



The Hospital Pharmacist 2020: a changed profile ?

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Dr. Roberto Frontini, President EAHP

president@eahp.eu



Conflict of interest

No commercial conflict of
interest to disclose



Dr. Roberto Frontini, President EAHP

president@eahp.eu







The Hospital Pharmacist 2020: a changed profile ?



Dr. Roberto Frontini, President EAHP

president@eahp.eu

Outline

-  History
-  The role of pharmacists
-  Some challenges
 -  Personalised medicine
 -  The informed patient
 -  The art of communication



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No future without reflecting the history



Seal of the Faculty of Medicine
University of Leipzig , ca 1415



St. Damian and St. Cosmas († ca 287)
patron saints of Pharmacy and Medicine



The martyrdom of Saints Cosmas and Damian by
Fra Angelico († 1455, Musée du Louvre, Paris)



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The challenge to speak about the future is not to re-invent the past

Statute of the Ospedale Maggiore della SS Annunziata di Savigliano 1762

Hospital pharmacists should be an integral part of all patient rounds to assist with therapeutic decision-making and advise on clinical pharmacy and patient safety issues

FIP 2008 Basel statement #30

„The pharmacist must accompany the physician in all rounds...and more he will make daily additional rounds to judge the pain of the most worsening patients and their immediate needs..“



* By courtesy of Prof. Giuseppe Ostino, Turin, Italy

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The challenge to speak about the future is not to re-invent the past

Agreement between the Ospedale Maggiore della SS Trinità di Fossano and Gino Stefano Bertolo, speciale (pharmacist) 1741

„Dovrà preparare li medicamenti prescritti... E portarli lui agli infermi mettendo sopra ogni bicchiere o carafina il biglietto in cui sia espresso il numero d'ogni rispettivo letto del malato o malata esortando caritatevolmente e con piacevolezza a prenderlo, se presente e fagli predere almeno nell'ora della Messa del Duomo....” *

„... he has to prepare the prescribed medicines... and bring them personally to the patients labelling every cup or decanter with the number of his or her bed and compassionately and gently inviting to take them either immediately or at least at time of the mass in the cathedral... “



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A definition of the role of pharmacists in the treatment of patients

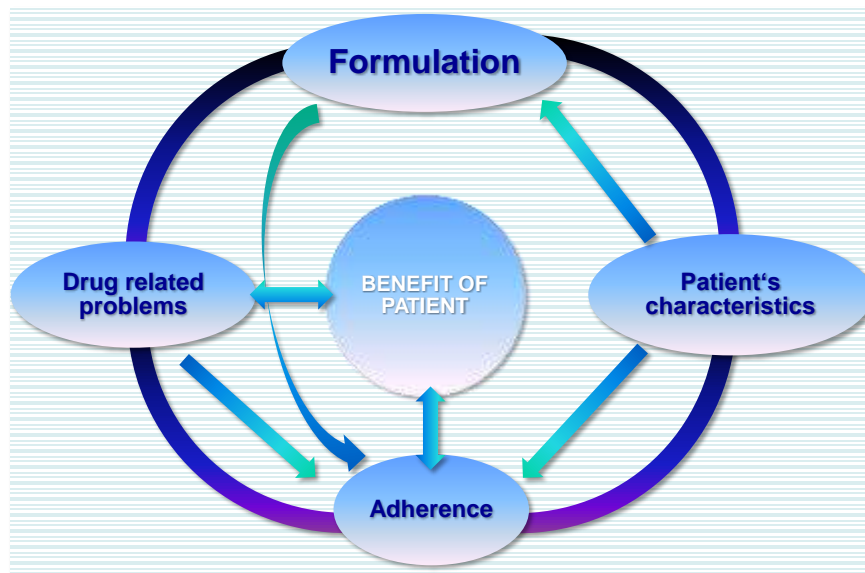
The pharmacist is the healthcare professional in the **care team** who seeks to ensure that pharmacologically active ingredients **achieve** the **best possible benefit** for the **individual patient**



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The pharmacist's to-do-list

- We have to provide the right medicine either by procurement or by production
- We have to seek the balance between expected effects and drug related problems

Pharmaceutical competencies

- We have to deal with individual patients
- We have to work in a team

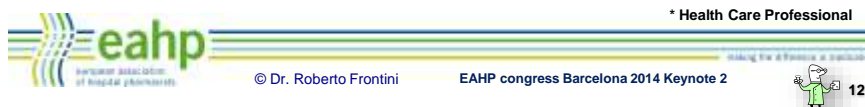
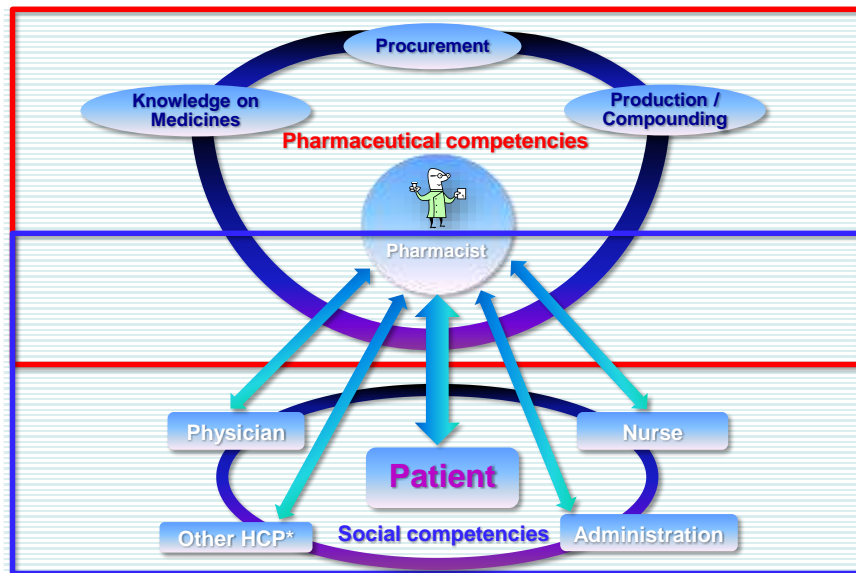
Social competencies

The team and the individual patient

Given clinicians' often-limited time, patient education may be delivered and reinforced by other members of the clinical care team in a collaborative care model*

Interventions are often designed to incorporate multiple components with the goal of providing synergistic effects and an additive if not multiplicative effect, but components must be personalised to the patient's situation. The intensity of resources and technology used should be scaled to meet an individual patient's needs

* Leah L. Zullig, PhD, MPH; Eric D. Peterson, MD, MPH; Hayden B. Bosworth, PhD. Ingredients of Successful Interventions to Improve Medication Adherence. JAMA. 2013;310(24):2611-2612



The challenges 2020



- **Medicines**
 - More complex
 - Targeted
 - **personalised**
 - More expensive
 - More effective ?
- **Dependency from industrial production**
 - Globalisation and supply chain
 - Small scale production for special patients groups

Pharmaceutical competencies



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The challenges 2020



- **Patient**
 - **Informed**
 - Different perception of harm
 - Interested in the outcome and not in the disease
 - More questioning rather than listening
- **More complex treatment pathways**
 - **Communication between teams**

Social competencies



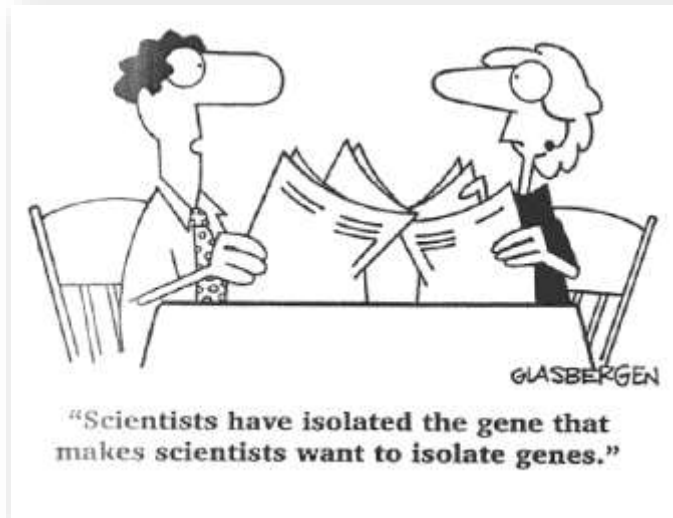
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personalised medicine



personalised medicine



*"We are on the leading edge of a true revolution in medicine, one that promises to transform the traditional 'one-size-fits-all' approach into a much more powerful strategy that considers each individual as unique and as having special characteristics that should guide an approach to staying healthy"**

*Francis Collins. The Language of Life: DNA and the Revolution in personalised Medicine. NY, USA: HarperCollins; 2010.



personalised medicine

*While genetic risk assessments can be useful to health planning in many contexts, they can also **obscure more effective approaches to common complex disorders** by eclipsing environmental and epigenetic factors that are actually more important than many genetic factors.**

*After the revolution? Ethical and social challenges in 'personalised genomic medicine'
Eric T Juengst,¹ Richard A Settersten, Jr,² Jennifer R Fishman,³ and Michelle L McGowan⁴
Per Med. 2012 June 1; 9(4): 429-439. doi: 10.2217/pme.12.37

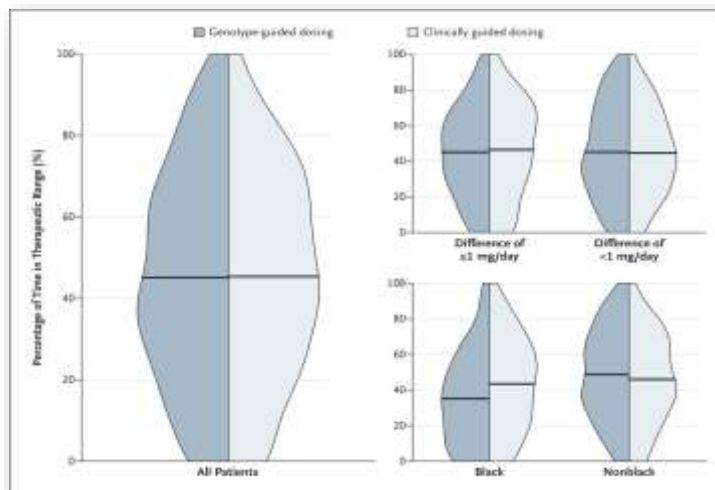


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Distribution of time in the therapeutic range of Warfarin*



*Kimmel, Stephen E.; French, Benjamin; Kasner, Scott E.; Johnson, Julie A.; Anderson, Jeffrey L.; Gage, Brian F.; et al. (2013): A Pharmacogenetic versus a Clinical Algorithm for Warfarin Dosing. In: N Engl J Med 2013;369:2283-2293.



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personalised medicine

Conclusions

Genotype-guided dosing of warfarin did not improve anticoagulation control during the first 4 weeks of therapy. There was, however, a significant interaction between dosing strategy and race ($P=0.003$). Among black patients, **the mean percentage of time in the therapeutic range was less in the genotype-guided group than in the clinically guided group.***

*Kimmel, Stephen E.; French, Benjamin; Kasner, Scott E.; Johnson, Julie A.; Anderson, Jeffrey L.; Gage, Brian F. et al. (2013): **A Pharmacogenetic versus a Clinical Algorithm for Warfarin Dosing.** In: N Engl J Med 2013;369:2283-2293.



personalised medicine

Genome sequencing is now sufficiently cost effective to be offered clinically...

Nevertheless, interpretation of individual genomic variation remains challenging and the importance of incidental findings is unclear

Our ability to generate data now far outstrips our ability to interpret it.

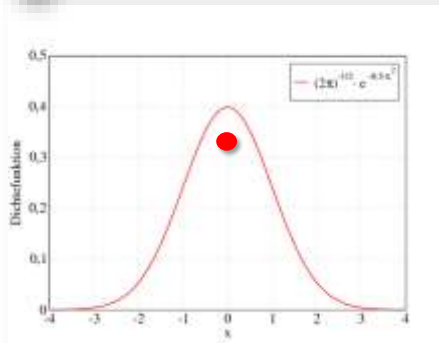
* Wright CF et al. **Policy challenges of clinical genome sequencing** BMJ 2013;347:f6845



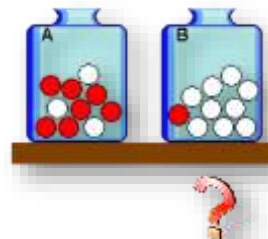
personalised medicine: Our job



Scientific perspective



Patient's perspective



Bayesian inference

$$P(A | R) = \frac{P(R | A) \cdot P(A)}{P(R)} = \frac{\frac{7}{10} \cdot \frac{1}{2}}{\frac{7}{10} \cdot \frac{1}{2} + \frac{3}{10} \cdot \frac{1}{2}} = \frac{7}{8}$$

http://de.wikipedia.org/wiki/Satz_von_Bayes downloaded 03/01/2014



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personalised medicine: our challenge



The challenge for the pharmacist in 2020 is **not to have sufficient knowledge** on the probabilistic effect of a genotype but **to make a Bayesian (subjective) estimation of the outcome** based on patient's a priori situation

Our knowledge on interactions between medicines is a similar situation



We have to translate **precise scientific statistics** that patients have difficulty in navigating, into **information they can comprehend**, respecting that the forecast outcome may, by nature, be imprecise



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The informed patient

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Communication

Send a message with a picture from Barcelona to New York and get an answer back*

- 300 communication not possible as North America had not been discovered by modern Europeans at this time.
- 1600 4 months
- 1810 1 month
- 1935 2 weeks
- 1950 1 day
- 1960 1 minute
- 2010 immediately
- 2020 ?



* Personally estimated times, not scientific evidence!

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Patients and the internet*

	2007			Change from 2005 to 2007		
	Find health information to help decide whether to consult a health professional	Find health information prior to an appointment	Find information after an appointment with health professionals	Find health information to help decide whether to consult a health professional	Find health information prior to an appointment	Find information after an appointment with health professionals
	Frequency Mean % (CI) ^a	Frequency Mean % (CI) ^a	Frequency Mean % (CI) ^a	Mean % (CI) ^a	Mean % (CI) ^a	Mean % (CI) ^a
Denmark	46.1 (43.2-49.0)	34.1 (31.3-36.9)	35.7 (32.8-38.5)	13.8 (9.7-17.8)	7.5 (3.6-11.4)	5.3 (1.3-9.3)
Germany	41.3 (38.5-44.1)	26.1 (23.5-28.7)	35.7 (32.9-38.5)	9.5 (17.2-3.7)	3.7 (0.0-7.3)	8.2 (4.3-12.2)
Greece	23.6 (21.2-26.0)	21.0 (18.6-23.4)	20.8 (18.4-23.2)	13.0 (9.6-6.5)	9.6 (6.5-12.7)	9.1 (6.1-12.2)
Latvia	30.3 (27.7-32.9)	22.8 (20.4-25.2)	25.3 (22.8-27.8)	9.1 (5.7-12.5)	6.8 (3.6-10.1)	10.2 (7.0-13.5)
Norway	39.0 (36.2-41.7)	27.8 (25.2-30.4)	35.8 (33.0-38.6)	5.3 (1.4-9.3)	3.2 (-0.5-7.0)	4.9 (0.9-8.9)
Poland	38.3 (35.6-41.0)	31.5 (28.9-34.1)	33.5 (30.8-36.2)	7.0 (3.3-10.8)	5.1 (1.5-8.7)	5.9 (2.2-9.6)
Portugal	18.9 (16.6-21.2)	15.6 (13.5-17.7)	17.7 (15.4-20.0)	5.8 (3.0-8.5)	3.5 (0.9-6.1)	5.3 (2.6-8.0)
Total	33.9 (32.9-34.9)	25.6 (24.6-26.5)	29.2 (28.2-30.2)	9.2 (7.8-10.5)	5.6 (4.3-6.9)	7.0 (5.7-8.4)

^a 95% confidence intervals (CI); differences are typed in italic when significantly different from 0 at the 5% level

* Santana S, Lausen B, Bujnowska-Fedak M, Chronaki CE, Prokosch HU, Wynn R. Informed citizen and empowered citizen in health: results from an European survey. BMC Fam Pract. 2011 Apr 16;12:20. doi: 10.1186/1471-2296-12-20



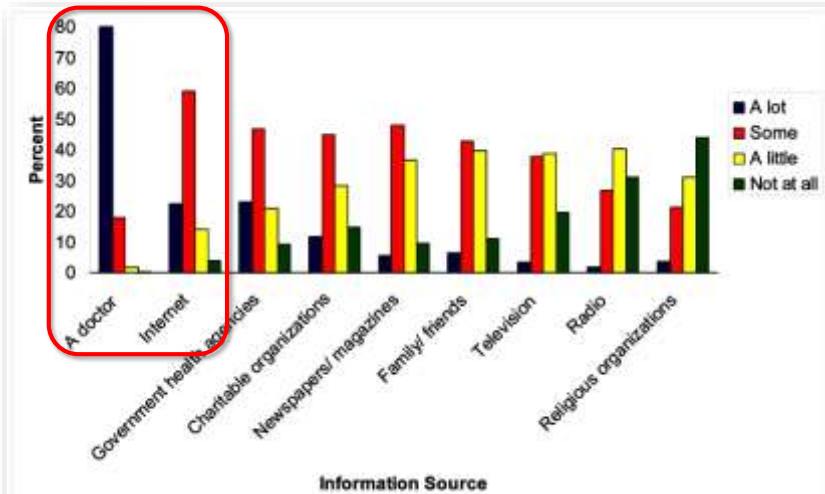
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Patients and Internet



Marrie RA, Salter AR, Tyrr T, Fox RJ, Cutler GR. Preferred sources of health information in persons with multiple sclerosis: degree of trust and information sought. J Med Internet Res. 2013 Mar 17;15(4):e67. doi: 10.2196/jmir.2466



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Patients and the internet

Use of the Internet for information related to specific decisions among **adults 40 y and older** was generally low (**28%**) ... Internet use was **higher at younger ages**, rising from 14% among those aged 70 y and older to 38% for those aged 40 to 49 y*

respondents with **mental disorders** were more likely to use patient information leaflets (OR 1.47, 95% CI 1.06-1.98) and the Internet (OR 1.64, 95% CI 1.02-2.64) as sources of medicines information than respondents without mental disorders**

* Couper MP, Singer E, Levin CA, Fowler FJ Jr, Fagerlin A, Zikmund-Fisher BJ. **Use of the Internet and ratings of information sources for medical decisions: results from the DECISIONS survey.** Med Decis Making. 2010 Sep-Oct;30(5 Suppl):106S-114S. doi: 10.1177/0272989X10377661

** Pohjanoksa-Mäntylä M, Bell JS, Helakorpi S, Närhi U, Pelkonen A, Airaksinen MS. **Is the Internet replacing health professionals? A population survey on sources of medicines information among people with mental disorders.** Soc Psychiatry Psychiatr Epidemiol. 2011 May;46(5):373-9. doi: 10.1007/s00127-010-0201-7. Epub 2010 Mar 12.



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Celebrities and Internet*



Suzanne Somers



Bioidentical hormones, which have the same molecular structure as the hormones produced in the body, **have actually been shown to have a protective effect against some diseases**, including those whose risk is increased by non-bioidentical hormones.

In a study, women who used non-bioidentical estrogen and progestin had a 69% greater risk of developing **invasive breast cancer** over an eight-year period in comparison with non-HRT users. **Those who used bioidentical estrogen and progesterone experienced a similar risk as non-HRT users.**⁴

⁴ Breast Cancer Res Treat. 2008 Jan;107(1):103-11

* Steven J Hoffman, Charlie Tan. **Following celebrities' medical advice: meta-narrative analysis** BMJ 2013;347:f7151

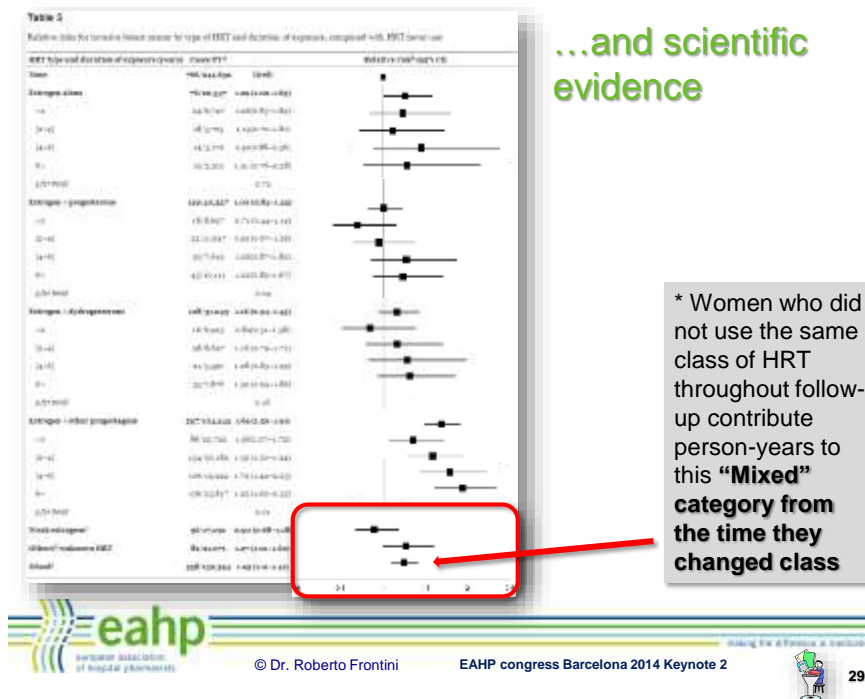


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Efficacy against Effectiveness*

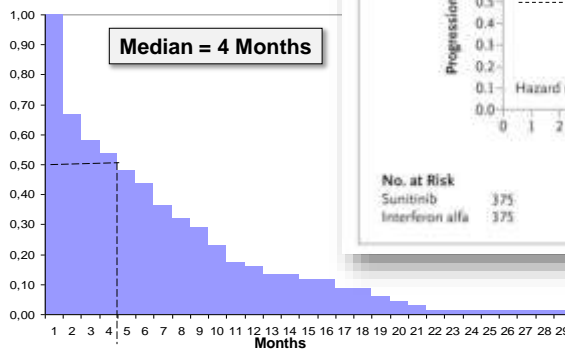
Older adults are often excluded from clinical trials. The benefit of preventive interventions tested in younger trial populations may be reduced when applied to older adults in the clinical setting if they are less likely to survive long enough to experience those outcomes targeted by the intervention.

CONCLUSIONS and RELEVANCE: Differences in baseline risk and life expectancy between trial subjects and real-world populations of older adults with CKD (Chronic Kidney Disease) **may reduce the marginal benefit to individual patients of interventions to prevent ESRD** (End-Stage Renal Disease).

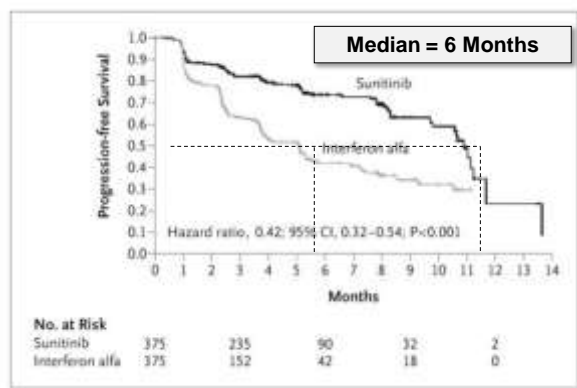
*Ann M. O'Hare et al. **Interpreting Treatment Effects From Clinical Trials in the Context of Real-World Risk Information.** *JAMA Intern Med.* Published online January 13, 2014. doi:10.1001/jamainternmed.2013.13328

Efficacy against Effectiveness

SUNITINIB
in kidney carcinoma
Register AIFA
(Agenzia Italiana del Farmaco)



Study: Motzer RJ et al.: N Engl J Med. 2007 356:115-24.



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Evidence Based Medicine

Today EBM is a loaded gun at clinicians' heads. "You better do as the evidence says," it hisses, leaving **no room for discretion or judgment**. EBM is now the problem, fueling overdiagnosis and overtreatment.

How many people care that the research pond is polluted, with fraud, sham diagnosis, **short term data**, poor regulation, **surrogate ends**, questionnaires that can't be validated, and **statistically significant but clinically irrelevant outcomes**?



*Des Spence. Evidence based medicine is broken. BMJ 2014;348:g22

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Information society: the challenges



Patient's perspective

The question marks



- Trustable source
- Understandable language
- Updated information
- Comprehensive information
- Proper use of apps

Pharmacist's perspective



The challenges



- Educating patients in the use of internet sources and apps
- The patient knows more than you!
- Biased information
- Data not relevant for the individual patient



Proper communication

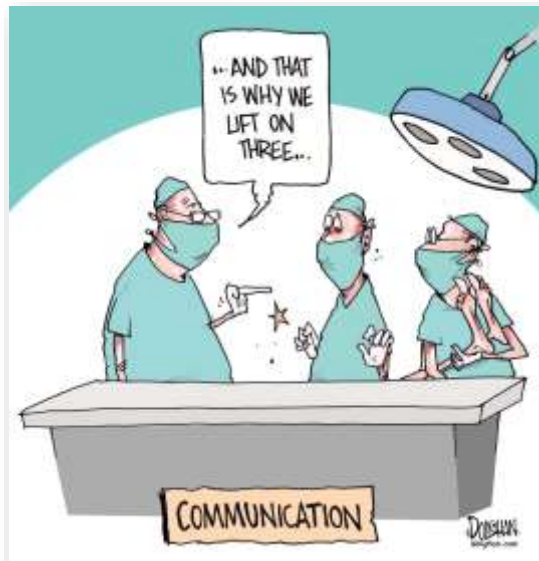


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Portals and technology for communication: The challenges

Table. Technological Solutions to Deliver Patient Education and Enable Self-monitoring		
Technology Categories	Specific Technological Solutions	Example Applications
Mobile health technology	Text messaging Smartphone applications Interactive voice response Electronic health records	Provide tailored educational information and feedback to multiple patients simultaneously Deliver time-sensitive, patient-specific medication reminders automatically
Electronic monitors	Biometric monitors (eg, blood pressure, glucose) Physical activity monitors Digital scales	Collect patient data (eg, blood pressure) between clinic visits to inform better treatment decision making Inform patient self-monitoring
Pill-monitoring technology	Electronic pill caps Smart blister packaging Digital pills	Measure adherence behaviors objectively Understand patients' medication taking patterns to advise a tailored intervention
Online resources and social media	Web-based peer support Condition-specific online support communities Online self-monitoring and reporting	Enable patient self-monitoring Develop patients' social support system

Leah L. Zullig, PhD, MPH; Eric D. Peterson, MD, MPH; Hayden B. Bosworth, PhD **Ingredients of Successful Interventions to Improve Medication Adherence.** JAMA. 2013;310(24):2611-2612. doi:10.1001/jama.2013.282818

 The JAMA Network
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Or better?

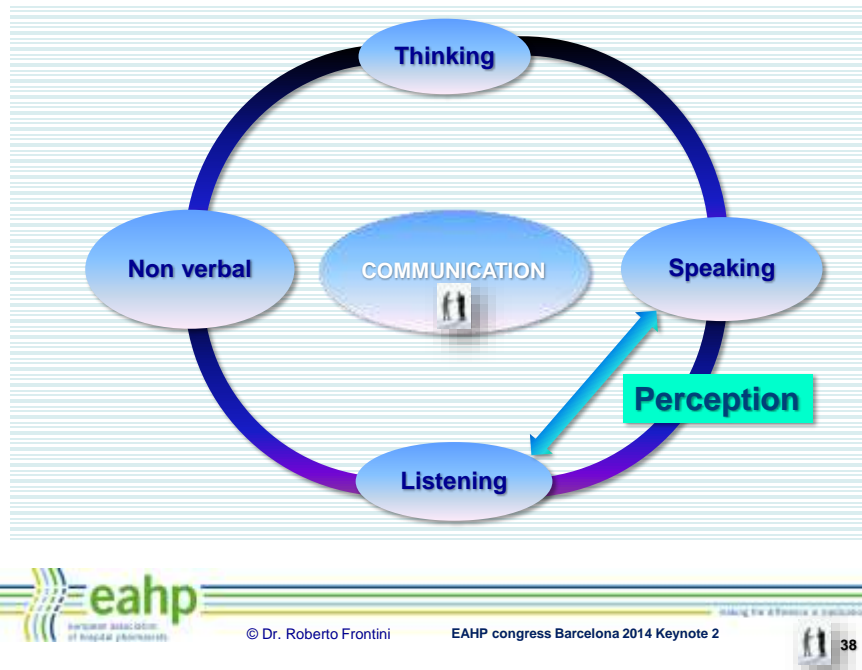


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Non verbal communication*

Maintaining adequate facial expression (FE), using affirmative gestures (AG), and limiting both unpurposive movements (UM) and hand gestures (HG) had a **significant positive effect on perception of interview quality** during this OSCE (Objective Structured Clinical Examination).

Non-verbal communication skills played a role in perception of overall interview quality as well as perception of culturally competent communication.

* Collins LG, Schrimmer A, Diamond J, Burke J. Evaluating verbal and non-verbal communication skills, in an ethnogeriatric OSCE. Patient Educ Couns. 2011 May;83(2):158-62. doi: 10.1016/j.pec.2010.05.012

"Tell me so I know you understand"^{44*}

Patient comprehension of dosage instructions is an essential condition for adherence to treatment regimens, but previous studies show that **pharmacists do not generally check understanding**.

Various strategies for verifying patient understanding were identified in the data, including eliciting a demonstration of understanding, using specific questions to verify understanding, using response solicitations and monitoring **patients' verbal and non-verbal responses**.

CONCLUSION:

These strategies for verification of patient understanding appear to be effective tools which enable pharmacists to identify misunderstandings or initiate clarification sequences

* Watermeyer J, Penn C. "Tell me so I know you understand": pharmacists' verification of patients' comprehension of antiretroviral dosage instructions in a cross-cultural context. Patient Educ Couns. 2009 May;75(2):205-13. doi: 10.1016/j.pec.2008.09.009. Epub 2008 Dec 13.



The way of communication and perception*

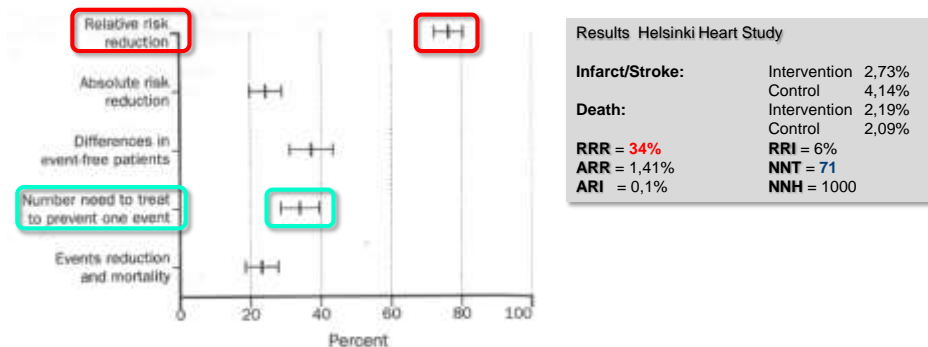
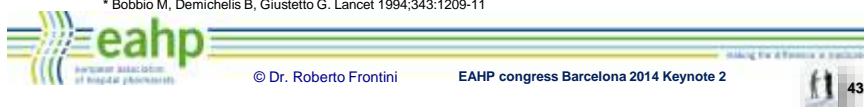


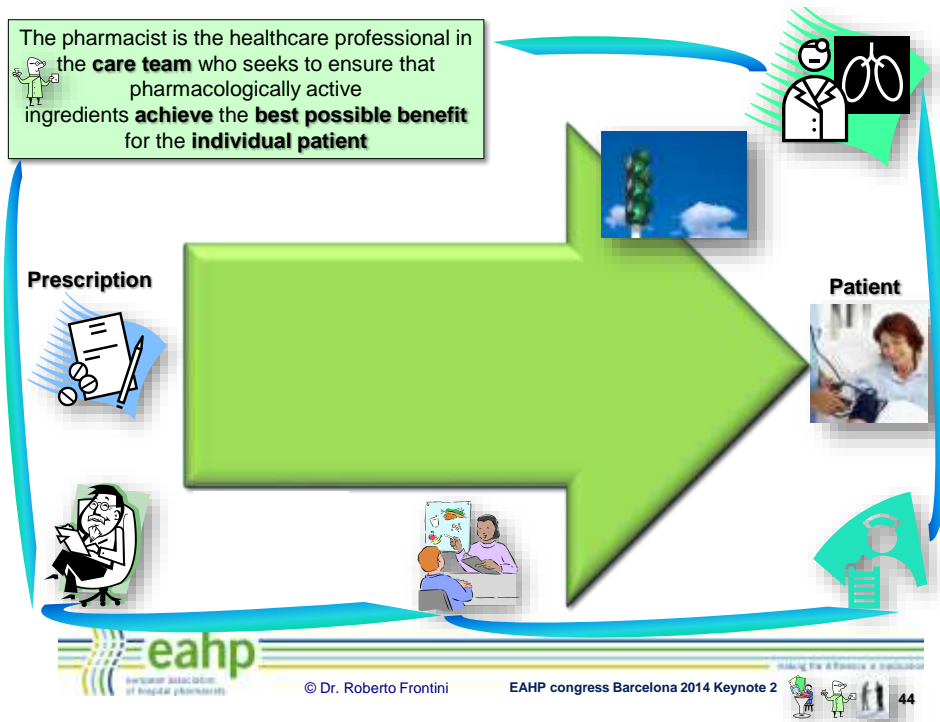
Figure: Physicians' agreement to prescribe the drug when data are reported in different terms
Means and 95 percent confidence intervals.

Results Helsinki Heart Study

Infarct/Stroke:	Intervention	2,73%
	Control	4,14%
Death:	Intervention	2,19%
	Control	2,09%
RRR = 34%	RRI = 6%	
ARR = 1,41%	NNT = 71	
ARI = 0,1%	NNH = 1000	

* Bobbio M, Demichelis B, Giustetto G. Lancet 1994;343:1209-11





"Piano-Illusion" by Shigeo Fukuda (*1932-†2009)



Take home messages



- The role of the hospital pharmacist has not intrinsically changed - but the environment has
- The challenge is less about having the knowledge, and more about making the knowledge understandable to patients.
- We have to shape the medication process from patient's perspective
- Only collaborative care can overcome the barriers hampering the effectiveness of modern medicines

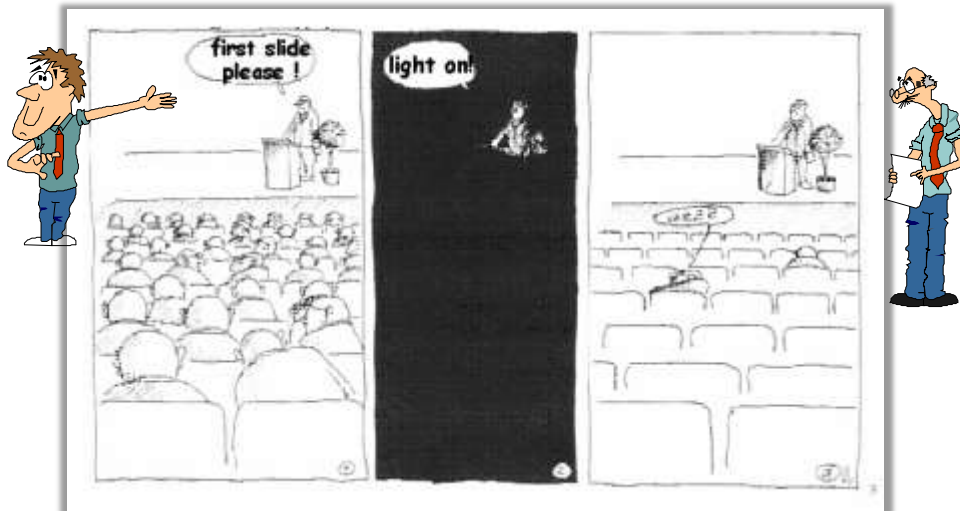


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Thank you very much for your attention!



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