



49th ASHP Midyear Clinical Meeting & Exhibition  
Anaheim, California | December 7–11, 2014

## ***PHARMACOGENOMICS AND EXHIBITION HALL***

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**Dr. Ignacio Cardona Pascual**  
**Hospital Universitari Vall d'Hebrón**

Madrid | 6 Marzo 2015



49th ASHP Midyear Clinical Meeting & Exhibition  
Anaheim, California | December 7–11, 2014

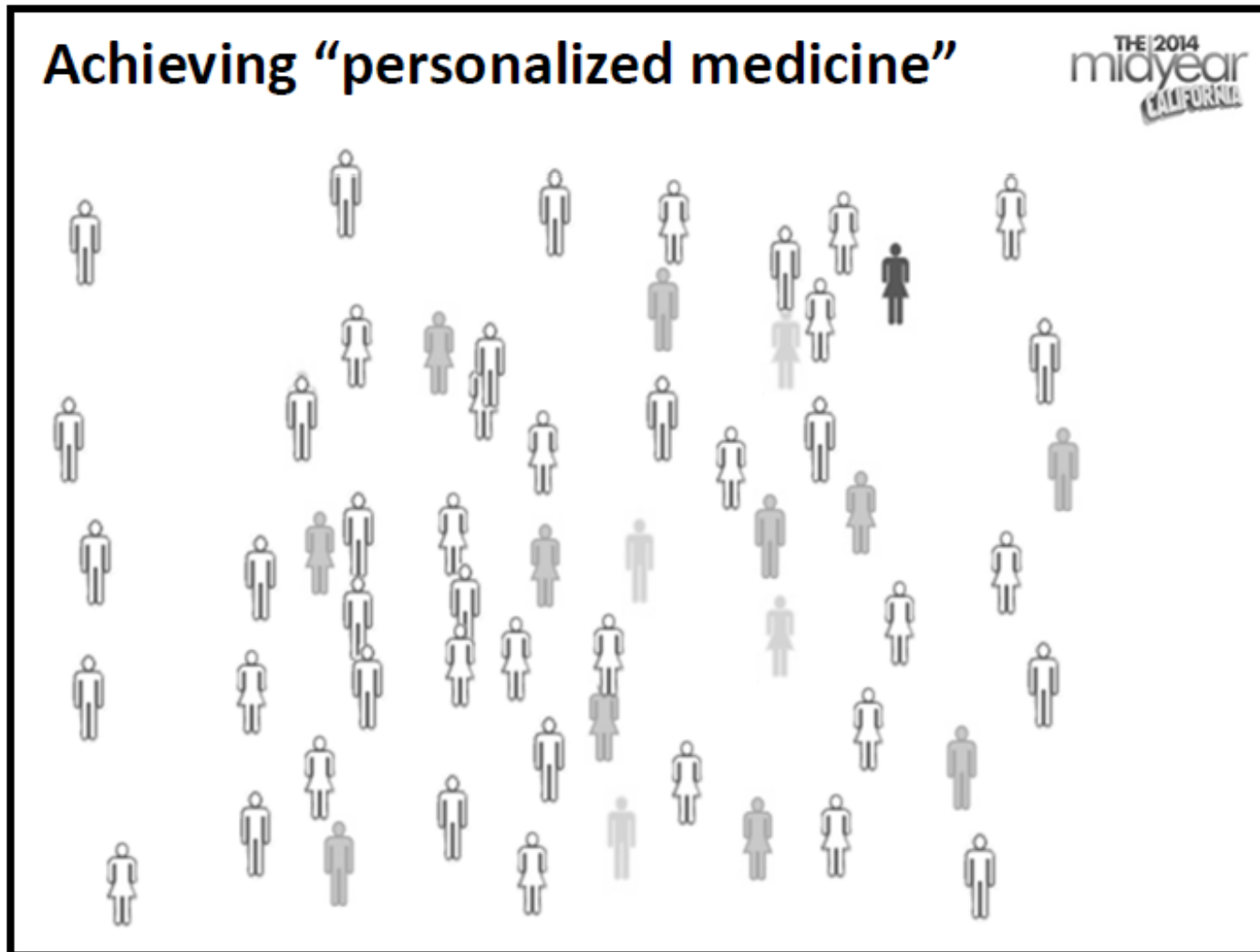
## ***PHARMACOGENOMICS***

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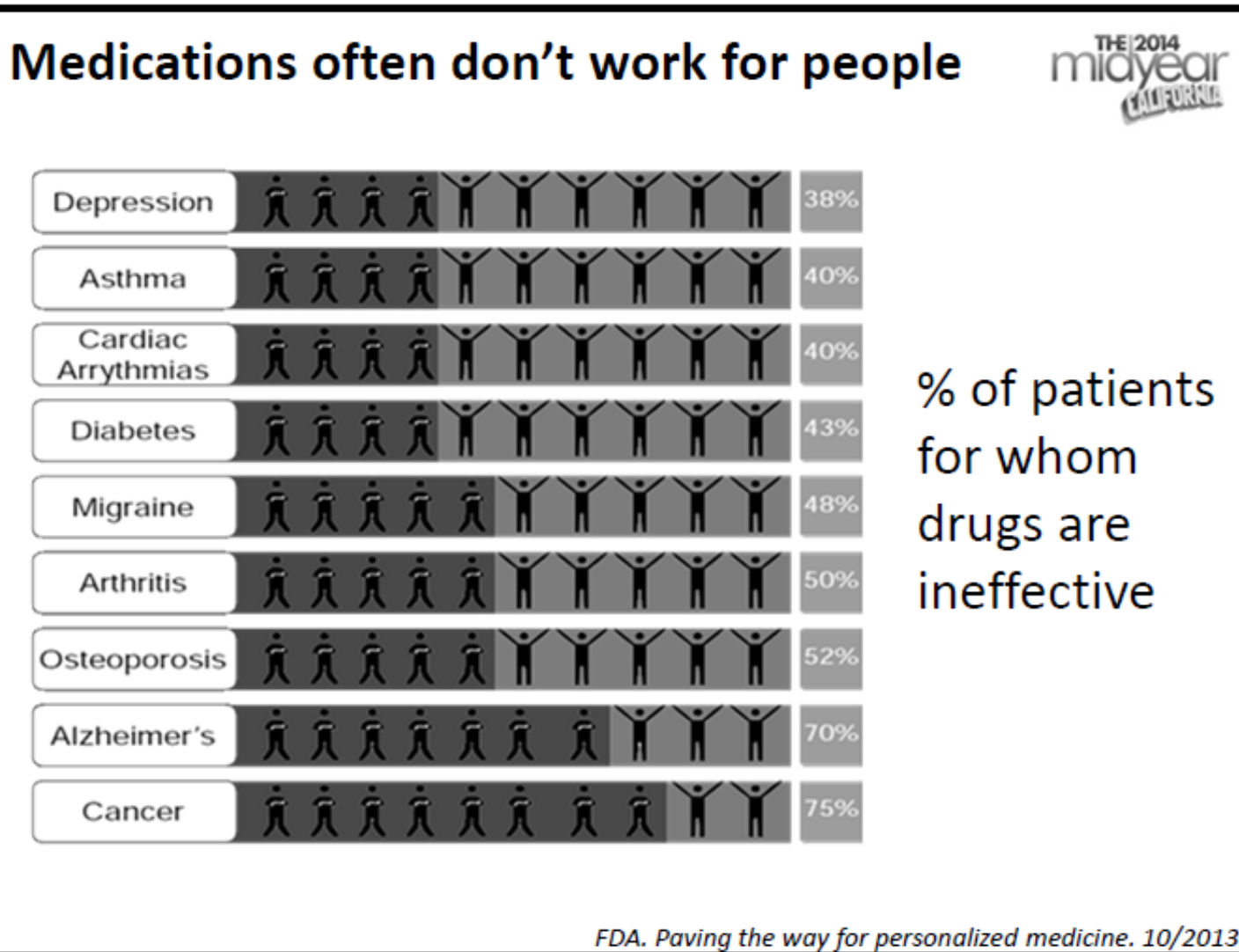
**Dr. Ignacio Cardona Pascual**  
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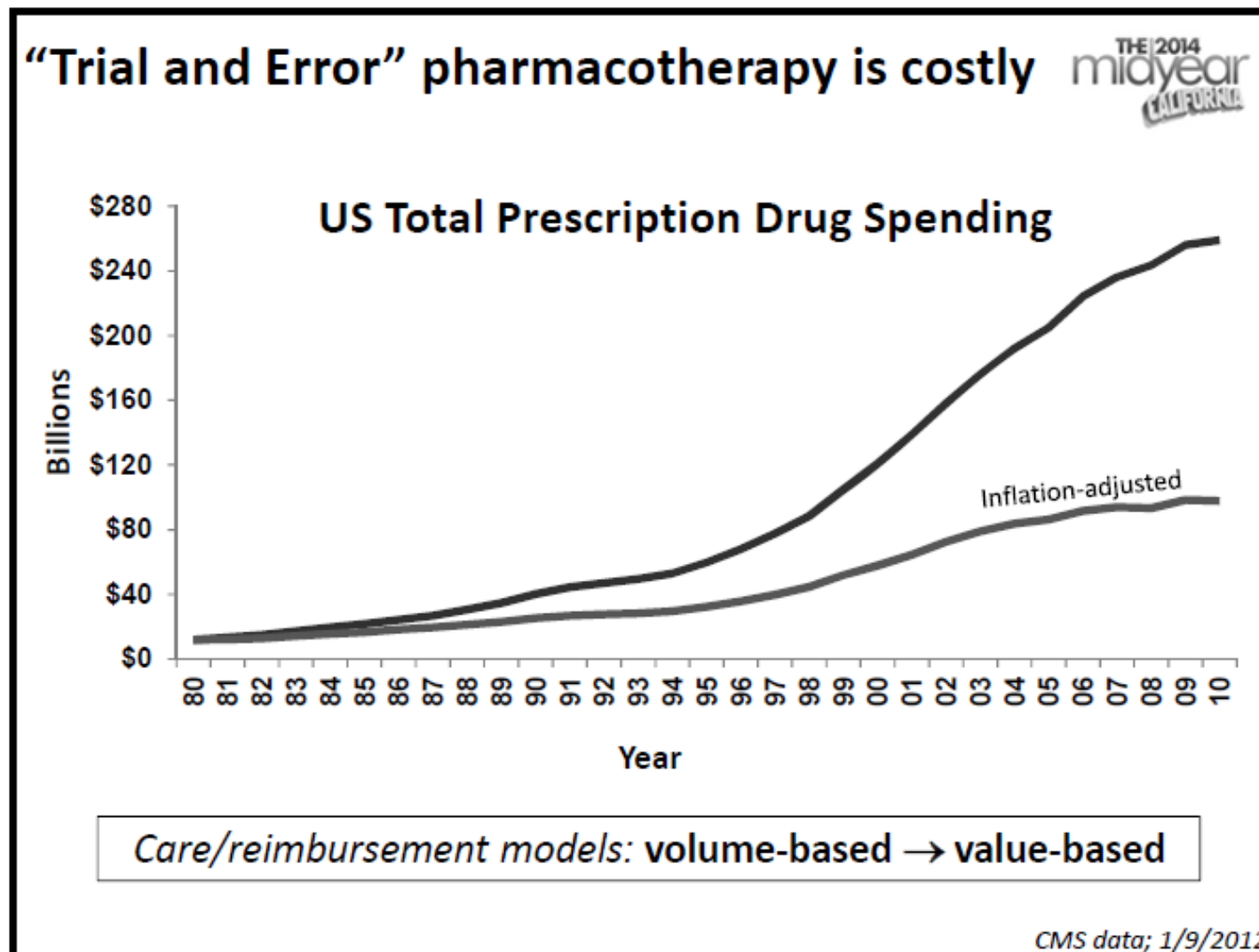
# Medicina individualizada



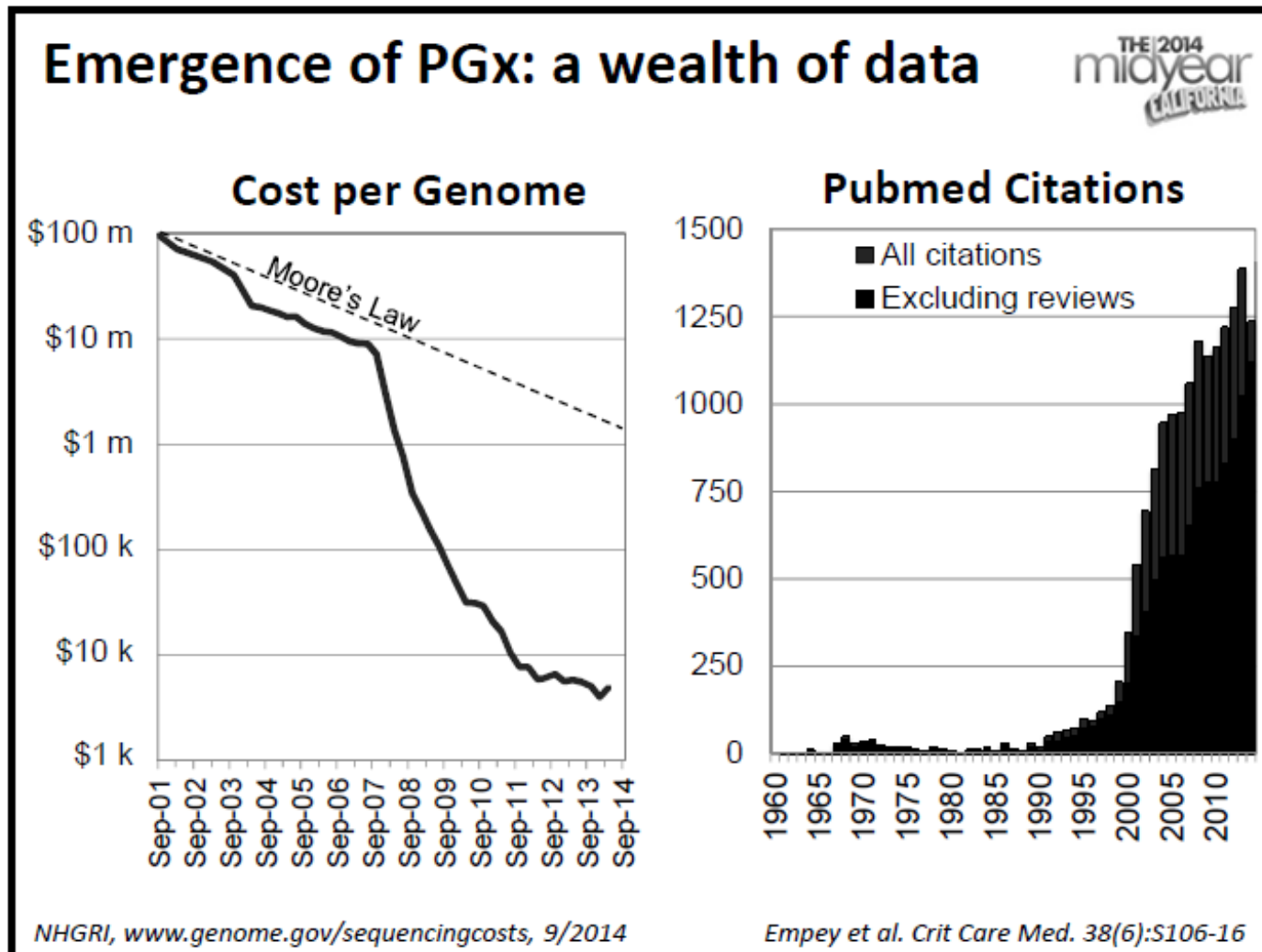
# Porque no responden los pacientes?



# Tto. “indiscriminado”=coste y ef. 2 rios



# Pruebas al alza, costes a la baja



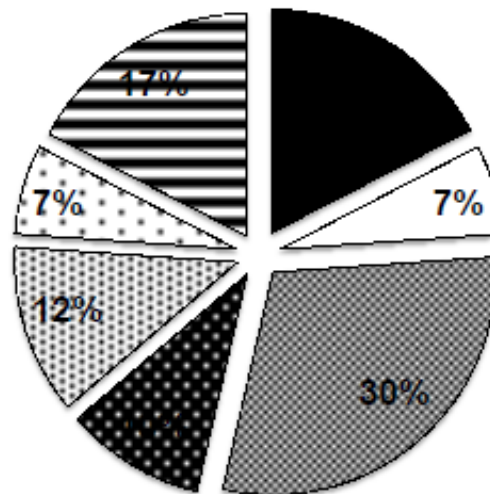
# Info. genética en ficha técnica

## PGx is already in medication label

138 drugs currently have genetic data  
in their FDA-approved product labeling

### Therapeutic area:

- psychiatry
- neurology
- ▨ oncology
- CV
- ▨ ID
- GI
- other



### ❖ Key examples:

- codeine
- azathioprine
- statins
- clopidogrel
- proton pump inhibitors
- abacavir
- carbamazepine
- warfarin

# 18 guías publicadas

## Making sense of the data



**CPIC: Implementing PGx**  
a PharmGKB & PGRN collaboration

- 1500+ drug-specific annotations; 29 currently at level 1A
- 18 genetics-guided drug therapy guidelines published

Drug(s)	Gene(s)	Recommendation
azathioprine, 6-MP	TPMT	Dosing based on genotype
clopidogrel	CYP2C19	Alternative therapy
warfarin	CYP2C9, VKORC1	Algorithms (genotype with clinical factors)
codeine	CYP2D6	Avoid in ultrarapid or poor metabolizers
abacavir	HLA-B	Avoid in those with HLA-B*5701
simvastatin	SLCO1B1	Dosing based on genotype
allopurinol	HLA-B	Avoid in those with HLA-B*5801
tricyclic antidepressants	CYP2D6, CYP2C19	Dosing based on genotype
carbamazepine	HLA-B	Avoid in those with HLA-B*1502
5-FU, capecitabine, tegfur	DPYD	Dosing based on genotype
peginterferon alpha	IL28B	Avoid in those with HLA-B*1502
Ivacaftor	CFTR	Alternative therapy if no G551D variant
rasburicase	G6PD	Avoid in those with G6PD deficiency



# Barreras

## Clínicas

- “Pocos” fármacos y algoritmos de decisión
- Faltan datos de resultados en salud prospectivos
- Poca información coste/eficacia

## Tests

- Disponibilidad / coste / reembolso de las pruebas
- Resultados lentos
- Gestión de la información

## TI

- Sistemas informáticos no preparados
- Soporte a la decisión inadecuado

## Educac.

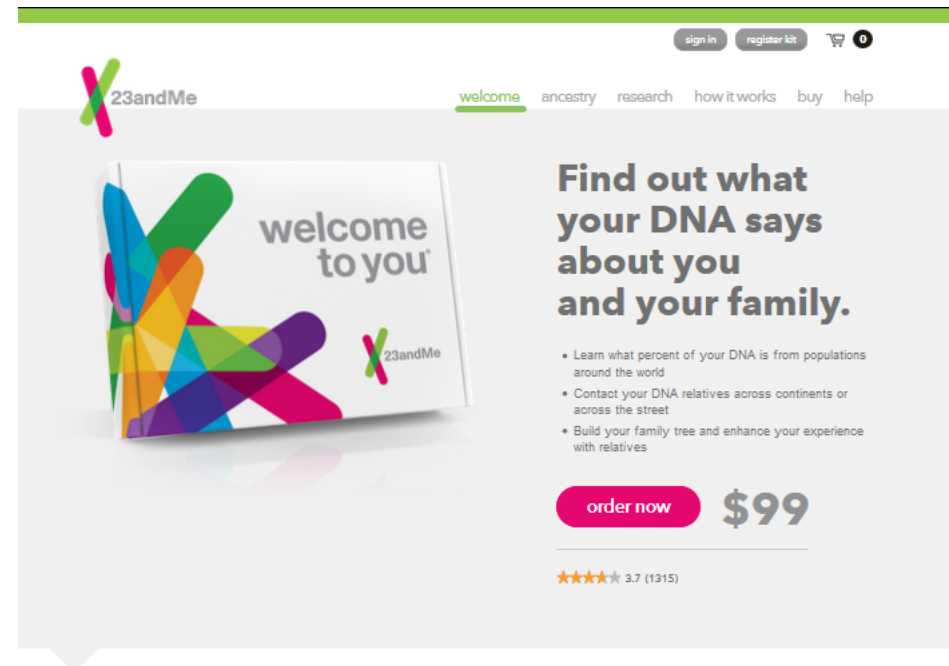
- Conocimiento de los profesionales
- Comprensión y expectativas de los pacientes

## Sociales

- Éticas (privacidad, equidad, allargos accidentales, toma de decisiones)
- Privacidad / legal (consentimiento informado / discriminación, patentes)

# Pruebas comerciales dirigidas al paciente

- Disponibilidad
- Accesibles
- Múltiples pruebas
- Económicos (100 dólares aprox.)
- Muestreo fácil (saliva)
- Calidad de la interpretación variable  
/ resultados sin interpretación



23andMe

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sign in register kit

welcome to you

Find out what your DNA says about you and your family.

- Learn what percent of your DNA is from populations around the world
- Contact your DNA relatives across continents or across the street
- Build your family tree and enhance your experience with relatives

order now \$99

★★★★★ 3.7 (1315)

## A little saliva is all it takes.

After we process your saliva sample, you will receive specific information about your DNA in your reports. Find out about your ancestral origins, what percent of your DNA comes from populations around the world, your maternal and paternal lines and your neanderthal percentage. [Learn more about how it works](#) →



# Oportunidad sin precedentes

## Take home points



- Genetic variation is a source of PK/PD variability
- Actionable PGx data are in drug labeling and are being used as standard of care at several institutions.
- FDA regulates testing; landscape is rapidly changing
- Testing is moving towards pre-emptive/sequencing and FDA-approved/point-of-care simultaneously
- Barriers remain, but personalized medicine is here and being led by PGx!

***Pharmacists have an unprecedented opportunity to lead implementation to improve the care of our patients in all practice settings***

# Health Personalized Medicine Program University of Florida



Anaheim, California | December 7-11, 2014

## Personalized Medicine Program- Launched June 25, 2012



UF&Shands Healing Learning Discovery Community UF University of Florida

Intranet Department of Medicine COM

**UF** Division of Cardiovascular Medicine  
Department of Medicine, College of Medicine

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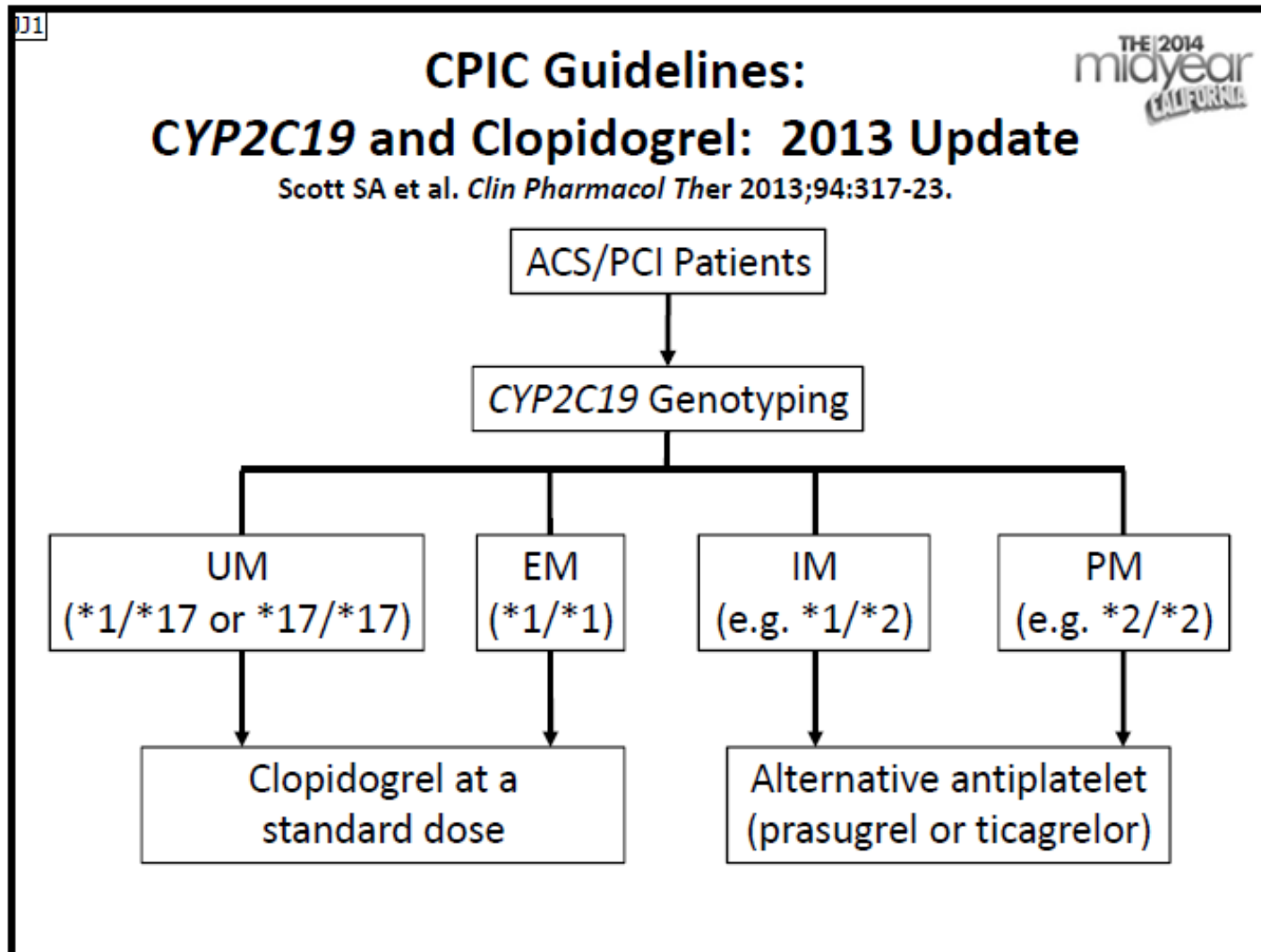
UF delivers promise of personalized medicine to heart patients

Personalized medicine — a concept in which an understanding of a patient's genetic makeup is used to enhance treatment — has arrived at UF&Shands, the University of Florida Academic Health [...]

Read More >

<https://ufandshands.org/news/2012/uf-delivers-promise-personalized-medicine-heart-patients#!/-1/>

# Health Personalized Medicine Program University of Florida





# Health Personalized Medicine Program University of Florida

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Anaheim, California | December 7-11, 2014

## IMPLEMENTACIÓN CLÍNICA:

- CYP2C19 incorporado a las pruebas de lab.
- El resultado se incorpora a la HC (aunque no haya tto. con clopidogrel)
- El farmacéutico clínico monitoriza los casos e interviene
- Después de un año pasa a facturarse e incluirse como opción en las ordenes de los pacientes post-PCI



# Health Personalized Medicine Program University of Florida

## EMR Clinical Decision Support

BestPractice Advisory - Epicwillow.Lemongello

**PROBLEM**  
This patient's CYP2C19 genotype is associated with very impaired metabolic activation of the prodrug clopidogrel (Plavix) and elevated risk for stent thrombosis or other cardiovascular events following PCL.

**REASONS**  
Reduced clopidogrel activation in this genotype results in significantly reduced platelet inhibition, increased residual platelet aggregation, and decreased clopidogrel efficacy.

**RECOMMENDATIONS - MODIFY TREATMENT BY CHOOSING ONE OF THE FOLLOWING:**

(A) Prescribe prasugrel (EFFIENT) 10 mg daily  
\*Contraindications: History of stroke or transient ischemic attack, active bleeding  
\*Caution: Increased bleeding risk: Age > 75 years, Body weight < 60 kg

OR

(B) Prescribe ticagrelor (BRILINTA) 90mg twice daily  
\*Contraindications: History of intracranial hemorrhage, active bleeding, severe hepatic impairment  
\*Caution: Aspirin doses > 100 mg/day reduce ticagrelor effectiveness and should be avoided.

More information on clopidogrel and CYP2C19

Last CYP2C19=\*2/\*8 on 4/12/2012

Acknowledge Reason:

Open order: Place order for prasugrel (EFFIENT) 10 mg daily. Note: remove order for clopidogrel on next screen.  
(Last done by Ellen Kershner at 2:50 PM on 4/16/2012)

Open order: Place order for ticagrelor (BRILINTA) 90 mg twice daily. Note: remove the clopidogrel order on next screen.  
(Last done by Inpatient Physician, MD at 12:12 PM on 5/16/2012)

Open order: Proceed with clopidogrel (PLAVIX) 75 mg daily. Note: please remove the bottom or second clopidogrel order as it will duplicate.  
(Last done by Inpatient Physician, MD at 12:17 PM on 4/26/2012)

Message sent: This alert has been sent via In Basket

Accept Cancel

# Health Personalized Medicine Program University of Florida

## Clopidogrel Pilot: Results

- First year, *CYP2C19* ordered on patients with LHC for suspicion of coronary disease.
  - 1097 with *CYP2C19* test ordered
  - PCI only – 247/291 patients (84%)
    - First 2 months (June and July 2012) 30/48 (63)
    - Last 2 months (May and June 2012) 40/41 (98) <0.001
  - Actionable genotypes post-PCI – n=80
    - 6/6 (100%) PMs had drug therapy changed
    - 50/74 (67%) IMs had drug therapy changed

American Journal of Medical Genetics Part C (Seminars in Medical Genetics) 166C:56-67 (2014)

### ARTICLE

#### Clinical Pharmacogenetics Implementation: Approaches, Successes, and Challenges

KRISTIN W. WEITZEL, AMANDA R. ELSEY, TAIMOUR Y. LANGAEE, BENJAMIN BURKLEY,  
DAVID R. NESSL, ANIWAA OWUSU OBENG, BENJAMIN J. STALEY, HUI-JIA DONG,  
ROBERT W. ALLAN, J. FELIX LIU, RHONDA M. COOPER-DEHOFF, R. DAVID ANDERSON,  
MICHAEL CONLON, MICHAEL J. CLARE-SALZLER, DAVID R. NELSON, AND JULIE A. JOHNSON

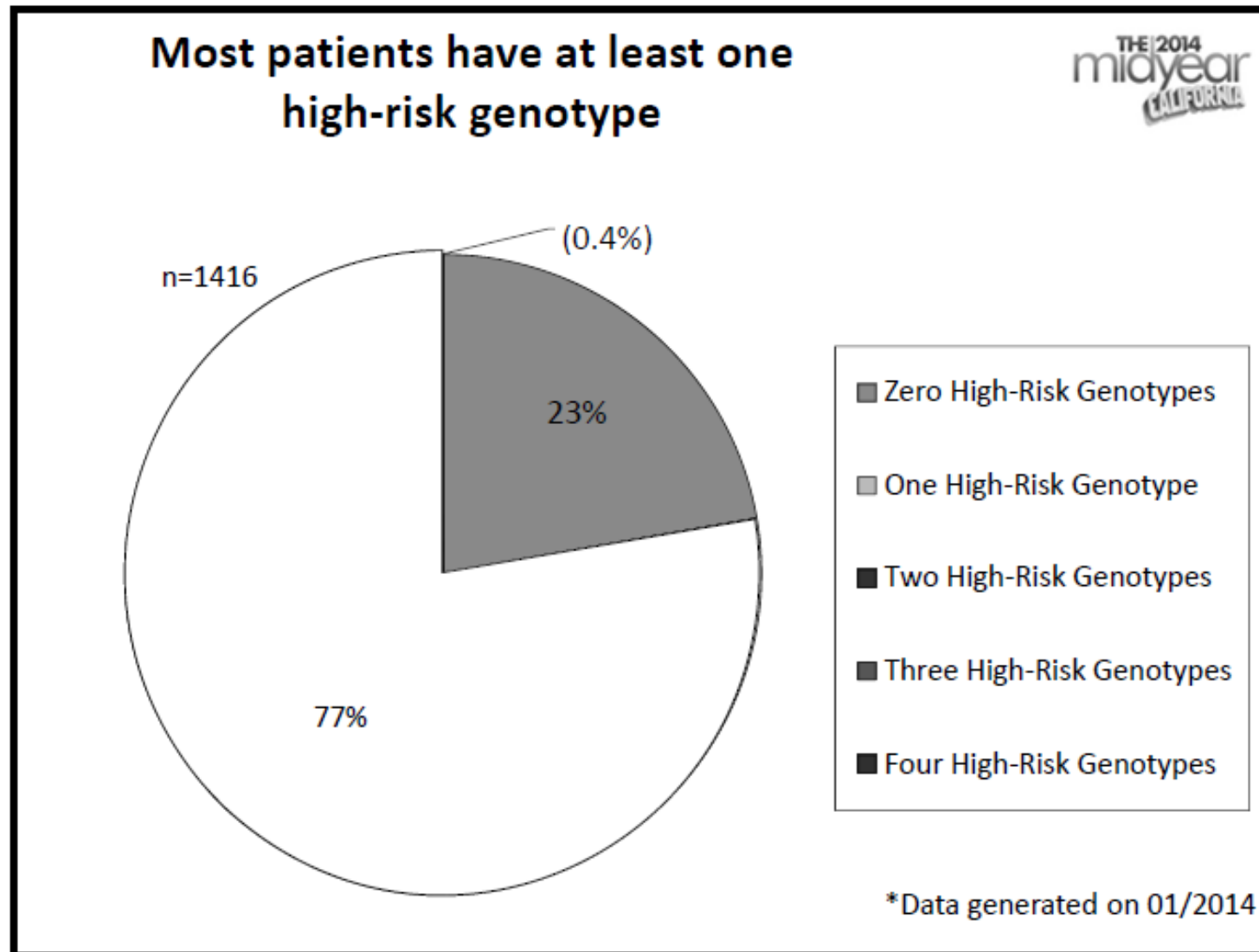


# St. Jude Children's Research Hospital

## 5 genes and 14 drugs have been implemented

- *CYP2D6*
  - Codeine
  - Oxycodone
  - Tramadol
  - Amitriptyline
  - Fluoxetine
  - Paroxetine
  - Ondansetron
- *DPYD*
  - Fluorouracil
  - Capecitabine
- *CYP2C19*
  - Clopidogrel
  - Amitriptyline
- *SLCO1B1*
  - Simvastatin
- *TPMT*
  - Mercaptopurine
  - Thioguanine
  - Azathioprine

# St. Jude Children's Research Hospital



# St. Jude Children's Research Hospital

## What are the features of useful pharmacogenetic CDS?

### Actionable

- Concisely state what should be done
  - Drug selection
  - Dose change
- Do not message if no action is needed

The *HLA-B\*57:01* allele, associated with abacavir hypersensitivity, was detected in this patient. *HLA-B\*57:01* positive patients should **NOT** be prescribed abacavir.

### Clinician Friendly

- Messages will be read by
  - Busy clinicians
  - Often do not have substantial genetics training!
- Carefully consider word choice
  - "wild type" vs. "normal function"
  - TPMT Genotype \*1/\*3C vs. TPMT intermediate activity
  - Provide both

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## What are the features of useful pharmacogenetic CDS?

### Timely

- An interruptive message must be sent at the right time

#### Post Test Alert

Diagnosis: (1 of 1)

**WARNING**

Based on the genotype result, this patient is predicted to have intermediate TPMT activity. The patient is at risk for myelosuppression with normal doses of 6-mercaptopurine. Consider starting 6-mercaptopurine doses at 30 - 70% of the normal dose. Please consult a clinical pharmacist or review the pharmacogenetics tab for more information.

Alert Action

Cancel entry

Dose altered accordingly

Modify

Buttons: [Cancel] [Add Entry] [OK]

### Targeted

- The message must reach the people who can take action

#### Pre Test Alert

**PGEN TESTING**

TPMT genotype data is recommended before using a thiopurine (mercaptopurine, thioguanine, and azathioprine). A TPMT genotype test result does not appear to be available for this patient. Please consider ordering a TPMT genotype test to help guide prescribing.

Add Order for:

Buttons: [Cancel] [Add Entry] [OK]

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## Pharmacogenetic information must be presented in the EHR two ways


### Passive

- Concise gene-specific interpretations must be provided to clinicians through the EHR
- The information can be posted once per gene
- Many combinations exist, and so the process must be automated

### Active

- Pre and post test alerts
- High-risk phenotypes automatically placed on the problem list
- Interruptive point of care alert triggered when problem list entry and high risk drug prescribing combine

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<p><b>***PHARMACOGENETICS CONSULT FOR***</b>  <b>*CYP2D6 GENOTYPE*</b></p> <p>Sample for CYP2D6 Genotype Obtained:          9/22/2011          PG4KDS CYP2D6 Genotype Result: (*1/*1)2N</p>	<p>Deconstruct the consult into sections; scalable to add additional diplotypes</p>	
<p>Based on the genotype result this patient is predicted to be an extensive (normal) metabolizer of CYP2D6 substrates.</p>	<p>Phenotype Assignment (6 versions)</p>	
<p>This result signifies that the patient has two copies of a wild-type (normal function) allele. The expected phenotype suggests that there is no reason to selectively adjust the dose of most medications (including codeine) that are metabolized by the CYP2D6 enzyme pathway. The diplotype result equates to a CYP2D6 activity score of 2. For more information about specific medications metabolized by CYP2D6, please go to <a href="http://www.stjude.org/pg4kds">www.stjude.org/pg4kds</a>.</p> <p>Comments: none          Jane Smith, Pharm.D., pager 1234</p>	<p>Diplotype Interpretation (32 versions)</p> <p>Dosing Recommendations (6 versions)</p> <p>Activity Score (11 versions)</p> <p>Educational Link</p>	

Hicks et al *Clin Pharmacol Ther.* 2012 PMID: [22990750](https://pubmed.ncbi.nlm.nih.gov/22990750/)

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## Result and Consult Display



Flowsheet

Protocol/NPT Documents\_Conents Consents

Labs/DI Quick View Wtals/Measures All Results Daily Clinical/Scanned Doc Mole Micro/Sero Diag

Flowsheet: Pharmacogenetics Level: Pharmacogenetics

Last 100

Navigator	Pharmacogenetics	1/25/2013
Pharmacogenetics	6/6/2013 10:16	22:10
<b>Pharmacogenetics</b>		
CYP2D6 PG4KDS Genotype	f>(*1/*1)0N	
CYP2D6 PG4KDS Consult	f Routine	
TPMT PG4KDS Genotype	f Abn *1/*3C	
TPMT PG4KDS Consult	f Abn Priority	
CYP2C19 PG4KDS Genotype	f Abn *1/*2B	
CYP2C19 PG4KDS Consult	f Abn Priority	
Glucose-6-Phosphate Dehydrogenase		9.9

Result Specimen Comments Action List

1.) (Medium Importance) Result Comment by DUNKENBERGER, MARK on August 28, 2013 17:21

\*\*\*PHARMACOGENETICS CONSULT FOR\*\*\*  
"TPMT GENOTYPE"

Sample for TPMT Genotype Obtained: 06/06/2013 10:16:00  
PG4KDS TPMT Genotype Result: \*1/\*3C

This result signifies that this patient has one copy of a wild-type (high activity) allele and one copy of a non-functional (low activity) allele. This patient is predicted to have intermediate TPMT activity. The patient is at risk for myelosuppression with normal doses of drugs in the thiopurine class (6-mercaptopurine, 6-thioguanine or azathioprine), and thus reduced starting doses may be needed. Some experts recommend lower doses of thiopurines in heterozygotes because these patients may be at a higher risk of thiopurine-related late secondary cancers. For 6-mercaptopurine and azathioprine, consider starting at 30-70% of the normal dose. For example, a normal dose of 6-mercaptopurine (e.g., 75 mg/m<sup>2</sup>/day) should be reduced to 20-50 mg/m<sup>2</sup>/day. A normal dose of azathioprine (e.g., 2-3 mg/kg/day) should be reduced to 0.6 - 2.0 mg/kg/day. For thioguanine reduce the normal dose by 30-50%.

Titrate thiopurine doses based on myelosuppression. In the setting of myelosuppression, and depending on other therapy, emphasis should be on reducing thiopurine doses over other agents. Allow 2-4 weeks to reach steady-state after each dosage adjustment. For drug monitoring, consider obtaining a thiopurine metabolite erythrocyte concentration (i.e., test name TGN/RBC clinical). For more information about how TPMT activity influences thiopurine dosing please go to [www.stjude.org/pg4kds](http://www.stjude.org/pg4kds).

Kristine Crews, Pharm.D., pager 2256

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THE 2014  
midyear  
CALIFORNIA

## High-risk pharmacogenetic phenotypes are added to the problem list

Qualifier	Name of Problem	Onset Date	Classification
	CYP2C19 ULTRA-RAPID METABOLIZER	08/20/2013	Clinical
	Hepatocarcinoma.	09/21/2012	HIMS Sum...
	HEPATOCELLULAR CARCINOMA	09/21/2012	HIMS Sum...
	HEPATOCELLULAR CARCINOMA, INV. LIVER	08/22/2013	HIMS Sum...
	HEPATOCELLULAR CARCINOMA, INV. PELVIS	12/26/2012	HIMS Sum...
	HEPATOCELLULAR CARCINOMA, INV. PERITONEUM	11/08/2012	HIMS Sum...
	HEPATOCELLULAR CARCINOMA, INVOLVEMENT LUNG	09/21/2012	HIMS Sum...
	PT. HAS SURROPORT SINGLE	09/21/2012	Medical
	SLCO1B1 - INTERMEDIATE FUNCTION	05/16/2013	Clinical

**Problem list entries serve as the discrete  
data element for interruptive  
point of care CDS**



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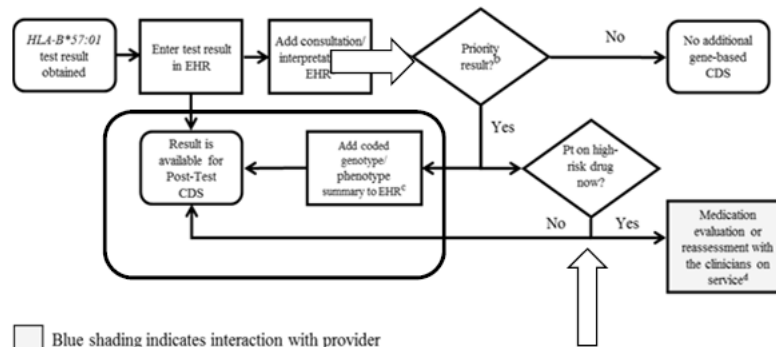
## Summary of Alert Prescribing Outcomes

- For May 2011 to November 2012, prescribing attempts per patient related to the first post-test alert for
  - *TPMT* and thiopurines
  - *CYP2D6* and codeine
- 19/20 (95%) of patients with post-test alert at the time of the first prescription received the appropriate change in therapy
- Additional data collection ongoing

# St. Jude Children's Research Hospital

## HLA-B\*57:01 Pharmacogenetic Test Result: Clinical Implementation Workflow for EHR

THE 2014  
midyear  
CALIFORNIA



## Translation Tables

THE 2014  
midyear  
CALIFORNIA

Table for abacavir is simple:

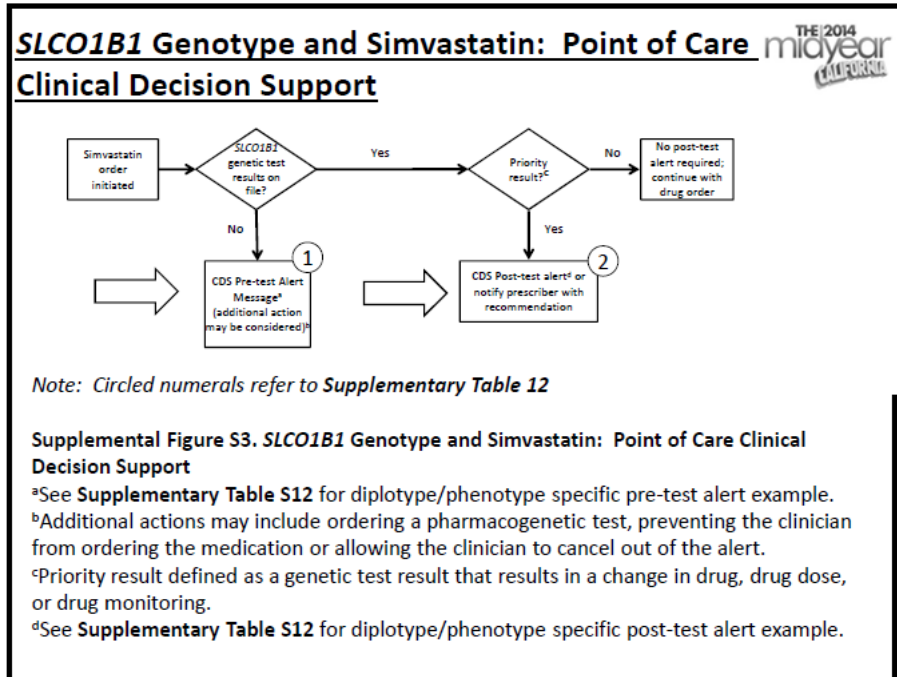
Test Result for HLA-B*57:01	Examples of Diplotypes	Interpreted Phenotype
Negative	X/X	Low Risk of abacavir hypersensitivity
Positive	X/57:01 or 57:01/57:01	High Risk of abacavir hypersensitivity

SLCO1B1/Simvastatin – Many more diplotypes

All possible diplotype combinations  
Post to PharmGKB

Diplotypes of known functional significance  
CPIC Supplement Table

# St. Jude Children's Research Hospital



**Supplemental Table S12. Example Implementation of this Guideline: Point of Care Clinical Decision Support**

Flow Chart Reference Point (See Supplemental Figure S3)	CDS Context, Relative to Genetic Testing	Trigger Condition	CDS Alert Text <sup>a</sup>
1	Pre-Test	No <i>SLCO1B1</i> result on file	<i>SLCO1B1</i> diplotype may be important for simvastatin side effects. An <i>SLCO1B1</i> genotype does not appear to have been ordered for this patient. Use of an alternative statin or dose may be recommended. Please consult a clinical pharmacist <sup>b</sup> for more information.
2	Post-Test	SLCO1B1 - Intermediate Function	Based on the genotype result, this patient is predicted to have intermediate SLCO1B1 function and may be at increased risk for developing simvastatin-associated myopathy. Consider starting with a lower dose of simvastatin (20 mg/day for adults) or choosing an alternate statin agent. Monitor creatine kinase levels routinely. Please consult a clinical pharmacist <sup>b</sup> for more information.
2	Post-Test	SLCO1B1 - Low Function	Based on the genotype result, this patient is predicted to have low SLCO1B1 function and may be at high risk for developing simvastatin-associated myopathy. Consider starting with a lower dose of simvastatin (20 mg/day for adults) or choosing an alternate statin agent. Monitor creatine kinase levels routinely. Please consult a clinical pharmacist <sup>b</sup> for more information.

<sup>a</sup>The specific wording of the alert text may differ among sites.

<sup>b</sup>Pharmacist, pharmacologist, or a clinician with pharmacogenetic expertise/training.

# St. Jude Children's Research Hospital



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## CPIC: Clinical Pharmacogenetics Implementation Consortium



The [Clinical Pharmacogenetics Implementation Consortium \(CPIC\)](#) was formed in late 2009, as a shared project between [PharmGKB](#) and the [Pharmacogenomics Research Network](#). CPIC guidelines are peer-reviewed and published in a leading journal (in partnership with [Clinical Pharmacology and Therapeutics](#)) with simultaneous posting to PharmGKB with supplemental information/data and updates. Anyone with clinical interests in pharmacogenetics is eligible for membership. CPIC's goal is to address some of the barriers to implementation of pharmacogenetic tests into clinical practice.

Questions? Send email to [cpic@pharmgkb.org](mailto:cpic@pharmgkb.org).

### CPIC Team

Leader	Co-Leader	Coordinator
Mary V. Relling, Pharm.D. St. Jude Children's Research Hospital, Memphis	Teri E. Klein, Ph.D. Stanford University	Kelly Caudle, Pharm.D., Ph.D. St. Jude Children's Research Hospital, Memphis

### CPIC Steering Committee

Mary V. Relling, Pharm.D. St. Jude Children's Research Hospital	Teri E. Klein, Ph.D. Stanford University	Julie A. Johnson, Pharm.D. University of Florida	Dan M. Roden, M.D. Vanderbilt University	Rachel F. Tyndale, Ph.D. University of Toronto and CAMH
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### BACKGROUND

One barrier to clinical implementation of pharmacogenetics is the lack of freely available, peer-reviewed, updatable, and detailed gene/drug clinical practice guidelines. CPIC provides guidelines that enable the translation of genetic laboratory test results into actionable prescribing decisions for specific drugs. The guidelines can center on genes (e.g. thiopurine methyltransferase and its implications for thiopurines) or around drugs (e.g. warfarin and CYP2C9 and VKORC1). Priority is given to genotyping tests that are already offered in CLIA-approved clinical settings.

### CPIC GUIDELINES

CPIC guidelines are designed to help clinicians understand HOW available genetic test results should be used to optimize drug therapy, rather than WHETHER tests should be ordered. A key assumption underlying the CPIC guidelines is that clinical high-throughput and pre-emptive (pre-prescription) genotyping will become more widespread, and that clinicians will be faced with having patients' genotypes available even if they have not explicitly ordered a test with a specific drug in mind. Each CPIC guideline adheres to a standard format, and includes a standard system for grading levels of evidence linking genotypes to phenotypes, how to assign phenotypes to clinical genotypes, prescribing recommendations based on genotype/phenotype, and a standard system for assigning strength to each prescribing recommendation. The SOP for guideline creation has been published in [Current Drug Metabolism: Incorporation of Pharmacogenomics into Routine Clinical Practice: The Pharmacogenetics Implementation Consortium \(CPIC\) Guideline Development Process](#). The SOP was updated in June 2014:

[www.pharmgkb.org/page/projects](http://www.pharmgkb.org/page/projects)

## Cuál crees que son los potenciales campos de desarrollo profesional del farmacéutico relacionados con la farmacogenética?

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1. Identificar oportunidades de mejora de la terapéutica gracias a la FG
2. Aportar la evidencia necesaria para desarrollar la FG en la práctica
3. Elaborar herramientas de soporte a la decisión clínica
4. Todas las anteriores



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## *EXHIBITION HALL*

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Dr. Ignacio Cardona Pascual  
Hospital Universitari Vall d'Hebrón

# Empresas representadas

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- Automatización: 40
- Lab. Farmacéuticos Biotecnología: 20
- Lab. Farmacéuticos (“marcas”): 39
- Lab. Farmacéuticos Genéricos: 43
- Software: 40
- Dispensación: 32
- Administración de Fármacos: 22
- Agencias de empleo: 6

# Empresas representadas

---

- Instalaciones y accesorios: 11
- Agencias Gubernamentales: 4
- Centrales de compras: 8
- Instituciones: 14
- Cuidados a domicilio: 11
- Cabinas de seguridad: 10
- Estudios de mercado: 4



# Empresas representadas

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- Embalaje y acondicionamiento: 18
- Parenterales: 13
- Servicios de Gestión: 33
- Asociaciones profesionales: 18
- Publicaciones: 21
- Refrigeración: 15
- USP: 24
- Distribución Mayorista: 10

# Pyxis<sup>®</sup> CareFusion



NE



# Pyxis® CareFusion



# Cerner Corporation



RxStation image

**Hardware modularity**  
 Non-proprietary components within the system enable you to switch out monitors and biometric readers without requiring a new cabinet or extensive service to existing cabinets. Your organization can also use Cerner's CareAware® device architecture to monitor devices in real-time and ensure that the RxStation is online at all times.

Quarter Height 20-compartment  
 Half Height Return 3-compartment  
 Single Dose Dispense Tray  
 Half Height Return 3-compartment  
 Open Matrix Tray  
 Half Height 8-compartment  
 Quarter Height 20-compartment

**Controlled Substance Vault/Supply Tower**

**Supply Module**  
 Up to 4 single-dose trays that can be fixed or pulled out.

**Remote Lock**  
 Can operate on any existing 90 degree angle

# Codonics

## Create Customized Labels

The SLS provides a multitude of labeling options including drug name, strengths, expiration, warning and message alerts, preparation notes, and 2D bar codes. All labels are TJC compliant, can be produced in full-color, and are specific to a facility's own formulary.



# Noritsu

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**NarcoMedic  
Pharmacy  
Management  
Platform**

**XANA  
Dose Dispensing  
System**



# Omnicell



# MetroMonitor<sup>®</sup>

**MetroMonitor™ Dashboard System**

Metro's intelligent management and monitoring dashboard system for mobile computing workstations. IT professionals with enterprise software now have web-based access to workstation performance data, including power system and network connectivity, to streamline fleet management and increase workstation uptime.



# MetroMonitor<sup>®</sup>

METRO<sup>®</sup> POINT-OF-CARE COMPUTING

METRO<sup>®</sup> POINT-OF-CARE COMPUTING

Advanced Workstation

Integrated Workstation

MetroMonitor<sup>™</sup> Dashboard System

Metro's intelligent management and monitoring dashboard system for mobile computing workstations. IT professionals with enterprise software now have web-based access to workstation performance data, including power system and network connectivity, to streamline fleet management and increase workstation uptime.

# Metro Workstations

Request a Demo



## WORKSTATIONS

FLO \* 1770 WORKSTATION

FLO \* 1770RX (WITH METRO SECURERX™ MED MODULE)

The Metro Flo 1770 workstation is the ideal point-of-care computing solution for most facilities. Our mobile hospital computer carts can be configured out-of-the-box or upgraded in the field to fit most applications, such as bar code medication administration (BCMA) by adding our SecureRx™ Med Module. The 1770 provides an effective way to support meaningful use requirements in the short-term with a strong long-term ROI.

Download Storage and Accessories  
Download Secure RX Spec Sheet  
Download POC Computing Brochure  
Download Sell Sheet

How To Buy

## Integrated. Reliable. Upgradable.



MULTIPLE POWER  
OPTIONS TO FIT  
YOUR TECHNOLOGY

MULTIPLE STORAGE  
OPTIONS FOR YOUR  
APPLICATION

RELIABLE AND  
SECURE INDIVIDUAL  
PATIENT BINS

ROBUST MOBILE  
HOSPITAL  
COMPUTER CART

FIELD-UPGRADABLE  
FOR SPECIFIC  
APPLICATIONS  
SUCH AS BCMA



# Aethon MedEx<sup>®</sup>

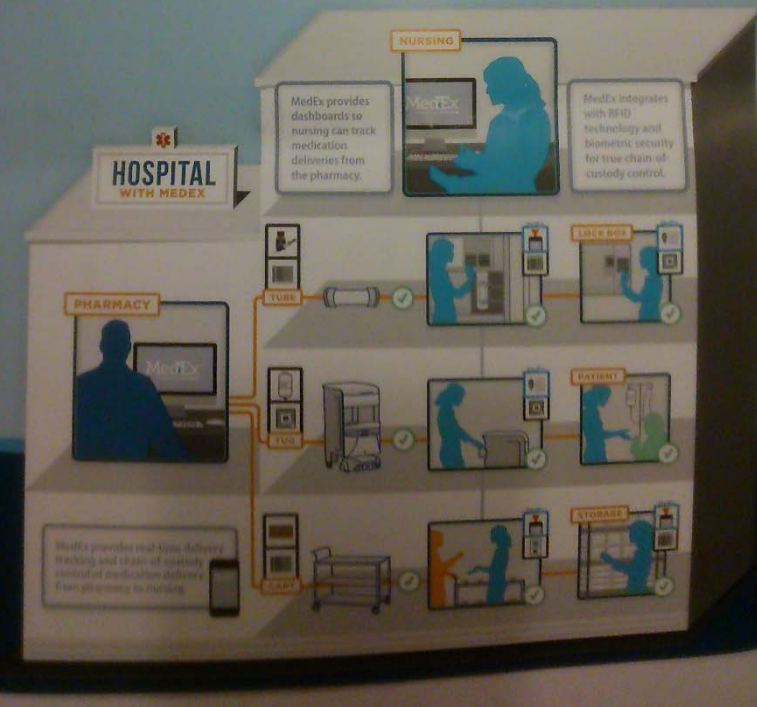
MedEx™

AETHON

MedEx™ controls the medication delivery process and provides real-time status information to pharmacy and nursing. It addresses the issues related to late, missing or divergent medication deliveries in both centralized and decentralized pharmacies and can be used with pneumatic tubes, manual courier, and the TUG autonomous robot.

## Benefits:

- Eliminates wasted time and inventory due to missing medication deliveries
- Pharmacy and nursing spend more time on patient care and clinical activities
- Improved compliance through chain-of-custody control and security
- Improved turnaround time of deliveries—alerts pharmacy if a delivery is delayed
- Provides data to measure staff performance and manage quality initiatives

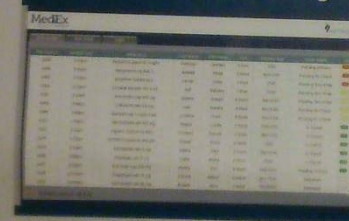


## Contact Us Today

Aethon, Inc.  
100 Business Center Dr., Pittsburgh, PA 15205  
www.aethon.com • inquiries@aethon.com  
(412) 322-2975

## Product Features

### MedEx™ Dashboard Tracking



### Performance Dashboards

Streamlined dashboards inform pharmacy and nursing

A streamlined easy to navigate dashboard keeps track of all medication deliveries. It provides visibility to both pharmacy and nursing so everyone is on the same page. It provides alerts when a delivery fails behind and also provides reports for measuring performance.

### Lockbox & RFID

RFID tags and RFID enabled lockboxes to track location detail

With Aethon's lockbox and RFID tags medications can be tracked based on their location. The lockbox has biometric security and ensures chain-of-custody. Aethon also RFID-enables their TUG mobile robot.

### Optional Pharmacy TUG



### Mobile Handheld Access

Delivery control anywhere in the hospital using Apple devices

Apple handheld devices running the free MedEx™ app allows for communication between the pharmacy and nursing. It also provides bar code reading for receipt and delivery and the ability to remotely request and send the TUG robot.

### Pharmacy TUG

Specifically designed cart securely delivers medications

TUG is an optional autonomous mobile robot that delivers all medications including those requiring chain-of-custody control. TUG communicates wirelessly to MedEx™ as it makes deliveries.

# Aethon MedEx<sup>®</sup>



# Logística

THE 2014  
midyear  
CALIFORNIA

Anaheim, California | December 7-11, 2014



# Talyst



# Kirby Lester

## Always-Accurate Counting



Kirby Lester's fastest, smallest tablet counter.

## Scan-Verification *Plus* Counting



Eliminate dispensing errors on one small device. Verify and count 100% of medications.

## Robotic Dispensing Systems



KL60 and KL100 pharmacy robots free up time by automating your common medications.

## Pharmaceutical/ Industrial



Industrial line of counting & bottling devices for QC, check-counts, bottle-filling.

# Fluidose®

THE 2014  
midyear  
CALIFORNIA

Anaheim, California | December 7-11, 2014





# Aesynt Robot -Rx<sup>®</sup>



# Aesynt Robot –Rx®



# Aesynt Robot –Rx<sup>®</sup>



# Dispensación



# SensoScientific

**senso**scientific  
Enabling Solutions for Quality and Compliance

## MOBILITY

Temperature and humidity monitoring  
made easy, scalable, and cost effective.

**BREAKTHROUGH IN-TRANSIT TEMPERATURE MONITORING TECHNOLOGY**

Food Service   Laboratories   Pharmacy   Blood Bank   Hospitals

### LEVERAGE YOUR EXISTING WI-FI NETWORK

**WiFi**

- Sensor nodes communicate directly with industry Standard Access Points
- No other devices needed (routers, repeaters, hosts, receivers)
- The sensors can utilize WEP, WPA, or WPA2 encryption

#### CLOUD DIAGRAM

**Email**

**Cell phone**

**Voice notification**

**Escalation alert**

### EASY and SECURE

temperature monitoring documentation  
for your temperature sensitive products

## ON THE GO

SensoTag temperature indicators are specifically designed for use in the life science, biotech, and pharmaceutical industries. They are ideal for monitoring temperature sensitive vaccines, clinical trial materials, blood, and pharmaceuticals.

*This product is designed to meet or exceed the WHO PQS performance specification E06/TR07.2*

- Track quality of the product in transit
- Temperature reports – data available immediately
- Intelligent in-transit continuous recorders capable of real time monitoring of storage temperature and alarms notification
- Intelligent in-transit one time recorders and data loggers
- Clear indication of temperature history/alarm status at all times
- Push button start and stop
- Data can be downloaded via your cell phone
- Robust and Accurate. Data collected is secure and cannot be manipulated
- Fits easily into packages and can be mailed via letter rate

# Medi Cup® blisters MediDose®

Jumbo—  
designed for compounded  
drugs, AIDS medication,  
veterinary pharmaceuticals

Denesting hip  
facilitates easy  
stacking and  
separation

Ovals—  
for specific size requirements  
of various automated  
dispensing cabinets

**Medi-Cup® Blisters**  
for solid oral unit dose  
**13 OPTIONS, 6 SIZES**

Beyond use dating	Mini 3/16"	Standard 3/8"	Deep 11/16"	Jumbo 1"	Oval 3/8"	Deep Oval 5/8"
6 months						
6 months*						
12 months						
12 months*						

\* ultraviolet (UV inhibitor) protection

**MILT**  
by Medi-Dose  
www.medidose.com  
800.523.8966  
Exp: 08/19/2025

Sealed with our Lid-Label®  
Covers, Medi-Dose  
provides you with a  
tamper-evident package  
that's easy to open,  
readily identifiable and  
bar code ready!

# MILT® 4 MediDose®

**MILT® 4**  
**Powerfully Easy**  
Software for Unit Dose Labeling

**Simple. Convenient. Flexible.**

- Designed with pharmacists and healthcare professionals to reduce medication errors, simplify bar coding and improve packaging workflow and reporting.
- Compatible with BPOC and BCMA systems to synchronize bar coding information for all departments.
- Can be installed on an unlimited number of computers for easy data sharing.
- Includes pre-designed label templates or easily allows custom designs to contain as much information as you prefer.
- Laser and direct thermal labels accommodate solids, liquids, syringes, IV's, ampules, equipment and supplies.
- Print Linear and 2-D barcodes with data from up to seven fields including NDC, lot numbers and expiration dates.
- Includes the FDA NDC database of medications that is updated at no additional cost.

**Brand Name (Generic Name) 2mg**  
NDC: 12345678901  
LOT: 8675309  
EXP: 02/25/25

**Brand Name (Generic Name) 120mg**  
NDC: 12345678901  
LOT: 8675309  
EXP: 10/14/25

**Receipt Label**  
Brand Name (Generic Name) 2 mg  
BY: SUP ON: 03/30/10 1:53 PM  
NDC: 12345678901  
LOT: 8675309  
EXP: 02/25/25

**1 Choose a Medication**

- Scan Bottle to Import from Included NDC Database
- Automatic Date Calculation Saves with Medication
- Control Who Can Edit, Save and Delete Information
- Prompt Users for Specific Fields (Optional)
- Customizable Field Names
- Formulary Grouping and Sorting Options
- Include Controlled Symbols (I, II, III, IV, V)

**2 Choose a Label**

- Label Selection Saves with Medication
- Supports All Medi-Dose® and LiquiDose® Laser and Thermal Labels
- Labels Designed Specifically for Pharmacy Use with Aggressive Adhesives for Maximum Durability
- The Perfect Labels for Solids, Bottles, Syringes, Ampules, Bags and Anything You Package

U.S. & Canada: 1-800-523-8966 / Worldwide: 215-396-8600 / MediDose.com

**Medi-Dose EPS**

**MILT 4**

Unit Dose, Bar Coding, Pharmacy & Nursing Supply Experts!

Sort Generic Strength (None)

- Acetaminophen
- Activated Charcoal
- Aspirin
  - 25 mg
  - 81 mg
- Atropine Sulfate
- Azithromycin
- Caffeine Citrate
- Calcium Chloride
- Doxepin Hydrochloride
- Hydrocodone Bitartrate
- Insulin Aspart
- Lorazepam
- Nalbuphine Hydrochloride
- Nitroglycerin
- Potassium Phosphate, Dibasic

Generic: Aspirin  
Brand: Aspirin  
Strength: 81 mg  
Lot: 123B  
NDC: 12345678901  
Form: TABLET  
Pkgd Exp: 02/25/2025  
Mfr Exp: 3/31/2025  
Mfr: ABC Company  
Note 1: Cabinet A9  
Note 2: Bin 27  
Note 3: Pocket 11  
Note 4: Take With Water  
Controlled: (None)

1. Medication: Aspirin 81 mg \*  
2. Label: Laser Lid-Label MD24w/MD23x  
3. Template: Standard 1-D  
4. Preview

**3 Choose a Template**

- Template Selection Saves with Medication
- Add Data Fields, Fixed Text and Formula Fields
- Add 1-D or 2-D Multi-Part Bar Codes
- Add Shapes and Images
- Use Tail Man Lettering
- Supports Any Windows Compatible Font
- 256 Colors for Fonts, Fills and Outlines

**4 Preview and Print**

- Remembers Printer, Tray and Alignment Settings for Each Label Type
- Choose Quantity of Doses, Log 1 and Log 2 Labels
- Print Log Labels for Your Paper Log Book
- Approve Print Jobs Before They are Recorded in Electronic Log History (Optional)
- View and Print Log History for Approved and/or Rejected Print Jobs and All User Activity

# MILT<sup>®</sup> 4 MediDose<sup>®</sup>








# TampAlertT<sup>®</sup> MediDose<sup>®</sup>

**Packaging solids, liquids or powders**

**TampAlert<sup>®</sup> for no-leak, tamper-evident unit dose**

Twist on tamper-evidence for liquid unit dose that's child-resistant and senior-friendly

**TampAlert<sup>®</sup> System**

- 1**  
  
 Dispense medication into TampAlert bottle.
- 2**  
  
 Twist TampAlert cap onto bottle.
- 3**  
  
 A secure, tamper-evident seal adheres to the bottle when you twist-off the cap.

A twist of the wrist is all it takes to dispense no-leak, tamper-evident unit dose. TampAlert is the simple, fast and inexpensive system for packaging solids, liquids or powders.

**Security and convenience for all generations.** Ideal for legend drugs and controlled substances in-patient, OPD or after hours dispensing, TampAlert vials are available from 15 to 120 ml, in natural or UV inhibitor polyethylene with regular or child-resistant screw caps.

Providing manual tamper-evidence was never so easy and cost-effective. See for yourself why TampAlert<sup>®</sup> is the right solution for your packaging needs.

Tamper-evident seal is contained within each

Square LiquiDose<sup>®</sup> labels were designed with TampAlert<sup>®</sup> bottles in mind. The label's size makes it ideal for scanning bar codes around the tight circumference of small bottles.

U.S. & Canada: 1-800-523-8966 / Worldwide: 215-396-8600 / [MediDose.com](http://MediDose.com)

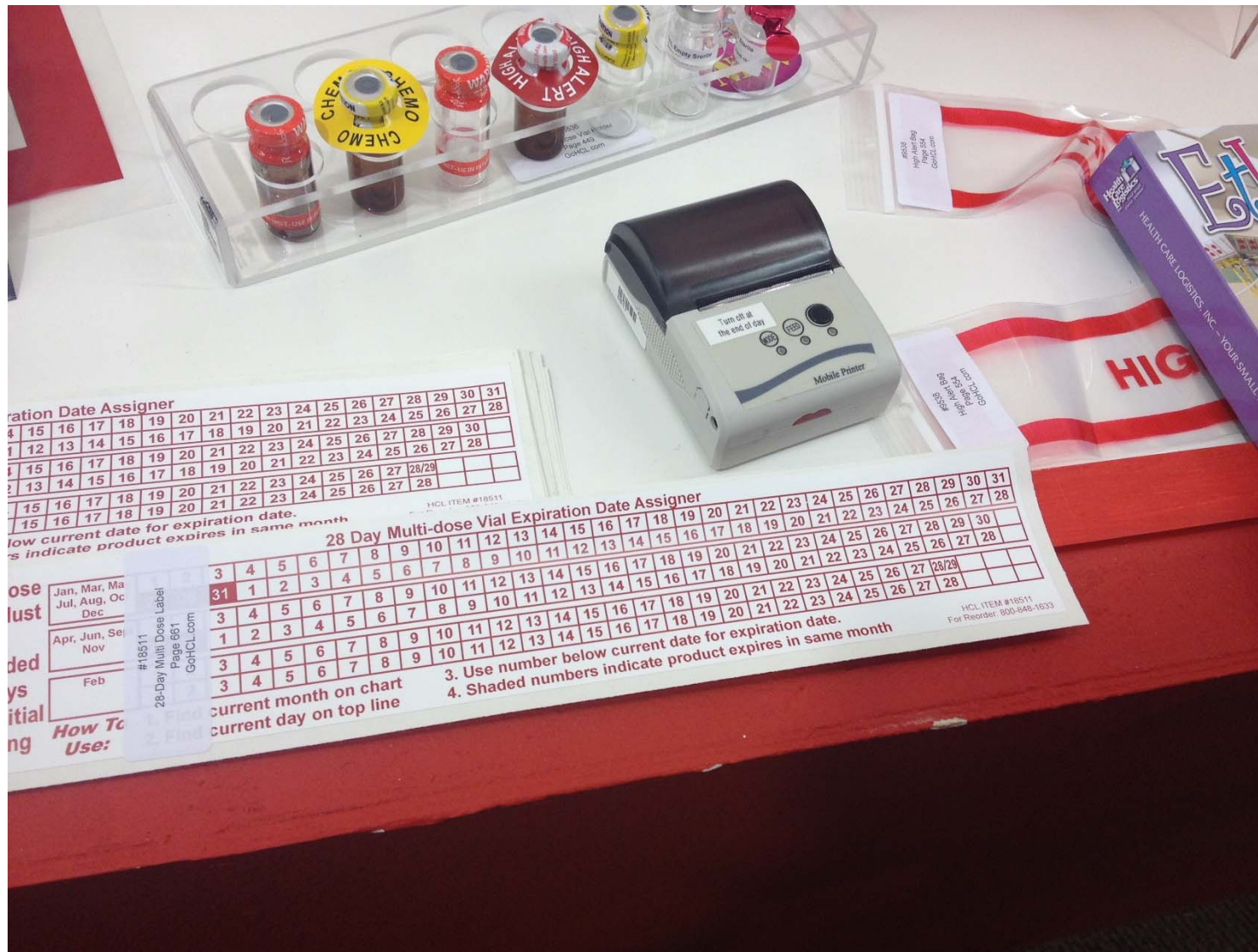
# Steri-Tamp®



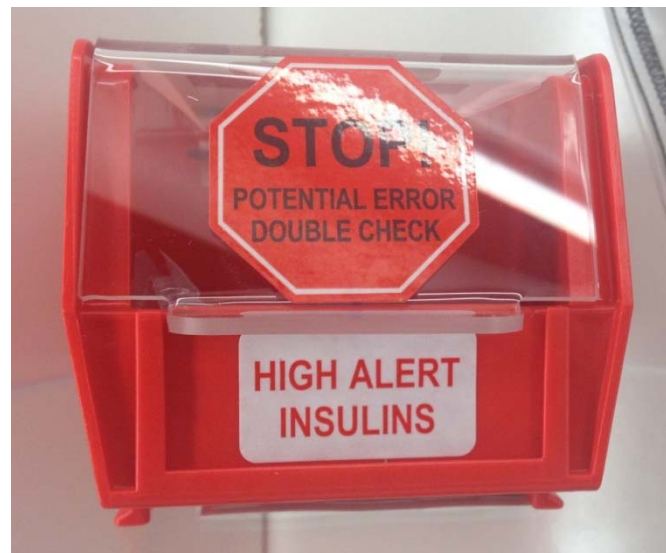
# Otros...



# Otros...



# Otros...



# Otros...



# Otros...

provide extraordinary value to your... operation. Unique product and package designs will add control and efficiency to your CSP's. Check out the sterile tray of 10 luer lock caps for example.



### Prep-Fill™ Sterile Luer Lock Connectors

Pharmacies operate under a unique range of processes and procedures. Many require special products to achieve the intended results. When it comes to sterile fluid transfers, no products are better suited than Prep-Fill Luer Lock Connectors. They provide solid performance, durability and ease of use. Each product is sterile and presented in individual blister packages.

### Rx-Vent™ Sterile Venting Needles

Rx-Vent Venting Needles safety and



# Otros...





# Otros...


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Your small friend, indeed®  
**Health Care Logistics**  
 INC.

























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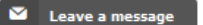
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**PRODUCT SPOTLIGHT!**    **ExactaMed Plastic Oral Dispenser with Tip Cap**



Special Answers to Special Problems for Healthcare Professionals

 Bins & Accessories	 Boxes, Totes & Cases	 Cabinets & Shelving	 Carts & Accessories	 Cassettes & Accessories	 Compounding & Dispensing
 Crushers, Cutters & Cups	 Custom Labels	 Emergency Medical Supplies	 Error Prevention & Patient Safety	 Foam & Accessories	 <a href="http://goHCLabels.com">goHCLabels.com</a>
 Infection Prevention	 IV Accessories	 Labels, Magnets & Stamps	 Liquid & Solid Unit Dose	 Medication Compliance	 Metal Options
 New Products	 Patient Supplies	 Pharmacy Supplies	 Pharmart	 Plastic Bags	 Plastic Options
 Printing & Labels	 Room Accessories	 Security Seals	 Temperature Monitoring		



# Kit Check



RFID Automates  
Checking Processes



# MEPS Real-Time

Intelliguard® RFID Solutions  
Reduce Cost,  
Increase Efficiency,  
Improve Patient Safety



RFID-Enabled Inventory Management  
Open the Door,  
Close the Door  
System  
Automatically  
Re-inventories



80%  
smaller than  
the competition



KITCHECK KITCHECK

3:45 PM  
Intelliguard® Cloud Connect Today

**Expiring Medication Alert**

To: TSmith@CentralHspit  
Location: Surgery Dept.  
Med: Proflinine® 500 iu  
Qty/Date: 10 ea in 60 days  
Lot No: PLK678

Location: Central Pharm 1  
Med: Treanda 25mg/8mL  
Qty/Date: 6 ea in 30 days  
Lot No: 51164Y

Yesterday



65%  
smaller



25B2DF

# Pinnacle<sup>®</sup> NPT Braun



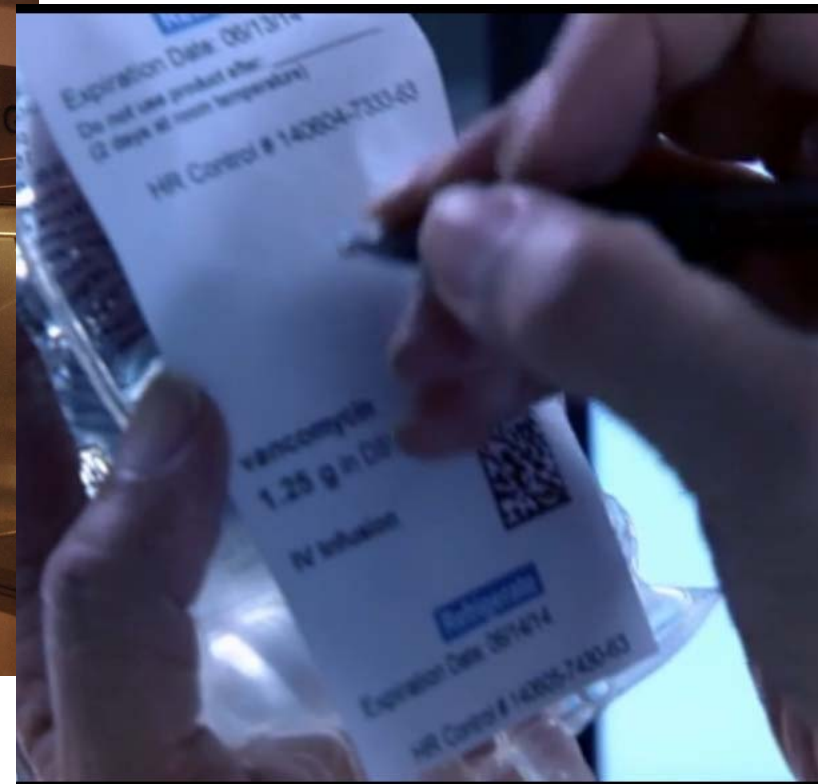
# i.v.Station Aesynt



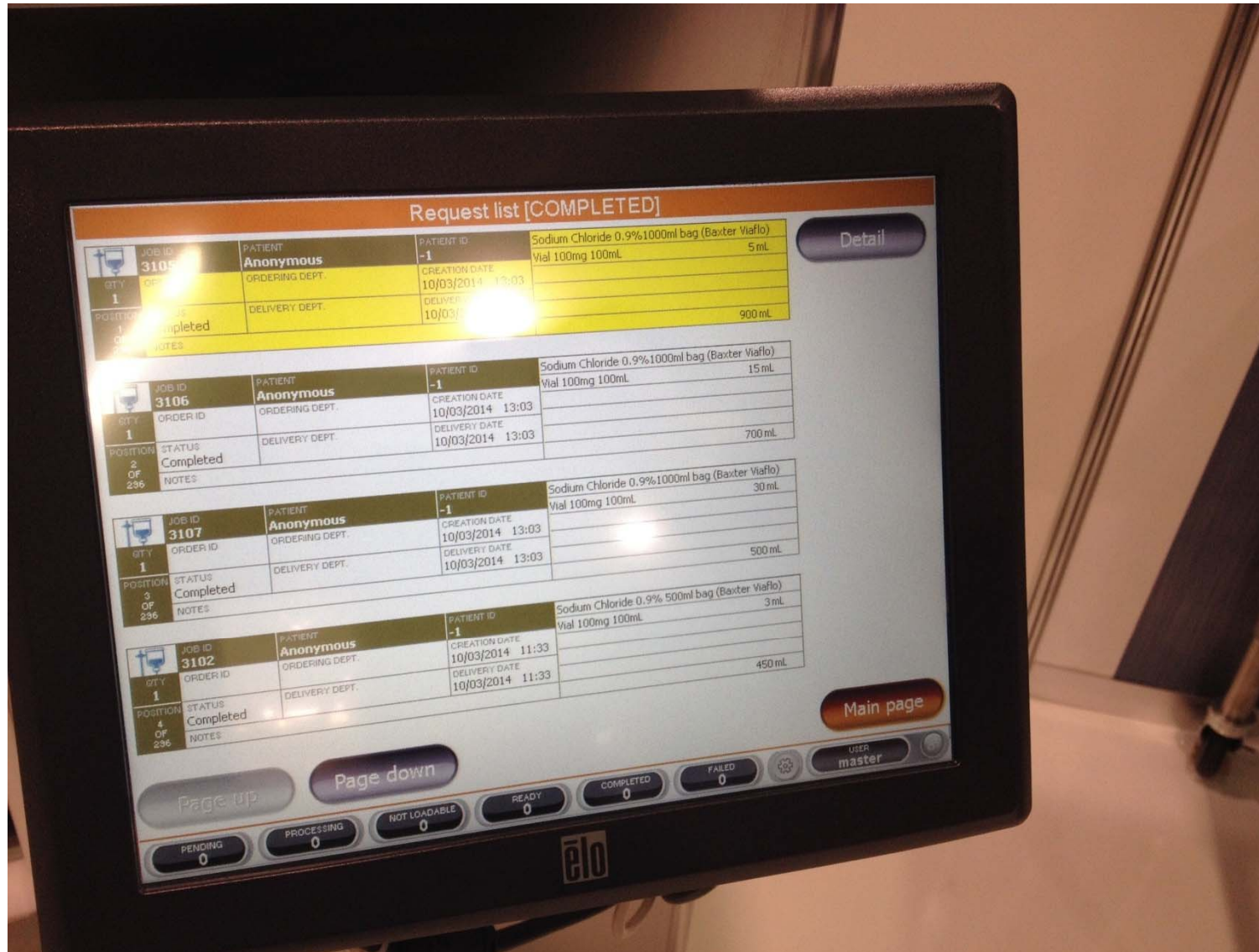
# i.v.SOFT Aesynt



# i.v.SOFT Aesynt



# i.v.SOFT i.v.STATION software





# ICU Medical Inc.

## Diana™ System May Help Compounding Pharmacies Avoid Drug Contamination



### medOC

#### Compounding Systems

Pharmacy compounding technology designed to quickly and accurately mix, transfer, or discharge liquids. Particularly suitable for:

- Patient-specific infusion
- Pediatric dosing
- Total parenteral nutrition (TPN)
- Syringe filling, sterile filtration, and antibiotics
- Chemotherapy, and filling of elastomeric pumps



\*Not available for sale in the United States.

# Riva Systems



# UCI virtual



# UCI virtual

