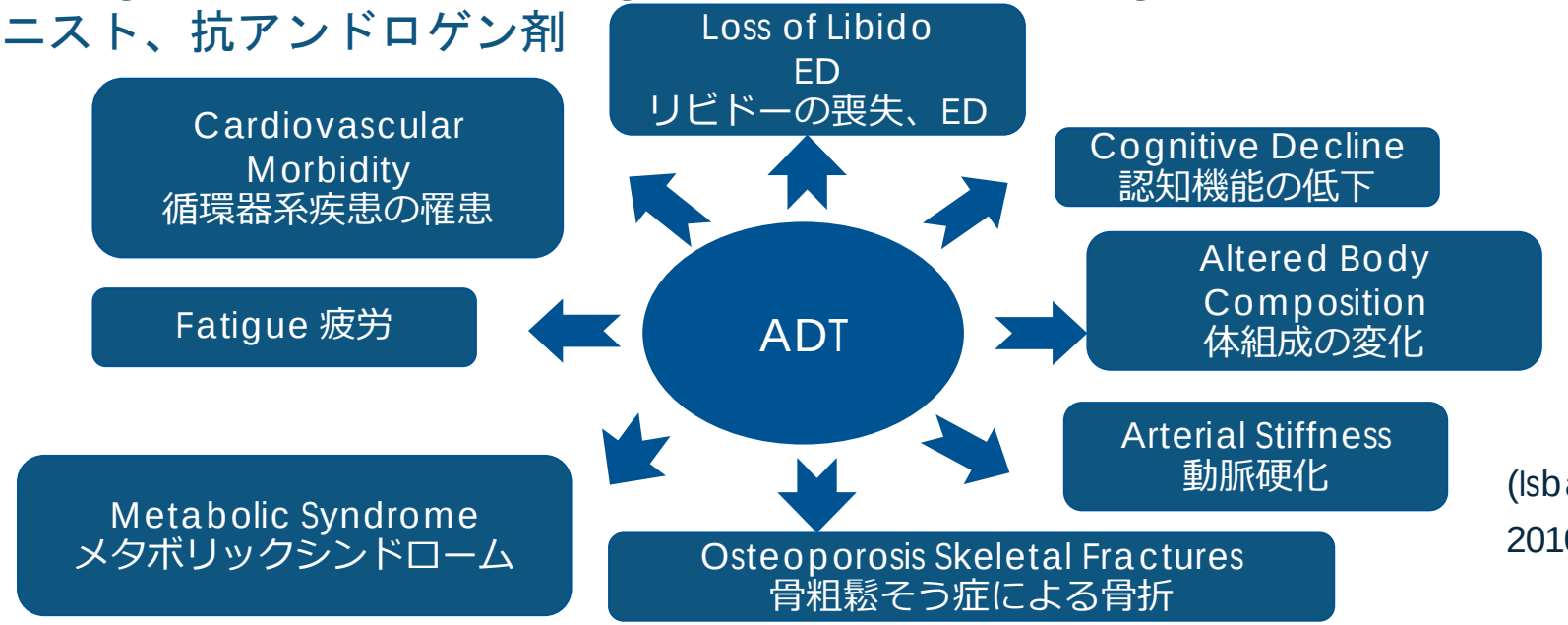
- 34 studies, RCTs
  34件のランダム化比較試験
- Mixed cancers 多種多様ながん
- Treatment vs. UC
  介入群 vs. 通常のケア群
- All web-based but variable tools (texting, chatting, peer support, phone support, info, tailored feedback) ウェブを用いた様々なツール
- Selected trials with harmonized outcomes
  アウトカムを統合した
  いくつかの試験

(Kim & Park, 2015)

Advanced Prostate Cancer 進行性前立腺がん

- ~20% of PC; older; more comorbidities; ~28% survival in met.
  ~20%の進行性前立腺がん; 高齢; さらなる併存疾患; ~28%転移におけるサバイバル
- Androgen Depravation Treatment (ADT) is common アンドロゲン除去療法が一般的
- LHRH agonists, LHRH antagonists & anti-androgens LHRHアゴニスト、LHRHアンタゴニスト、抗アンドロゲン剤

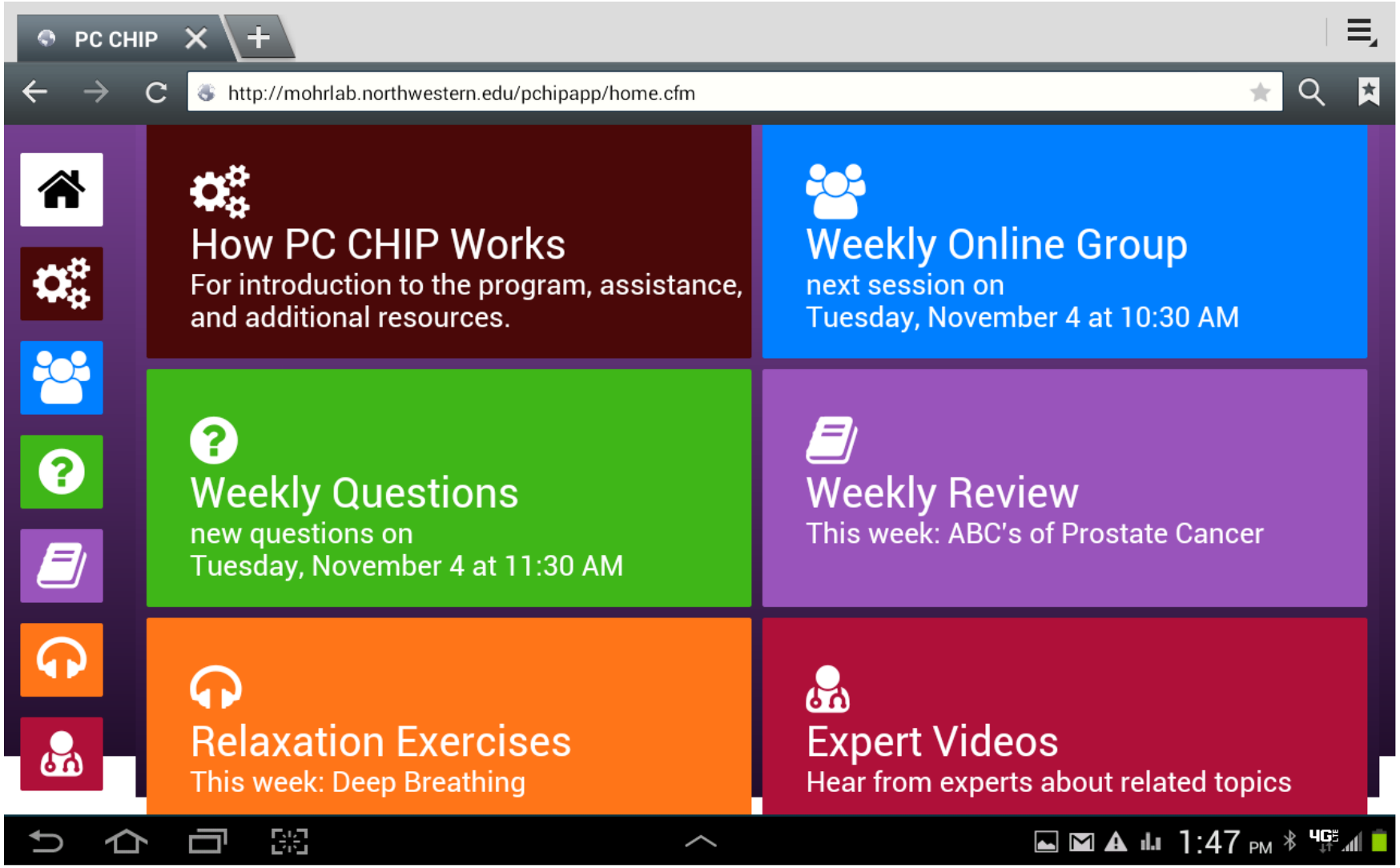


(Isbarn et al., 2005; Couper et al; 2010; Yanez et al., 2016)

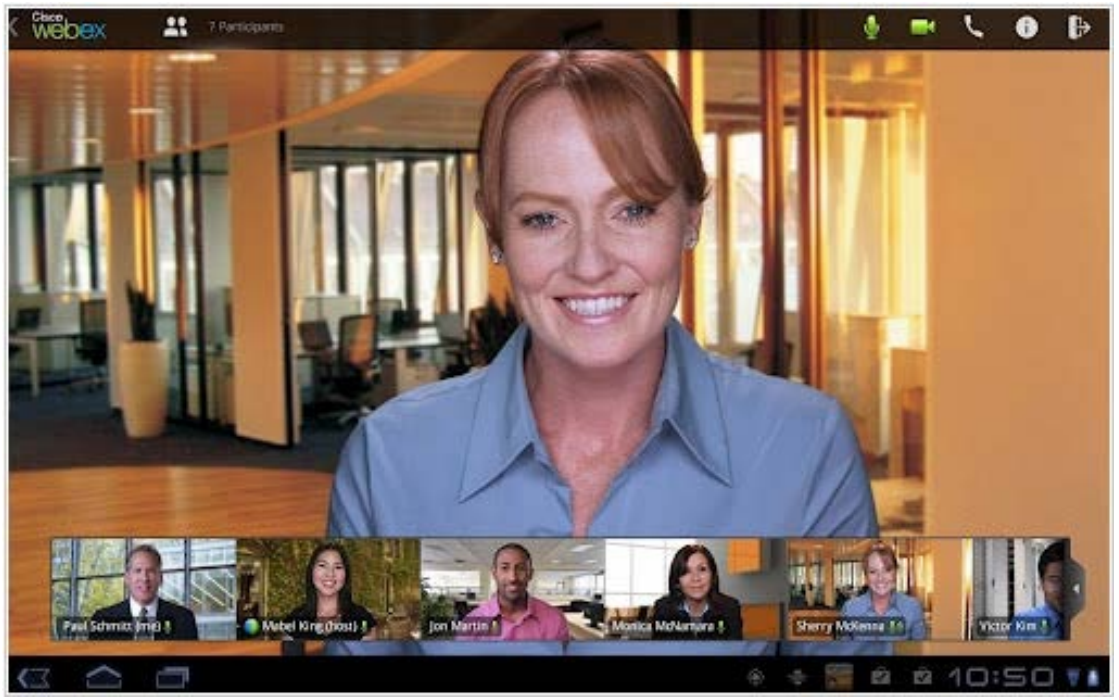
- About 30% report clinically elevated distress—symptom related 約30%が増悪した抑うつを報告
- Ongoing disease monitoring and risk of progression 疾患の継続モニタリングと進行のリスク
- ***Can we deliver CBSM online?*** *CBSMをオンラインで提供できないものか？*

Prostate Cancer Health Intervention Program (PC-CHIP)
前立腺がん保健介入プログラム(PC-CHIP)

- n=136/200
- APC on ADTアンドロゲン除去療法中のAPC
- CBSM vs. HP
- 1:1
- Adv. & Met. 進行性＆転移
- 10 weeks 10週間
- 1.5 hrs./week 1.5時間/週
- Age, comorb., SES, time TX/DX 年齢、併存疾患、社会経済的要因、治療/診断の時期
- Samsung Tablet サムスンのタブレット

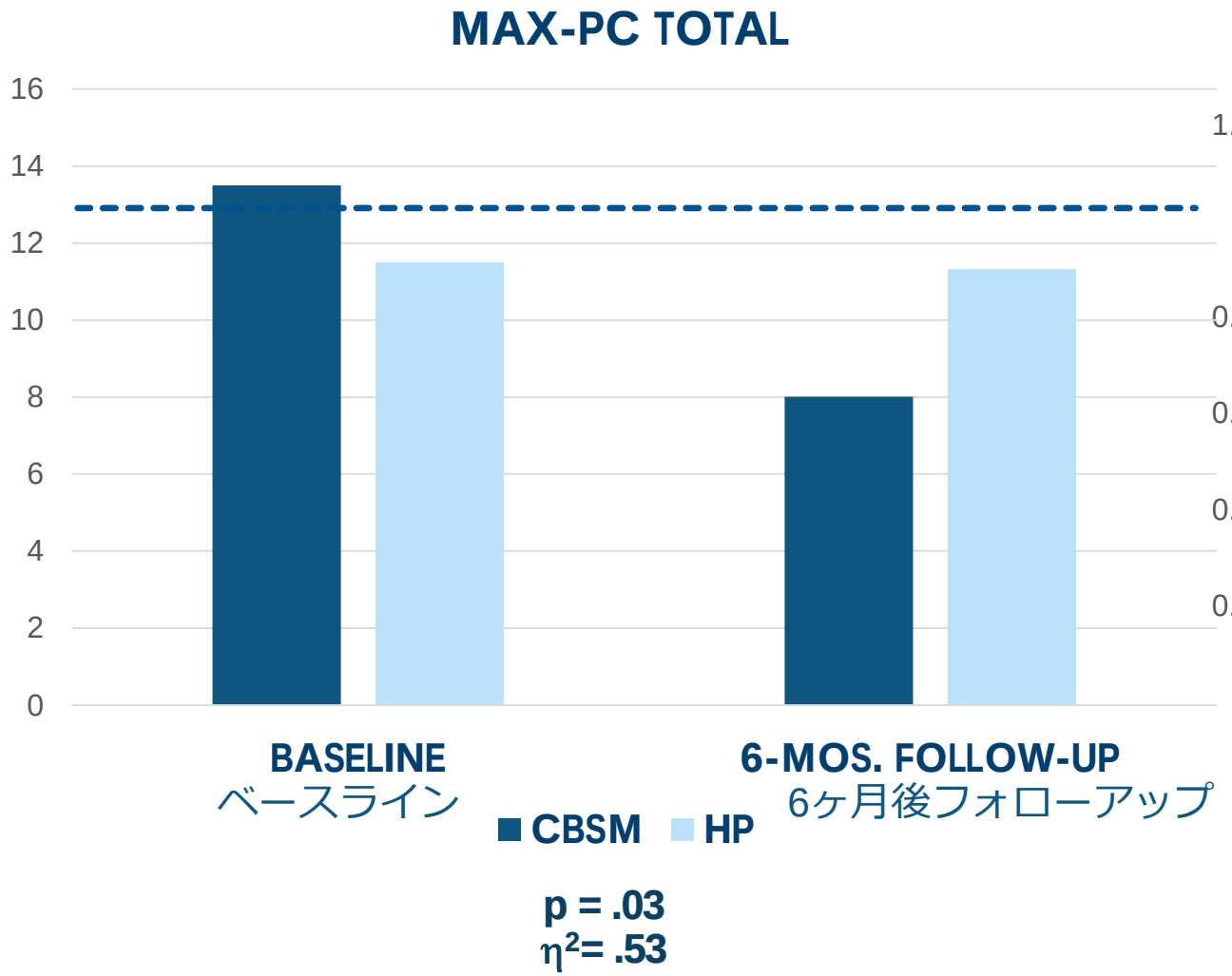


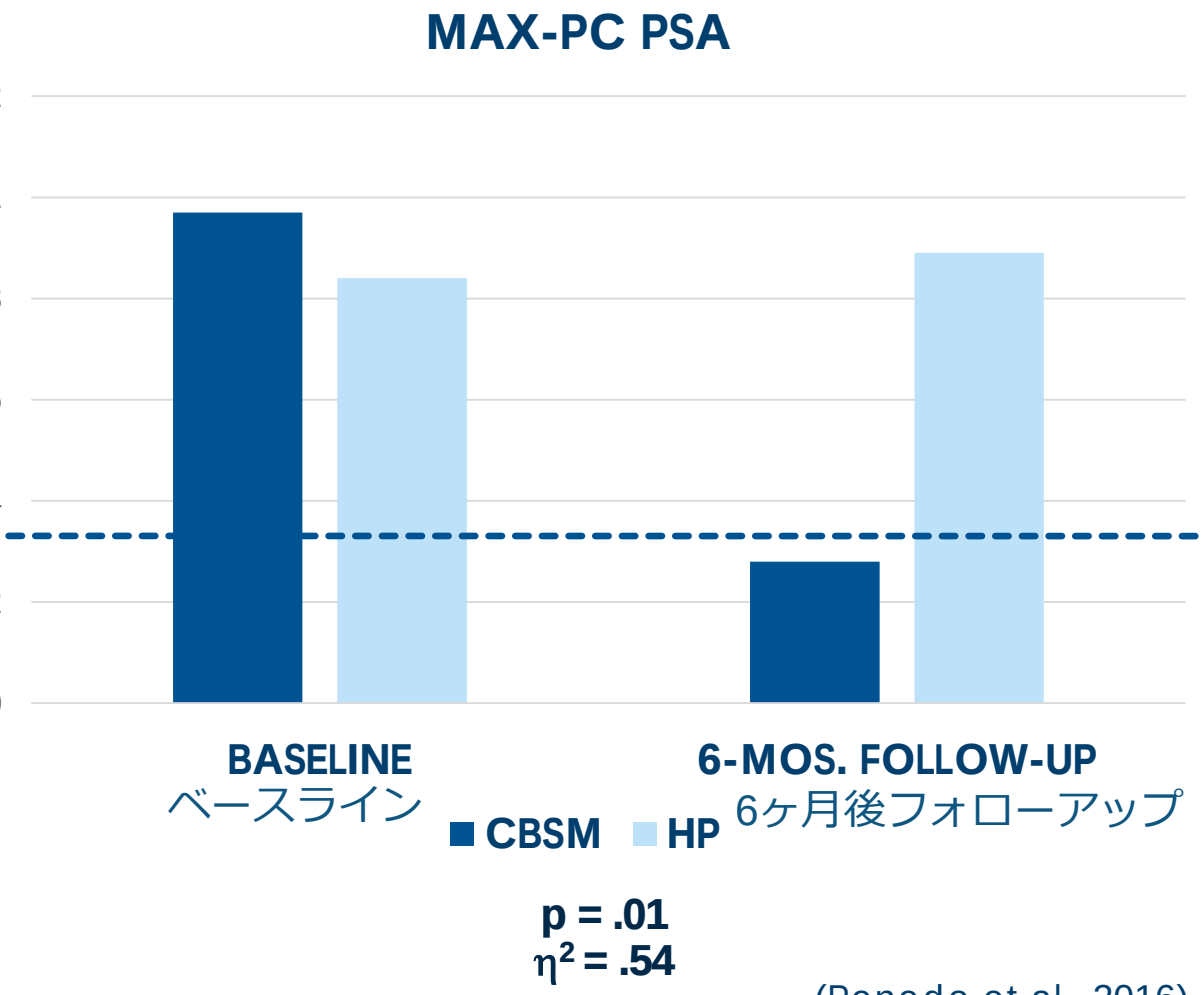
Cisco webex™



(Penedo et al., 2016)

PSA Anxiety
PSA値に関する不安

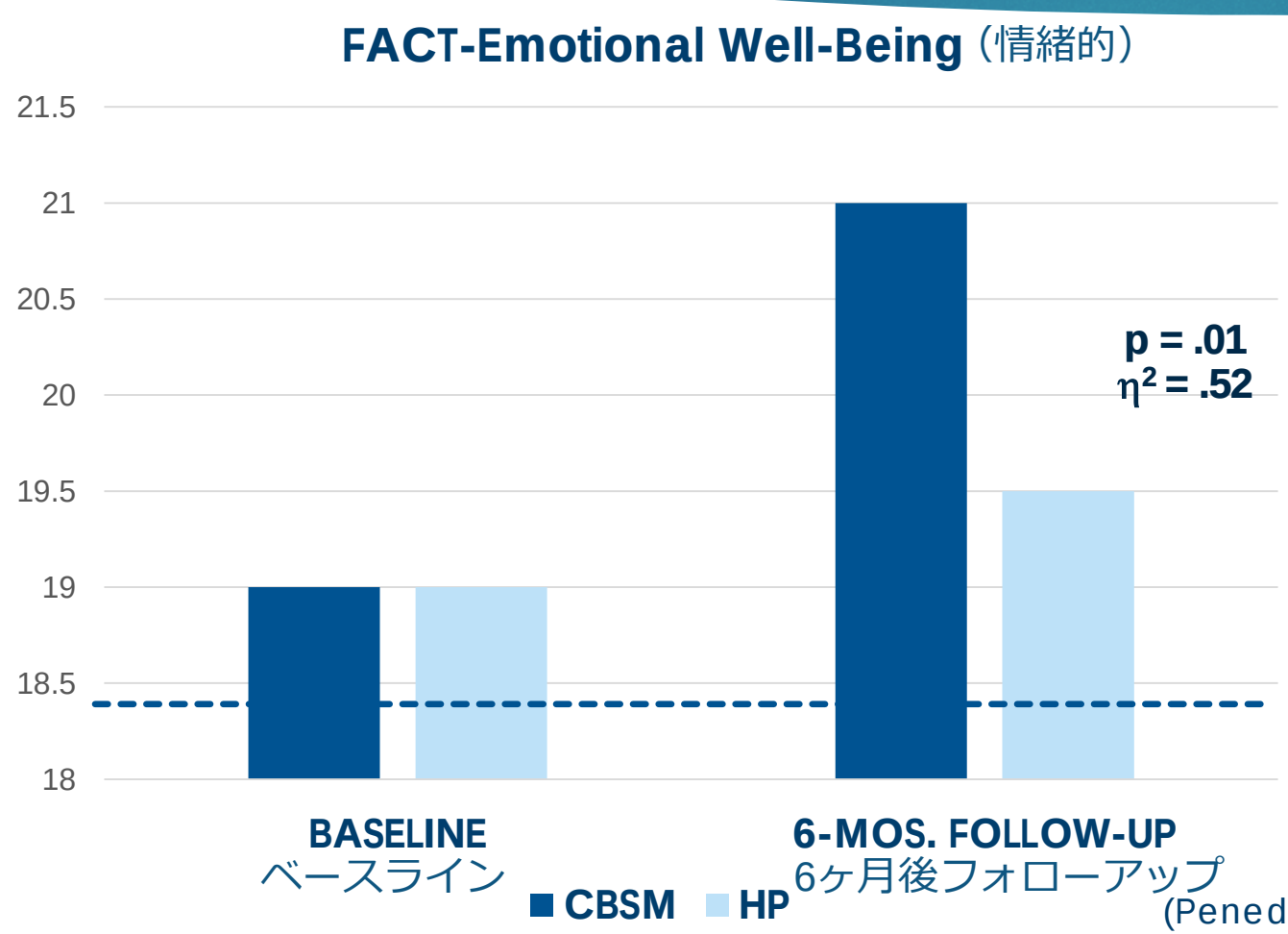


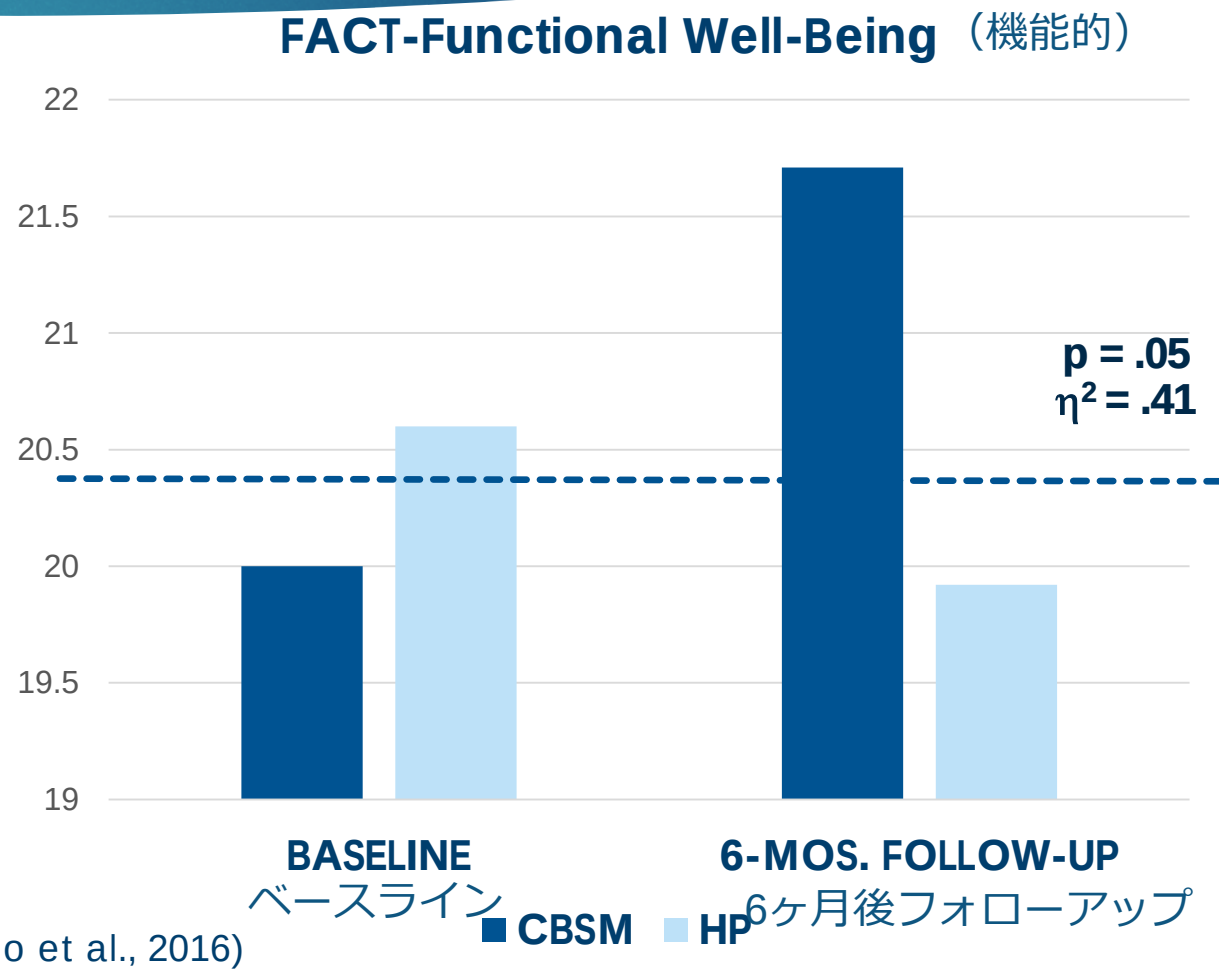


(Penedo et al., 2016)

Emotional & Functional Well-Being

情緒的･機能的ウェルビーイング

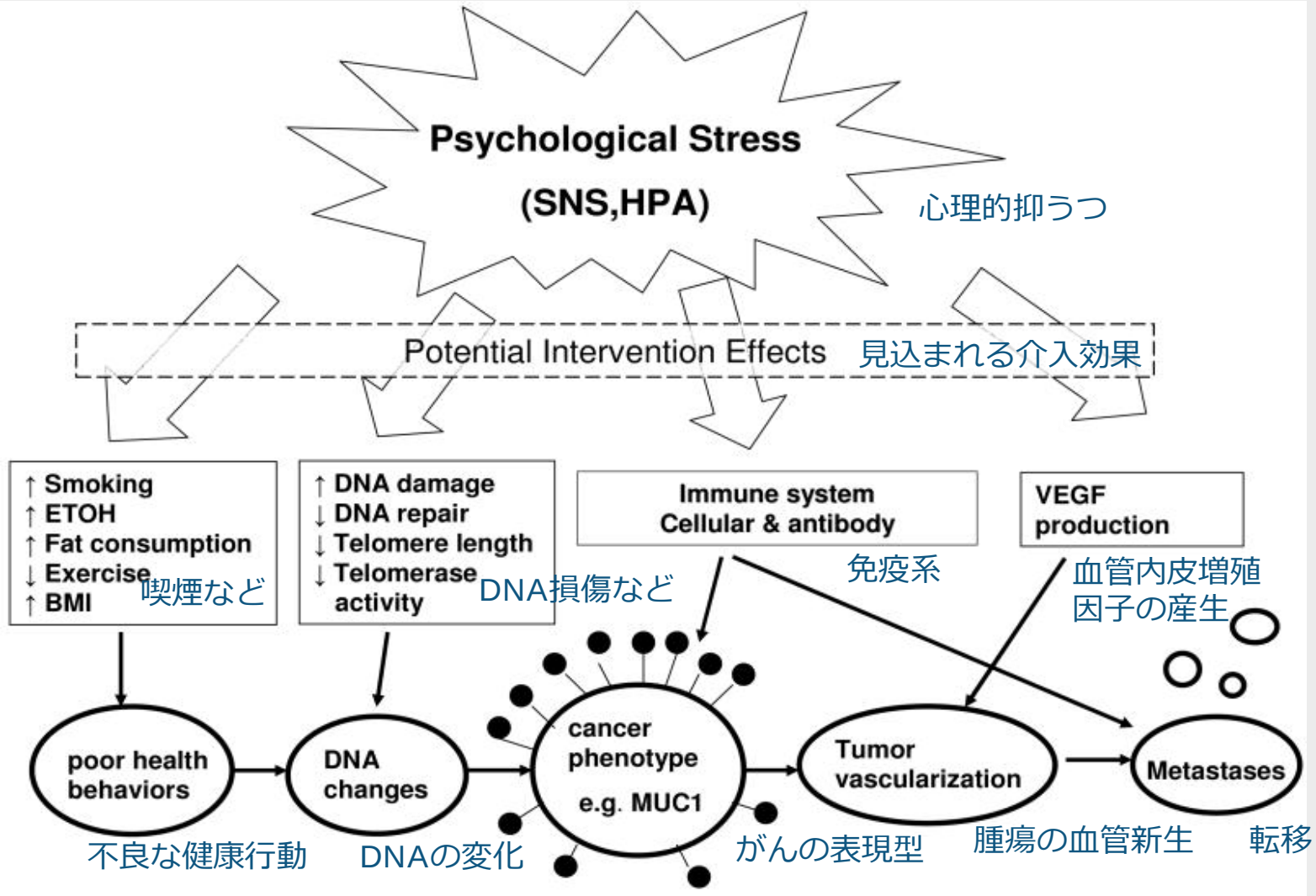




(Penedo et al., 2016)

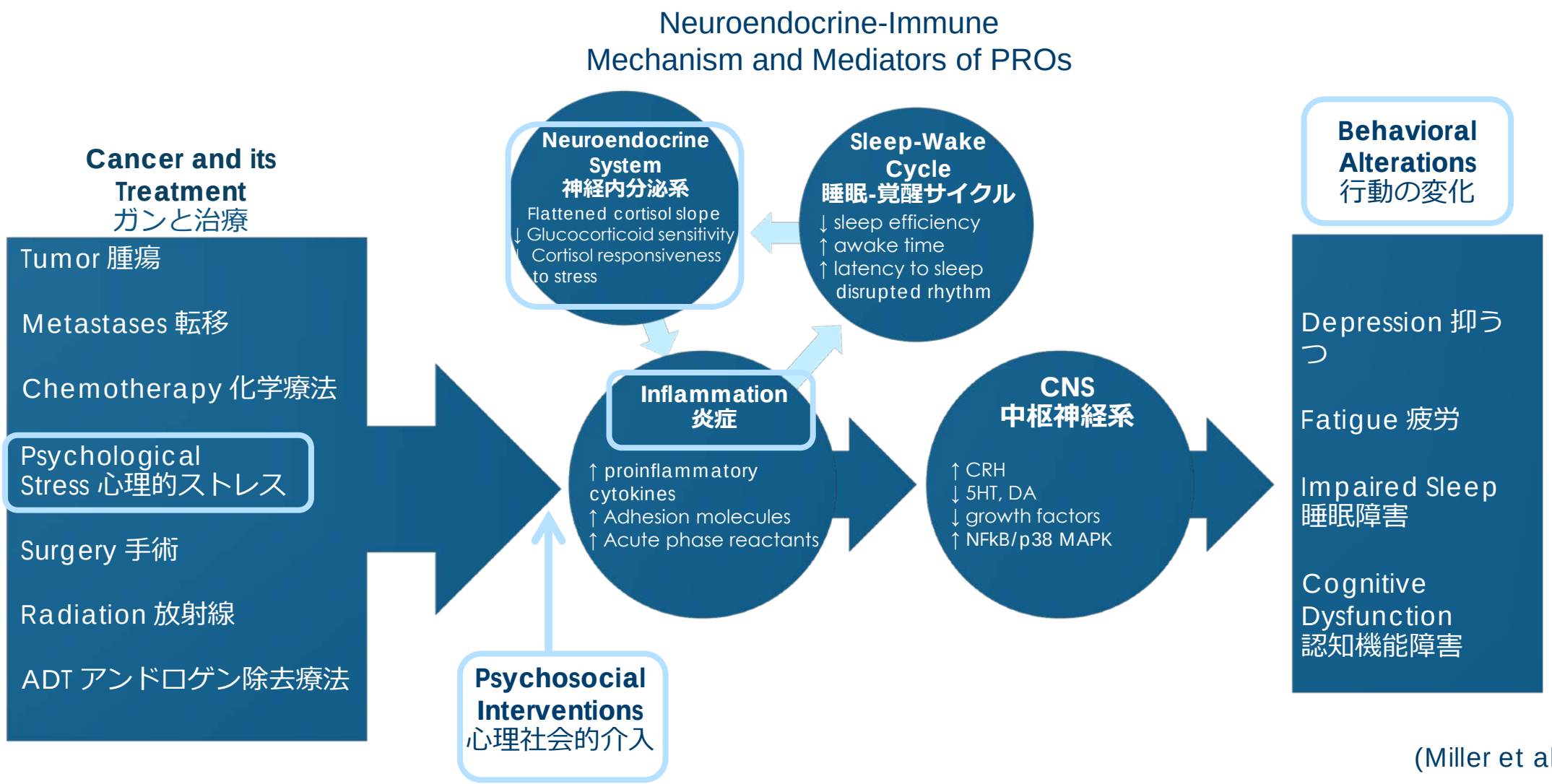
Biobehavioral Mechanisms in APC: Neuroimmune Model of Symptom Expression

進行性前立腺がんの生物行動科学的メカニズム：症状発現の神経免疫モデル



McGregor & Antoni, 2009

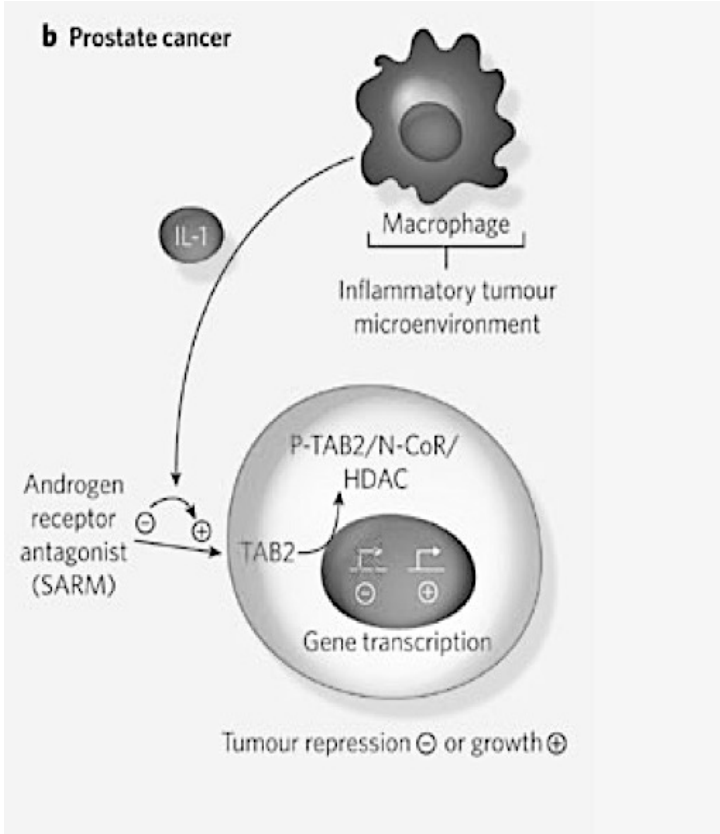
Biobehavioral Mechanisms in APC: Neuroimmune Model of Symptom Expression
進行性前立腺がんの生物行動科学的メカニズム：症状発現の神経免疫モデル



(Miller et al., 2008)

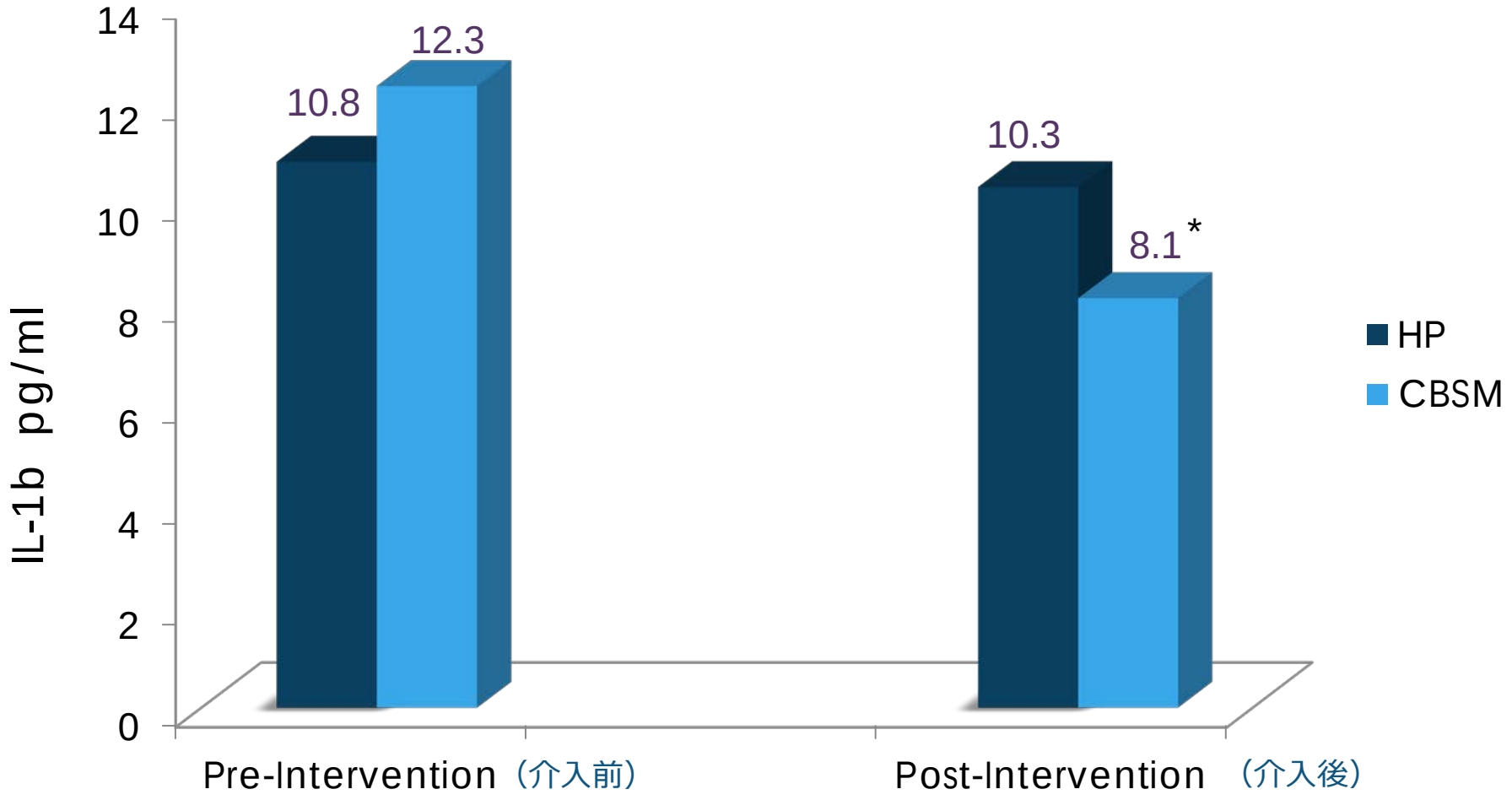
Inflammation and Symptom Burden in PC
前立腺がんにおける炎症と症状の負担

- Inflammatory cytokines can promote sickness behaviors/symptoms in cancer populations: pain, fatigue, mood disturbance, cognitive impairments, etc.
  炎症性サイトカインは、がん患者の疾病行動/症状を促進させる:
  痛み、疲労、気分障害、認知機能障害など
- IL-1, TNF-α & IL-6 contribute to lower urinary tract symptoms (LUTS) including bladder inflammation & urinary & sexual dysfunction in BPH and PC samples IL-1, TNF-α & IL-6は、BPHとPCサンプルにおいて、出血性炎症、排尿・性機能障害などの尿路症状の軽減に貢献
- Inflammation impacts disease progression
  炎症は疾病の進行に影響を与える



(Bower et al., 2006; Cleeland et al., 2003; Illman et al, 2005; Seruga et al., 2008; St. Sauver et al., 2008; Mauri at al., 2005; Irani et al., 1999; Montonvani et al., 2007)

Tele-CBSM Effects on IL-1b
IL-1bに対する遠隔CBSMの効果



(adjusted for age & comorbidities; Penedo et al., 2012)

Survivorship Care Planning: Delivery of Essential Components
サバイバーシップ診療計画：必須サービスの提供

Prevention 予防

- Lifestyle changes prevent new cancers and recurrent cancer
  生活習慣の変容によりがんの新規発症および再発を防ぐ

Surveillance 監視

- For cancer spread, recurrence or second cancers
  がんの広がり、再発、二次がん発症を監視する

Intervention 介入

- For consequences of cancer and is treatment (symptom burden, psychosocial distress)
  がんとその治療による結果（症状の負担、心理社会的苦痛）に対して

Coordination 協調

- Between specialists and primary care providers
  専門医とプライマリケア提供者の協調

Hewitt, M, Greenfield, S, Stovall, E, et al. From cancer patient to cancer survivor: Lost in transition. (National Academies Press, Washington DC), 2006 http://www.iom.edu/Reports/2005/From-Cancer-Patient-to-Cancer-Survivor-Lost-in-Transition.aspx (Accessed on February 20, 2014).

Breast Cancer Treatment Summary and Care Plan
乳がん治療の要約とケアプラン

General Information	
Patient Name	Angela Ztest
Date of Birth	5/15/195
Patient Address	1212 N. S Chicago I
Health Care Team	
Primary Treatment Location	{TX LOCATION:18909}
Primary Care Provider	No primary care provider on file.
Gynecologist	***
Medical Oncologist	{MED ONC:19010}
Radiation Oncologist	{RAD ONC:19012}
Surgical Oncologist	{SURG ONC:19009}
Plastic Surgeon	{PLAS SUR
Survivorship Clinician	***

Background Information	
Date of diagnosis	***
Age at diagnosis	***
Cancer detection	{Canc
Pathology/Genetic	
Tumor site	{Site:16821}
Tumor type/Histology	{Histology:19000}
Stage	No matching staging information was found for the patient.
ER	{POSITIVE/NEGATIVE:10087::"Positive"}
PR	{POSITIVE/NEGATIVE:10087::"Positive"}
HER2	{POSITIVE/NEGATIVE:10087::"Positive"}
# Lymph nodes removed, # positive	Removed: ***, Positive: ***
Additional pathology findings	{Add'l Path:16820}
Genetic counseling completed?	{Testing:19008}
Oncotype completed?	{ONC

Treatment Summary and Care Plan

Surgical Summary	
Surgery	{Site:16821} {Procedures:19003}, {Site:16821} {Procedures:19003}

Care Team
ケアチーム

Pt. Demos.
患者の基本情報

Tumor Info.
腫瘍に関する情報

Tx. Summary
治療の要約

Survivor

Follow-Up
フォローアップ

Follow-up Care Recommendation	How Often	Coordinating Provider
Medical History & Physical Exam	Every 3-6 months for the first 3 years Every 6-12 months for years 4 and 5 Then annually thereafter	{MED ONC:19010} {SURG ONC:19009}
Mammogram	Every 12 months	***
Breast self-exam	Every month, includes exam of your chest wall and surgical scar. B self-exams should be done in addition to mammograms an clinical breast exams by your physician	N/A

Lifestyle & Gen. Hlth.
生活習慣，一般的健康

Continue to see your primary care provider for all general health recommendations for someone your age, including cancer screening tests. Please contact your primary care provider or medical oncologist if you experience any new or persistent symptoms or anything you are worried about that might be related to your cancer returning.

Notify your surgical or medical oncologist if you experience any of the following symptoms:

- New lumps, rash, skin changes or nipple discharge
- Bone pain or fractures
- Chest pain
- Shortness of breath
- Abdominal pain
- Persistent headaches

Symptoms
症状

Potential late or long-term effects of you cancer treatment, including [illegible]

NCCN Recs.
NCCNが推奨すること

National Comprehensive Cancer Network (NCCN) Guidelines. Breast Cancer Version 2.2015

Wellness Guidelines

Pelvic Health & Cervical Cancer Screening

- Continue regular follow-up with your gynecologist, including annual pelvic examinations
- *(If under 65)* You should have a pap smear plus a human papilloma virus (HPV) test every 5 years (preferred) or a pap smear alone every 3 years. Your gynecologist or primary care provider may also recommend that you have these tests done more often.
- *(If over 65)* Now that you are 65 or older, you may no longer require pap smear screening for cervical cancer. You should discuss with your gynecologist or primary care physician final recommendations for pap smear testing.
- Notify your gynecologist or your primary care provider if you have any unexpected or abnormal vaginal bleeding or spotting.

(Garcia, Kircher & Penedo, 2015)

Cancer Survivor Automated Care Plans
がんサバイバーの自動化診療計画

Assessment Center (AC)　診断センター

- MyChart link to patient
  患者へのMyChartリンク
- PROMIS PRO assessments
  PROMS PRO診断

Electronic Medical Records (EPIC)　電子記録

- Chart Abstraction
  計画の抽出

Enterprise Data Warehouse (EDW)　企業データ倉庫
Data Integration & SCP Generation
データ統合とサバイバーシップ診療計画の作成

- AC and EPIC data—nightly downloads to EDW
  ACとEPICデーター毎晩EDWにダウンロード
- Algorithms to create individualized survivorship TX summaries & recommendations
  個人ごとのサバイバーシップ治療の要約と推奨を形成するための手順

SCP generated
サバイバーシップ診療計画による
- TX summary　治療の要約
- Follow-up rec.　望まれるフォローアップ
- Lifestyle rec.　望ま
  活習慣
- PROs

Data reviewed & revised by clinical team
医療チームによりデータがレビューされ見直される

SCP Delivered to Patient & PCP
サバイバーシップ診療計画が患者とPCPに伝えられる

(Garcia et al., 2016)

Cancer Survivorship Automated Care Plans
がんサバイバーシップの自動化診療計画

Automated SCPs:

自動化サバイバーシップ診療計画(SCP):

- Reduced free-text clinician entry by auto-populating 20%
  自動記入化により臨床家の文字入力を20%削減
- Drop-down menus for another 65%
  ドロップダウンメニューによりさらに65%削減
- ***SCP completion time is 12 minutes (vs. 1 hr.)***
  SCP作成時間が12分に(従来は1時間)
- ***Improvements in knowledge, self-efficacy***
  知識、自己効力感の向上
- Long-term impact (?) – patient & system level
  長期的な影響(?)— 患者・システムレベル
- Dynamic plan & intervention?
  ダイナミックな計画と介入?

(Garcia et al., 2016)

Survivor Concierge: Extending SCPs & Care Beyond the Clinic via mHealth Intervention

*サバイバーのコンシェルジュ:*mヘルス介入によりSCPと診療をクリニック外へ拡張

10 domains (monitoring):
10の領域(モニタリング):

- Anxiety & Depression
  不安・抑うつ
- Fatigue & Pain
  疲労・痛み
- Sleep
  睡眠
- Physical Activity & Nutrition
  身体活動・栄養
- Alcohol Use
  飲酒
- Sexual Function
  性機能
- Follow-up Care Adherence
  フォローアップケアへのアドヒアランス

(Garcia et al., 2016)

vibrent
Technology for Better Health

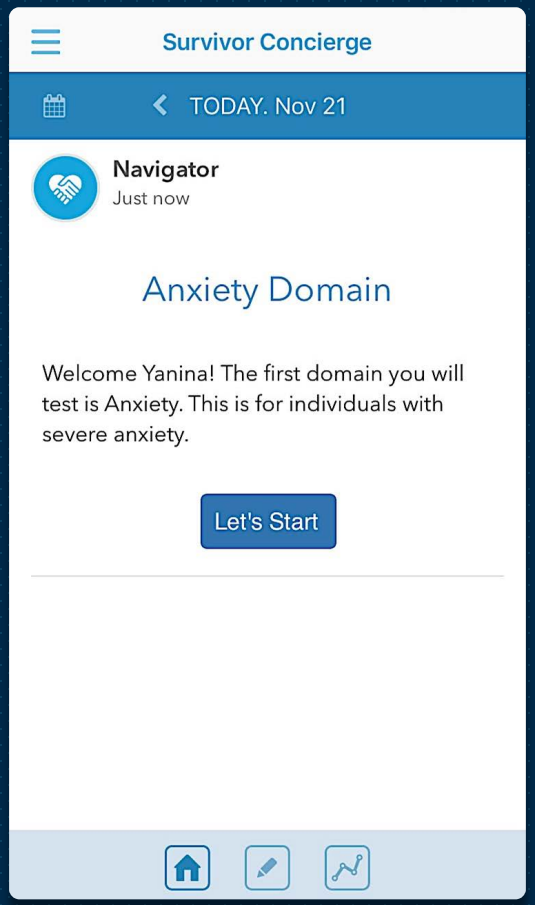
Program features:
プログラムの内容:

- mSCP: ***mobile survivorship care plan***
  mSCP: **モバイルサバイバーシップケア計画**
- Symptom Management: ***monitoring***
  症状管理:**モニタリング**
- Survivorship ***Tracker (of health behaviors)***
  サバイバーシップトラッカー(保健行動追跡)
- Tools for Thriving: ***education & skills modules***
  充実した生活へのツール:**教育・技能モジュール**
- Survivor Weekly Goals: ***health challenges***
  サバイバーの週間目標:**ヘルスチャレンジ**
- mNavigator: **mobile *navigator messaging***
  mナビゲーター:**モバイルナビゲーターメッセージ**

Survivor Concierge: Smartphone App

Introduction to Anxiety Domain

不安についての解説



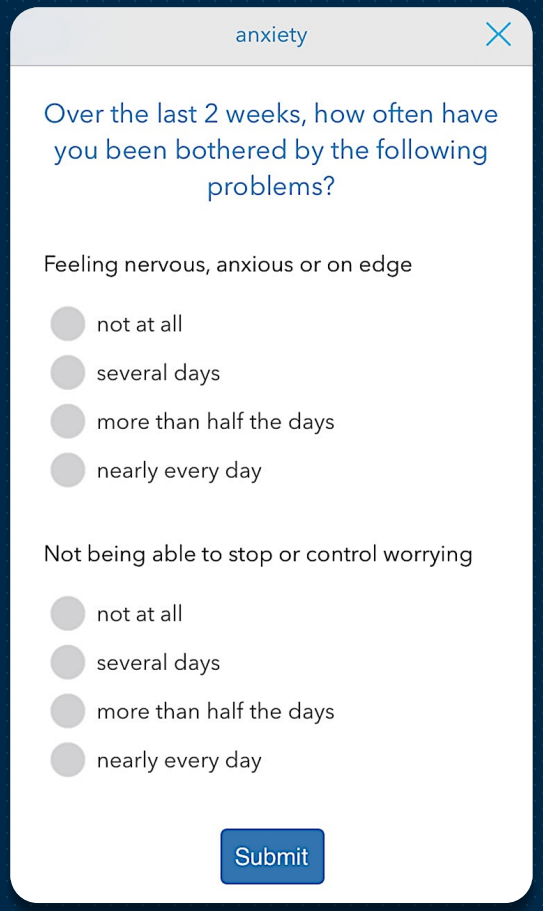
Severe Anxiety Program initiated when scoring ≥ 65 on the PROMIS Anxiety CAT

PROMIS不安CATで65点以上の人を高不安プログラムに参加させる

サバイバーのコンシェルジュ：スマホアプリ

Anxiety Tracker

不安尺度

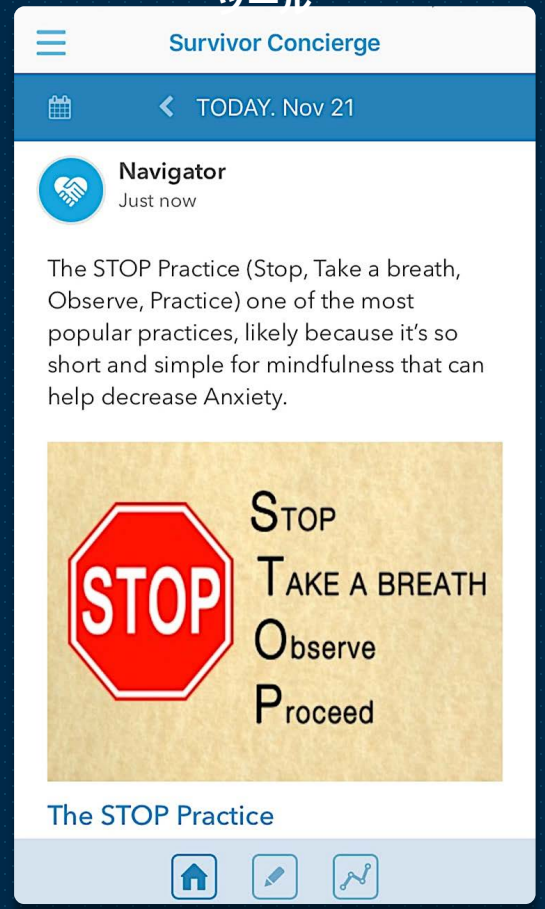


Periodic reassessment (determined by severity), response triggers tailored navigator messages

強度の定期的な再調査　ナビゲーションメッセージによって回答を開始する

Tools for Thriving Module

充実した生活を送るためのツール

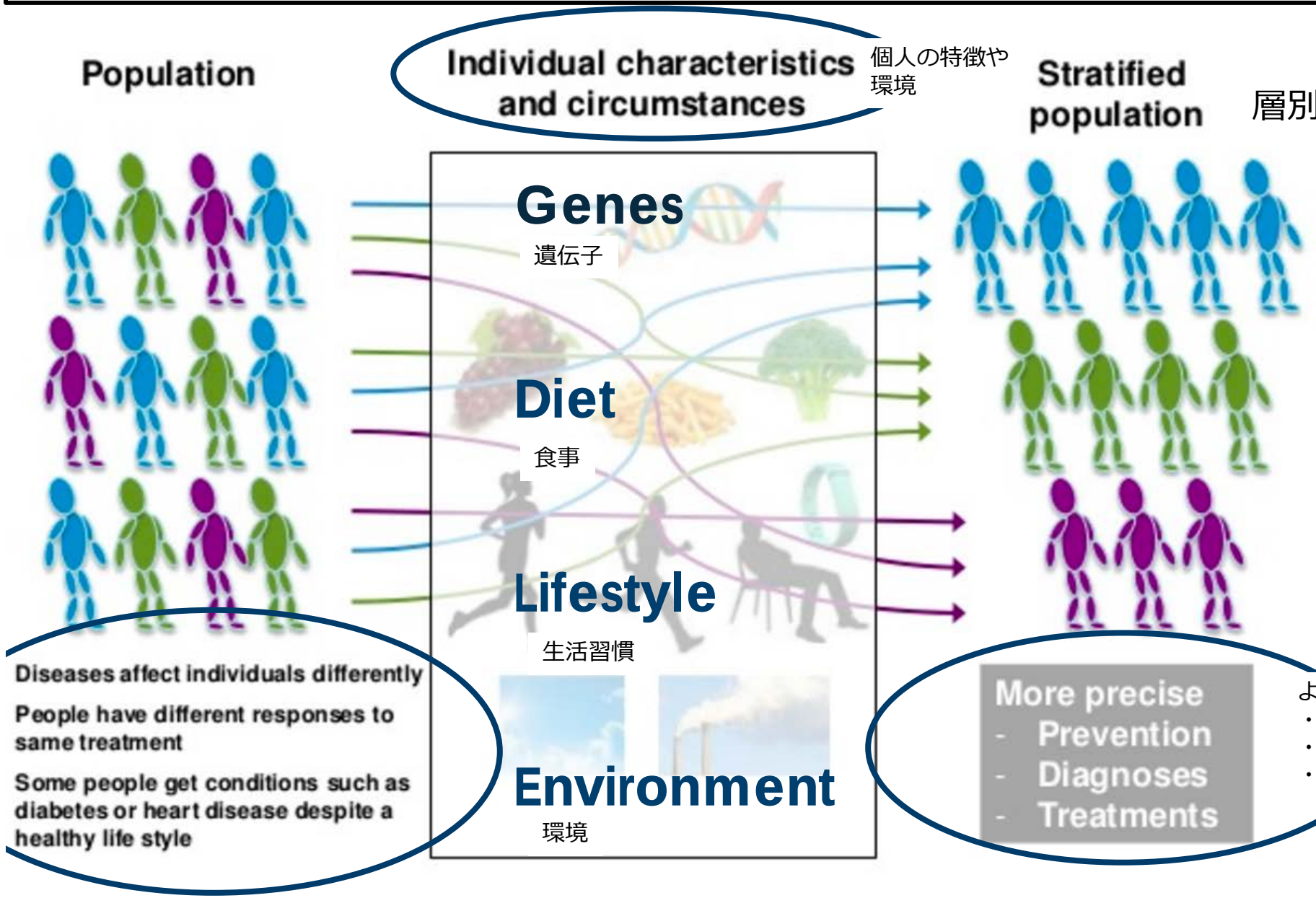


Symptom management skills & education

症状管理スキルと教育

(Garcia et al., 2016)

Precision Medicine: toward tailored approaches to health and disease
プレシジョンメディシン：健康と疾患への個別化アプローチに向けて



・個人によって病気の影響は異なる

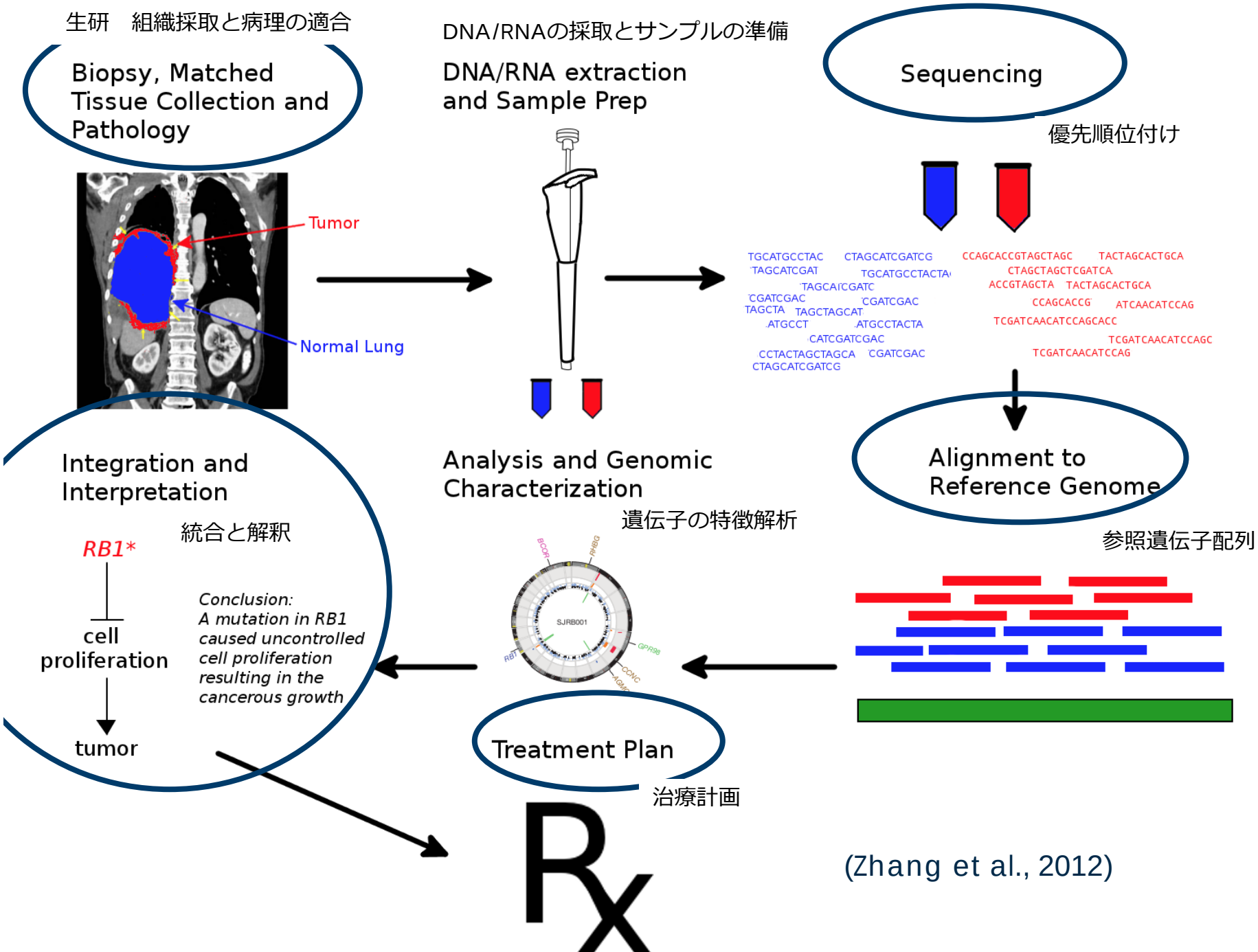
・個人によって治療への反応性は異なる

・健康な生活習慣を送っていても糖尿病や心疾患にかかるような人もいる

(Butte, 2016)

Precision Oncology Care
プレシジョンがん診療

- 33% of personalized medicine studies are targeting oncology problems
  個別化医療研究の33%は、がんの問題を対象としている
- Molecular targeted therapies based on genomic profiling of tumors
  分子標的治療は腫瘍のゲノムプロファイルを利用
- Becoming a routine to offer a molecular diagnosis to guide optimal treatment
  最適治療を実施するための分子診断がルーチン化



(Zhang et al., 2012)

ONCOSET
The Future of Precision Medicine for Cancer Treatment

Northwestern Medicine | Robert H. Lurie Comprehensive Cancer Center of Northwestern University

OUR APPROACH | ABOUT US | FOR PHYSICIANS | CONTACT

How the OncoSET Process Works

どのようにOncoSETのプロセスが進んでいるのか

SEQUENCE >		EVALUATE >	TREAT	
				
A **blood draw** is taken 血液採取	**Molecular/genomic testing** analyses changes in specific genes 遺伝子解析	Personalized results are reviewed and extensively discussed by our **tumor advisory board** and a summary report is eated	A personalized and precise **treatment plan** is recommended which may involve treatment in a clinical trial or other availa herapy	A **comprehensive summary** of your results are provided including your individual program, treatment options, testing and evaluation 要約

How is the OncoSET process diffe

When can I expect my test results?

How do I make an appointment?

What if I have a question?

What does an OncoSET report look like?

Patient Engagement (pre-tx)
治療前の患者の特徴
OncoTool

Symptom Monitoring (during tx)
治療中の症状モニタリング
OncoPRO

Specific Tumor Mutations
特別な腫瘍の変異

Function of the Mutation
変異の機能

Available Options
可能な選択肢

Recommendations
推奨

Name:

OncoSET SEQUENCE EVALUATE TREAT

Skin excision of right shoulder

Right axillary lymph node positive for metastatic

ERK

Lurie Cancer Center OncoSET
233 East Superior Street | Chicago, IL 60611
(312) 472-1234 | OncoSET@northwestern.edu

Name:

DOB:

OncoSET SEQUENCE EVALUATE TREAT
The Future of Precision Medicine for Cancer Treatment

OncoSET Tumor Board Comments

Reviewed Patient History, Imaging, and Molecular testing results. 36 yo Caucasian female with metastatic melanoma currently on treatment with Opdivo™ (Nivolumab). She is currently doing well on treatment with no major side effects. Her tumor was reviewed for genetic mutations that may help us identify other treatment options.

Foundation One – test to look at the Genetic changes in your tumor biopsy. This test found the following mutations

BRAF V600E
FBXW7 S582L
PBRM1 G765fs*10, R1000*
TERT promoter -124C>T
PDGFRA M302I
FGFR4 A253G

Guardant 360 – blood test to look at the genetic changes which links to your tumor

BRAFV600E: 1.6% cfDNA
PDGFRA M302I: 2.5% cfDNA
FBXW7 G459W: 0.7% cfDNA

INTERPRETATION

The tests above found certain 'drivers' of your cancer. These 'drivers' are thought to be pathways which can used as markers for new drugs. Please note – none of these mutations or 'genetic drivers' have been passed onto you from your family. These are unique to your cancer – like the cancer fingerprint.

MAPK pathway: BRAF mutation – this alteration is seen in upto 50% of patients with cutaneous melanomas. This alteration can be blocked with targeted agents known as (BRAF inhibitors and MEK inhibitors) that have shown to improve survival in melanoma patients.

PDGFRA alteration: In melanoma, increased expression (or levels) of PDGFRA may lead to increased potential for the cancer to spread to other places within your body. There are some drugs that are available to block this pathway – known as P13K/mTOR inhibitors. These drugs are currently not FDA approved and are only available on clinical trials.

FBXW7 alteration: This change is seen in a small population of melanoma patients (around 1-4% of patients). We think that this alteration may work to promote cancer growth by affecting some of the other pathways responsible for cancer in melanoma. There are some new drugs available to block this alteration which are available through clinical trials.

Your Options based on what we have at Northwestern University's Clinical trial list

1. The RAMM Trial: BRAF, Autophagy and MEK inhibition in Metastatic Melanoma: A Phase I/II Trial of Dabrafenib, Trametinib, and Hydroxychloroquine in Patients with Advanced BRAF Mutant Melanoma (NU UP15M01) – ***Pending upcoming opening***
2. A Phase I, Open-label, Dose Escalation Study To Investigate the Safety, Pharmacokinetics, Pharmacodynamics and Clinical Activity of GSK2816126 in Subjects with Relapsed/Refractory Diffuse Large B Cell Lymphoma, Transformed Follicular Lymphoma, other Non-Hodgkin's Lymphomas, Solid Tumors, and Multiple Myeloma (DRUG EZH117208) - ***Active***
3. Modular Phase II Study To Link Targeted Therapy to Patients with Pathway Activated Tumors: Module 6 - BGJ398 for Patients with Tumors with FGFR Genetic Alterations (DRUG CBGJ398XUS04) - ***Active***

RECOMMENDATIONS

After reviewing the history, images, tests results, and tumor pathway the members of the OncoSET Tumor Board agree with Nivolumab in the first line setting.

We recommend that Guardant testing be obtained in conjunction with radiographic assessment (usually every 3 months with Nivolumab) which may give a sense of the tumor burden prior to radiographic or clinical progression.

- At time of progression on Nivolumab, would recommend combined dual targeted therapy with BRAF and MEK inhibition (Dabrafenib/Trametinib or Vemurafenib/Cobimetinib) as second line therapy
- At time of progression on combined dual targeted therapy, would recommend a clinical trial (please see above for some options).

OncoSET SEQUENCE EVALUATE TREAT
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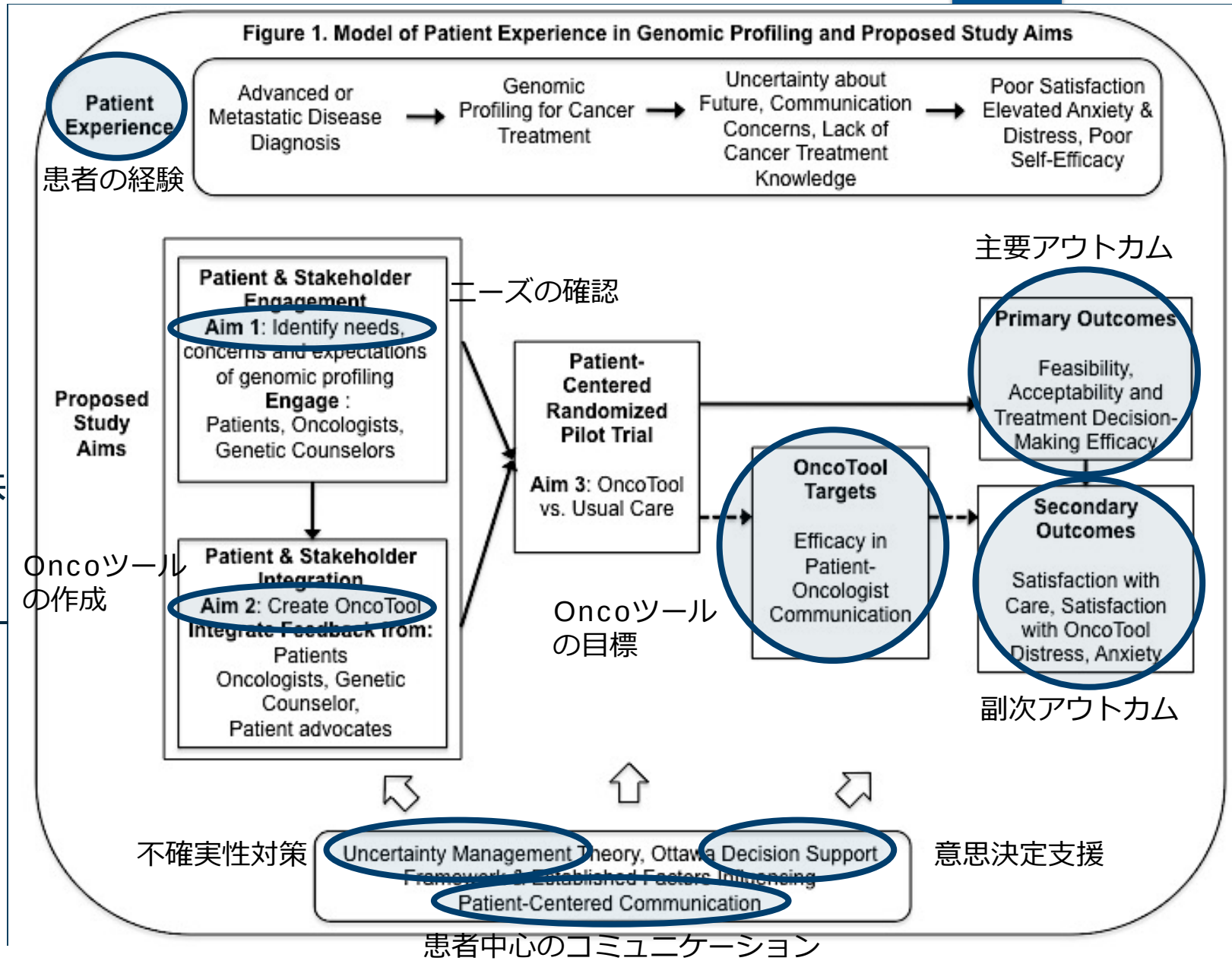
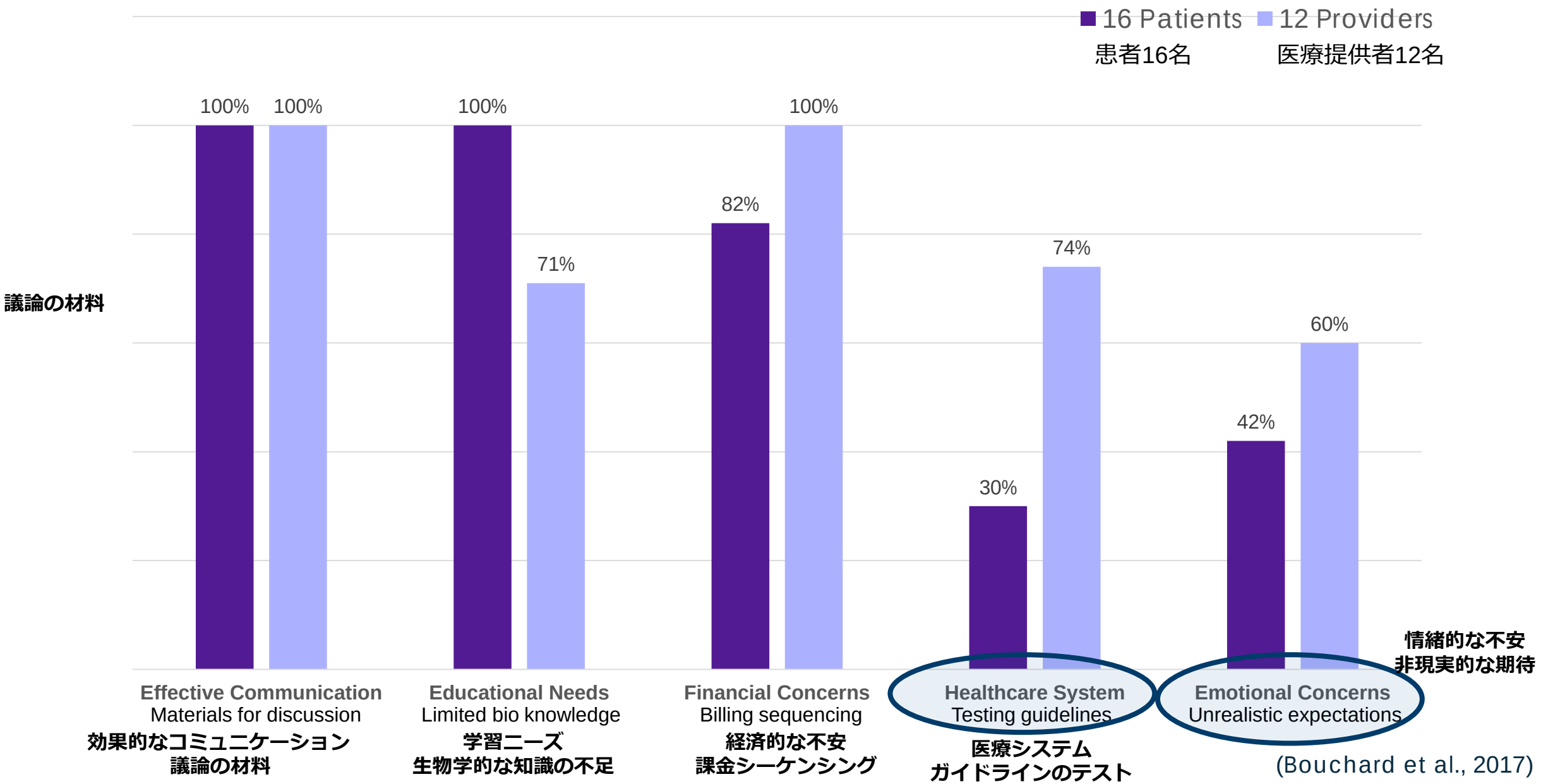
OncoTool for OncoSET
OncoSET用OncoTool
Betina Yanez, PhD—PI

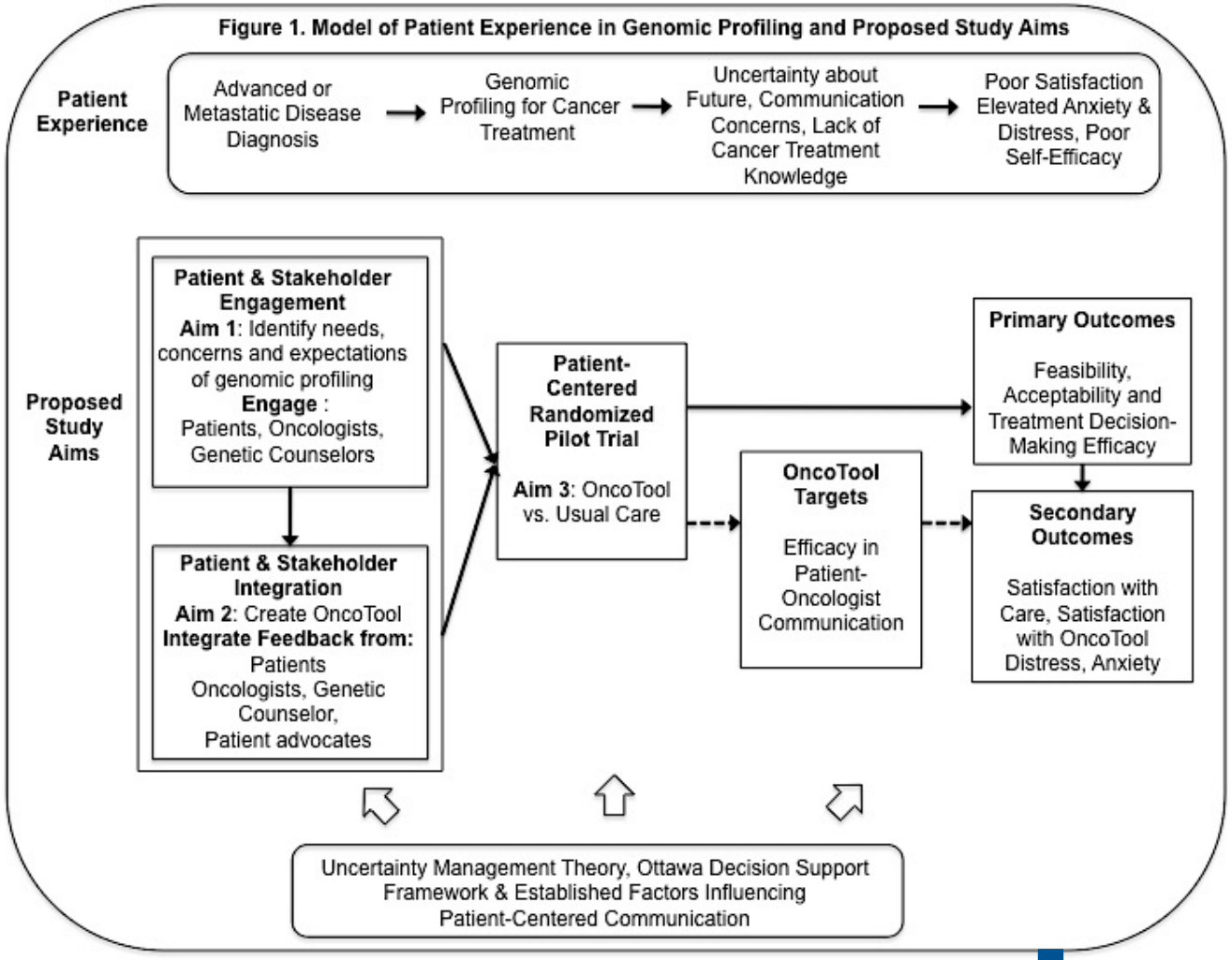
- eHealth tool for patient & provider engagement
  患者と医療提供者を関与させるためのeヘルスツール
- Centered on patient preferences
  患者の希望を中心とする
- Facilitate delivery of complex genomic and treatment information
  ゲノムと治療に関する複雑な情報の提供を容易に
- Assists with uncertainty management & decision support—lower distress
  不確実性対策と意思決定を支援—苦痛を軽減
- Balances patient preferences with clinical data—cost/benefit of treatment (e.g. toxicities)
  患者の希望と臨床データのバランス —治療の費用便益（毒性など）



Patient & Provider Concerns – Genomic Testing
患者と医療提供者の懸念 — ゲノム検査



(Bouchard et al., 2017)



OncoPRO for OncoSET

Toxicities Monitoring in Precision Cancer Care

OncoSET用OncoPRO

がんプレシジョン診療における毒性モニタリング

Frank Penedo, PhD—PI

- eHealth monitoring
- Toxicities
- Other PROs
- Actionable data
- EHR-linked

OncoPRO

Outcomes:

Toxicities（毒性）

Other PROs （他のPRO）

System Level

（システムレベル）

OncoPRO Study:

Assessing Patient Report Outcomes (PROs) in our OncoSET clinic.

OncoPRO試験:

OncoSETクリニックにおける 患者報告アウトカム (PRO)の評価

- **Mostly patients with refractory disease**
  患者のほとんどが難治性疾患を持つ
- **Distress, Uncertainty** **苦痛、不確実性**
- **Battery administered Pre-Tx Initiation, then:**
  Weekly: Weeks 1 – 6
  Monthly: 12 mos.
- **PROMIS CATs & PRO-CTCAE**
  Actionable Data—EHR Integrated
- **HRQoL, Tx Satisfaction** **健康関連QoL、治療満足度**
- **System-Level Outcomes**

Patient Completes Web-Based PRO Measures

↓ 患者はWeb上で評価項目を記入

EHR Messaging/Alerts for Elevated Sx's

↓ EHRのメッセージ/アラート

Assessmen 評価	Action Requested: 求められるアクション
PROMIS (CAT) MEASURE	
PROMIS Anxiety	NONE/WITHIN NORMAL RANGE
PROMIS Depression	**ELEVATED – 48 HR CONTACT REQUIRED**
PROMIS Fatigue	**ELEVATED – 48 HR CONTACT REQUIRED**
PROMIS Physical Function	NONE/WITHIN NORMAL RANGE
PROMIS Pain Interference	WITHIN NORMAL RANGE
PRO-CTCAE ELEVATED SX'S – 48 HR CONTACT REQUIRED	
• **NAUSEA**	**ALMOST CONSTANTLY**
• **ARM/LEG SWELLING**	**FREQUENTLY**
• **FATIGUE**	**VERY SERVERE**

↓

Medical or SW Team Contacts Patient

↓ 医療者/ソーシャルワーカーが患者にコンタクト

Disposition/Referrals Coded in EHR

処置・照会コードをEHRに記入

Opportunities for Behavioral Medicine
行動医学の可能性

- Rapidly changing and evolving technologies provide broad opportunities to apply behavioral medicine principles & interventions that work
  技術の急速な変化と進化により、行動医学の原理と介入を有効に適用する大きな機会が得られる
- Big data—from system usage of web-based programs to massive amounts of sensor data from wearable devices
  ビッグデータ — ウェブベースプログラムのシステム使用から、ウェアラブルデバイスによる膨大なセンサーデータまで
- Cost & partnerships—how do we capitalize from collaborative, multi-site and international projects
  コストとパートナーシップ — 多施設・多国間の共同プロジェクトから利益をどう得るか
- Cost/Benefit ratios—individual and system level benefits & costs/savings
  費用便益比 — 個人レベルおよびシステムレベルの費用便益とコスト削減
- Ecological validity and generalizability across populations
  生態学的妥当性と人口集団間への一般化可能性
- Behavioral Medicine is well positioned to be a key contributor to precision- and technology-based approaches
  行動医学は技術を活用した精密なアプローチに大きく貢献できる好位置にある

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Thank you!

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Northwestern Medicine | Robert H. Lurie Comprehensive Cancer Center of Northwestern University

Cancer Survivorship Institute
Enhancing Life Beyond Cancer

ISBM
International Society of Behavioral Medicine