

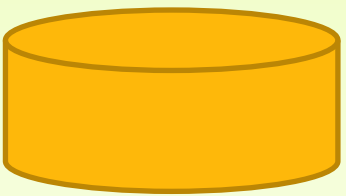
# FHIRを医療情報システムのエコシステムに組み込む

**Security & Privacy**

Security, Consent, Provenance, AuditEvent

**Exchange**

REST API + Search Documents Messaging Services Databases



連携システム

**Terminology**

CodeSystem, ValueSet, ConceptMap, Terminology Svc

+ 統制用語集



**Clinical**

Allergy, Problem, Procedure, CarePlan/ServiceRe, Family Hi, RiskAsses, etc.

**Diagnostics**

Observation, Report, Speci, ImagingStud, Genomics, Specimen, ImagingStud

**Medications**

Medication, Request, Dispense, Administration, Statement, Immunization, etc.

AIと連携した臨床判断支援

**Clinical Reasoning**



<https://www.hl7.org/fhir/> に掲載されていた図より利用

# PHRの情報源たる電子カルテの普及は進んでいるが中身は伴っているだろうか？

## 電子カルテシステム等の普及状況の推移

### 電子カルテシステム

	一般病院 (※1)	病床規模別			一般診療所 (※2)
		400床以上	200～399床	200床未満	
平成20年	14.2% (1,092/7,714)	38.8% (279/720)	22.7% (313/1,380)	8.9% (500/5,614)	14.7% (14,602/99,083)
平成23年 (※3)	21.9% (1,620/7,410)	57.3% (401/700)	33.4% (440/1,317)	14.4% (779/5,393)	21.2% (20,797/98,004)
平成26年	34.2% (2,542/7,426)	77.5% (550/710)	50.9% (682/1,340)	24.4% (1,310/5,376)	35.0% (35,178/100,461)
平成29年	<b>46.7%</b> (3,432/7,353)	<b>85.4%</b> (603/706)	<b>64.9%</b> (864/1,332)	<b>37.0%</b> (1,965/5,315)	<b>41.6%</b> (42,167/101,471)

### オーダーリングシステム

	一般病院 (※1)	病床規模別		
		400床以上	200～399床	200床未満
平成20年	31.7% (2,448/7,714)	82.4% (593/720)	54.0% (745/1,380)	19.8% (1,110/5,614)
平成23年 (※3)	39.3% (2,913/7,410)	86.6% (606/700)	62.8% (827/1,317)	27.4% (1,480/5,393)
平成26年	47.7% (3,539/7,426)	89.7% (637/710)	70.6% (946/1,340)	36.4% (1,956/5,376)
平成29年	<b>55.6%</b> (4,088/7,353)	<b>91.4%</b> (645/706)	<b>76.7%</b> (1,021/1,332)	<b>45.6%</b> (2,422/5,315)

#### 【注釈】

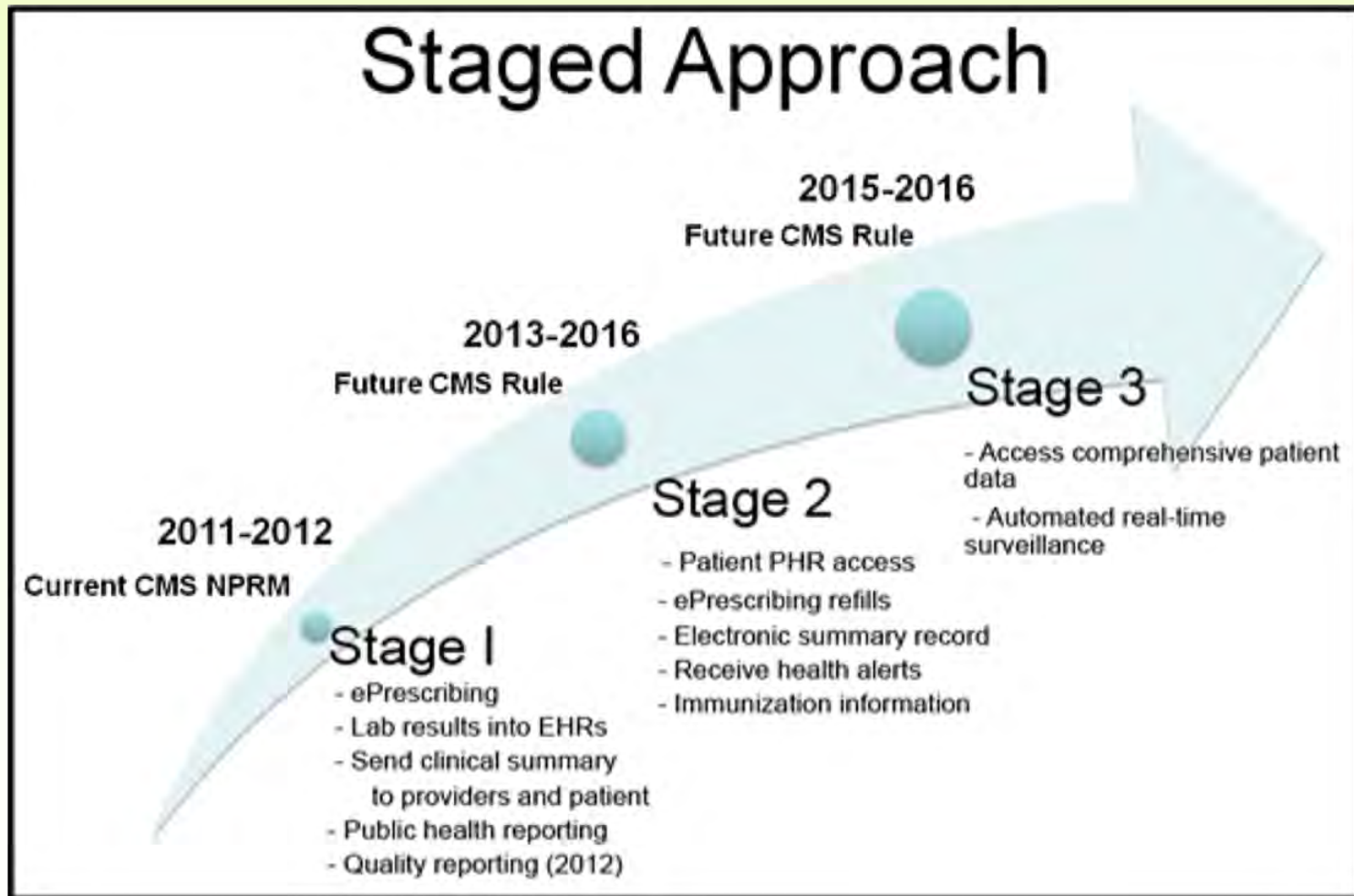
(※1) 一般病院とは、病院のうち、精神科病床のみを有する病院及び結核病床のみを有する病院を除いたものをいう。

(※2) 一般診療所とは、診療所のうち歯科医業のみを行う診療所を除いたものをいう。

(※3) 平成23年は、宮城県の石巻医療圏、気仙沼医療圏及び福島県の全域を除いた数値である。

出典：医療施設調査(厚生労働省)

# Meaningful Use 3 Stages



<http://dhss.alaska.gov/HIT/Meaningfuluse/Pages/Default.aspx>



# Understanding Certified Health IT

Browse criteria by clicking an icon from the wheel.



Interoperability is essential for systems to communicate



Certification supports clinician engagement in clinical practice improvement and care coordination activities using health IT – including participation in CMS programs



**Patients**  
can access and send their health information electronically



**Clinicians & Hospitals**  
have tools for clinical processes, care coordination, and quality improvement



**Developers**  
can assure their customers that their product meets recognized standards and functionality



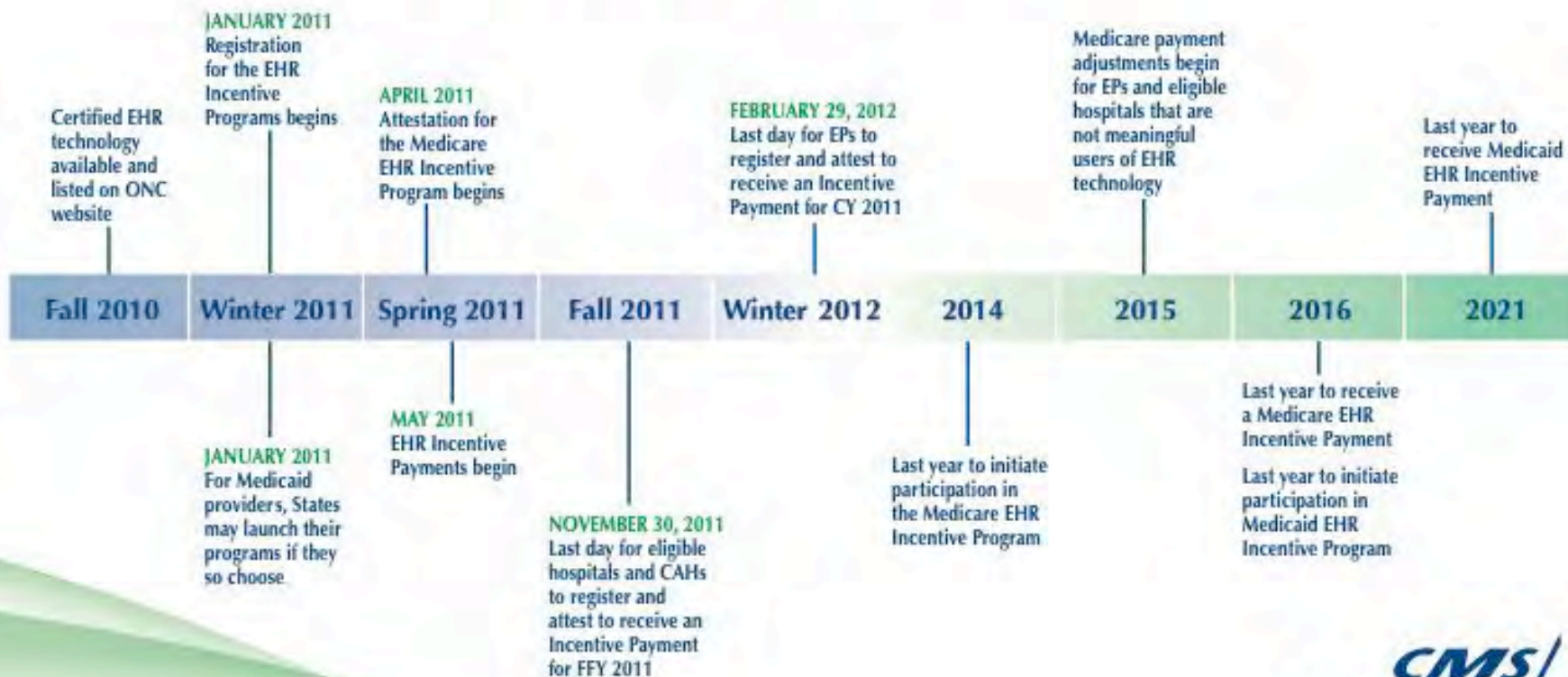
## About the Certification Criteria

There are sixty 2015 Edition health IT certification criteria, which are organized into the eight categories specified on the wheel above. ONC-Authorized Certification Bodies (ONC-ACBs) certify health IT products that have been successfully tested by an ONC-Authorized Testing Laboratory (ONC-ATL) to the certification criteria. These products are then listed on the Certified Health IT Product List (CHPL). We encourage clinicians to work with their health IT developers to determine if their products include the right set of certified functionality to support their practices and patients.

<https://www.healthit.gov/topic/certification-ehrs/2015-edition>



# CMS Medicare and Medicaid EHR Incentive Programs Milestone Timeline



# EMR Adoption Model<sup>SM</sup> - Asia Pacific

Stage	Short Description	2015 Q4	2016 Q1	2016 Q2	2016 Q3
<b>Stage 7</b>	Complete EMR, Data Analytics to Improve Care	0.5%	0.5%	0.5%	0.6%
<b>Stage 6</b>	Physician documentation (templates), Full CDSS, Closed Loop Medication Administration	3.9%	4.0%	4.2%	4.3%
<b>Stage 5</b>	Full R-PACS	7.4%	7.8%	8.9%	9.5%
<b>Stage 4</b>	CPOE, Clinical Decision Support (clinical protocols)	1.7%	1.7%	1.5%	1.5%
<b>Stage 3</b>	Nursing/Clinical Documentation, CDSS (error checking), PACS Available Outside Radiology	0.6%	0.6%	0.8%	0.8%
<b>Stage 2</b>	CDR, Controlled Medical Vocabulary, CDS, HIE capable	32.7%	32.6%	31.4%	32.0%
<b>Stage 1</b>	Ancillaries - Lab, Rad, Pharmacy - All Installed	4.9%	4.9%	4.6%	4.6%
<b>Stage 0</b>	All Three Ancillaries Not Installed	48.2%	47.9%	48.1%	46.7%

Data from HIMSS Analytics® Database © 2016 HIMSS Analytics

N= 770

N= 773

N= 784

N= 790

## HiMSS Analytics EMR Adoption Model 2016Q2-2016Q3 Regional Comparisons

<http://www.himss.cn/himss/2016/HIMSS%20EMRAM%E8%AF%84%E7%BA%A7%E5%85%A8%E7%90%83%E5%88%86%E5%B8%83%E6%95%B0%E6%8D%AE%E2%80%942016%E5%B9%B4%E5%BA%A6%EF%BC%88Q3%EF%BC%89.pdf>

# US EMR Adoption Model<sup>SM</sup> (2010-2015)

Stage	2010	2011	2012	2013	2014	2015
Stage 7	1.0%	1.2%	1.9%	2.9%	3.6%	4.1%
Stage 6	3.2%	5.2%	8.2%	12.5%	17.9%	25.4%
Stage 5	4.5%	8.4%	14.0%	22.0%	32.8%	34.6%
Stage 4	10.5%	13.2%	14.2%	15.5%	14.0%	10.3%
Stage 3	49.0%	44.9%	38.3%	30.3%	21.0%	17.3%
Stage 2	14.6%	12.4%	10.7%	7.6%	5.1%	3.4%
Stage 1	7.1%	5.7%	4.3%	3.3%	2.0%	1.8%
Stage 0	10.1%	9.0%	8.4%	5.8%	3.7%	3.1%

N = 5,337

N = 5,458

N = 5,458

N = 5,449

N = 5,467

N = 5,454

Data from HIMSS Analytics® Database © 2015 HIMSS Analytics

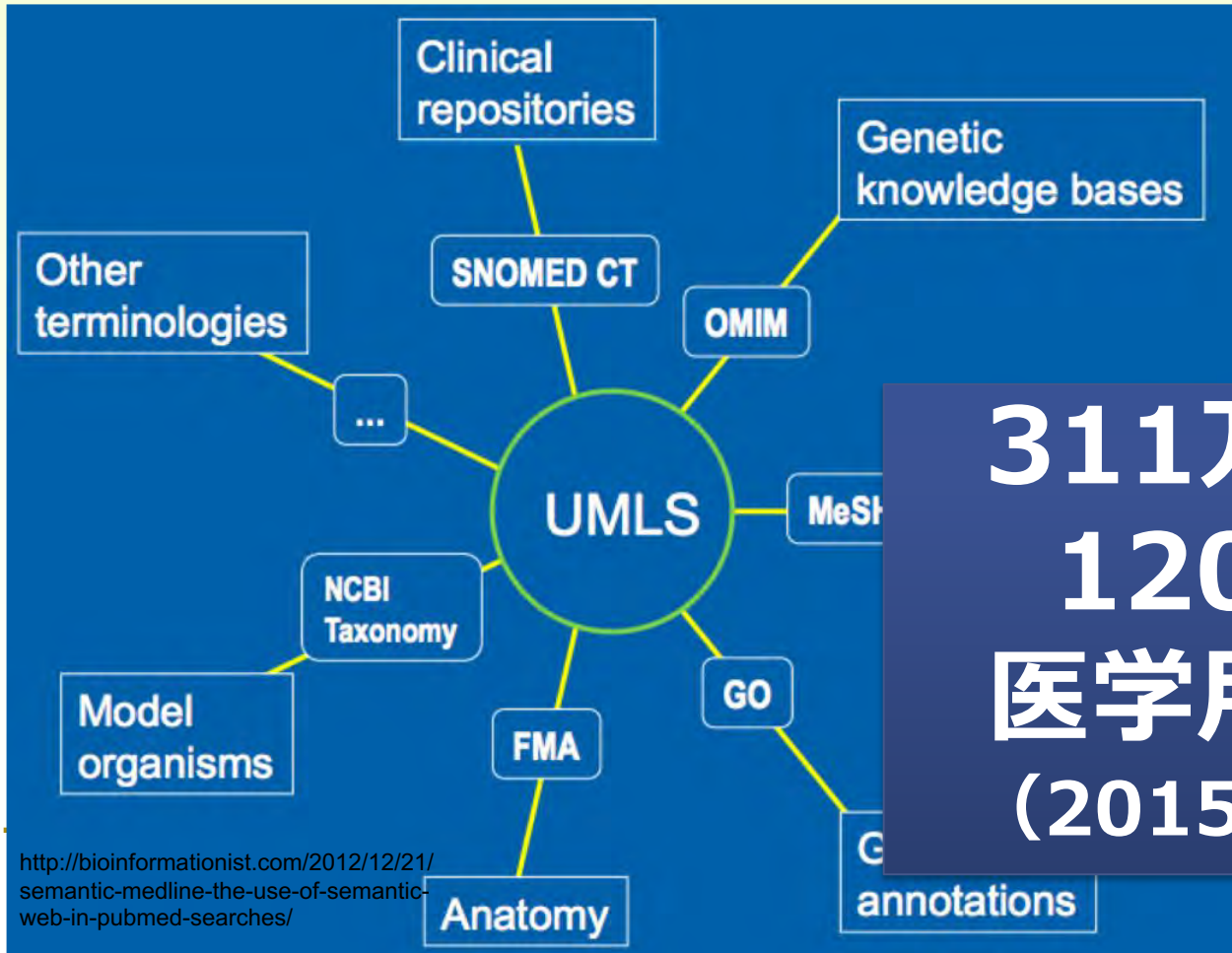
## HiMSS Analytics EMR Adoption Model 2016Q2-2016Q3 Regional Comparisons

<http://www.himss.cn/himss/2016/HIMSS%20EMRAM%E8%AF%84%E7%BA%A7%E5%85%A8%E7%90%83%E5%88%86%E5%B8%83%E6%95%B0%E6%8D%AE%E2%80%942016%E5%B9%B4%E5%BA%A6%EF%BC%88Q3%EF%BC%89.pdf>



# 医学用語を統一的に 網羅する辞書

## Unified Medical Language System



311万個の概念  
1200万個の  
医学用語(AUI)  
(2015AA年現在\*1)

<http://bioinformationist.com/2012/12/21/semantic-medline-the-use-of-semantic-web-in-pubmed-searches/>

[http://www.nlm.nih.gov/research/umls/knowledge\\_sources/metathesaurus/release/statistics.html](http://www.nlm.nih.gov/research/umls/knowledge_sources/metathesaurus/release/statistics.html)



# 実はWatsonも利用している

databases and in common data elements and patient assessment instruments used in NIH and HHS-funded comparative effectiveness and clinical research. NLM's Unified Medical Language System (UMLS) resources provide essential infrastructure for advanced clinical decision support by connecting standard clinical terminologies to billing codes and more than 120 other important biomedical vocabularies, such as those used in information retrieval and gene annotation. By linking the many different terms used to represent the same concepts and by providing associated natural language processing programs, NLM's UMLS resources help computer programs interpret biomedical text correctly. These resources are heavily used in NIH-funded research; in commercial products and developments, including IBM's Watson question answering system; and in many electronic information services, including those produced by NLM.

# 2015年の報告から見える UMLSに関する目標

- 2015年 Meaningful Useプロジェクトと連動 電子カルテ開発者へ標準語彙の利用を支援
- 2013年にValue Set Authority CenterをONCをはじめとした各団体と協働して設立  
臨床の質を評価するための語彙を整備
- 電子カルテに標準的語彙集を導入することによって、臨床判断支援を効率的に援用できるようにする
- 2013年に電子カルテバイダーが患者プロブレム、処方、検査結果に関してMUの基準を満たせるようにMedline Plus Connect Serviceを改善。
- ゲノム研究データベース、標準データ項目、患者アセスメント機器(? patient assesment instrument)の為に標準医学語彙集の開発
- 標準語彙集を120以上のbiomedical用語集と支払い請求コードに接続することで、より踏み込んだ臨床支援を実現可能にする。
- 同じ概念を表現する多くの異なる用語をリンクし、NLPと連携することで、biomedicalなテキストを正確に解釈できることを可能にする。