# Early awareness and alert (EAA) systems

# EuroScan International Network: History and Impact

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# Early awareness and alert (EAA) systems

- EAA systems are also known as early warning systems or horizon scanning systems
- Aim to:
  - identify, filter and prioritise new and emerging health technologies;
  - assess or predict the impact of emerging technologies on health, costs, society and the healthcare system; and
  - inform decision makers, research planners, health care professionals, patients and patient organisations.

# Adoption, diffusion and obsolescence
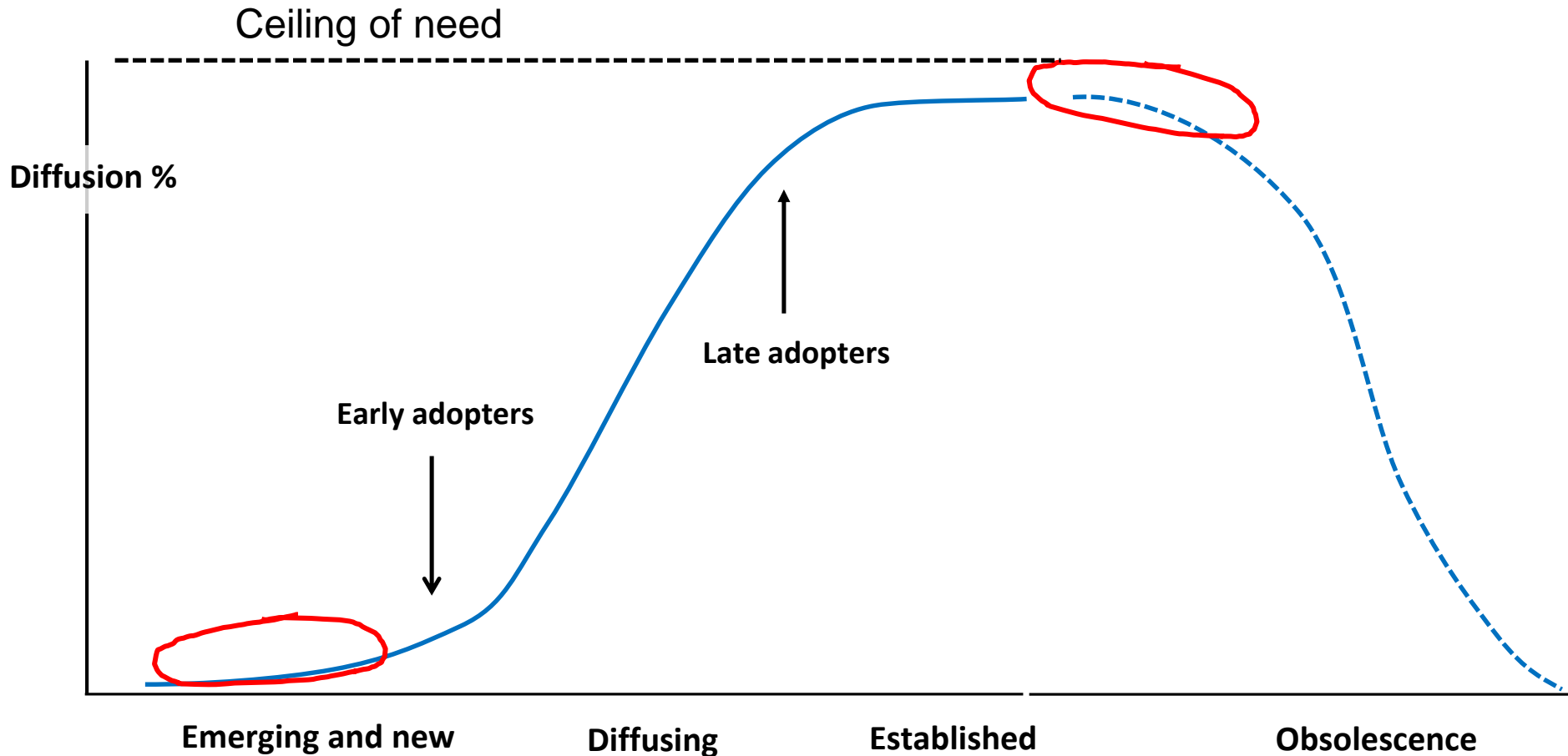
# Benefits of EAA systems

Being systematic:

- Ensuring a methodical approach to identifying important new and emerging health technologies

Being prepared:

- Ensuring that technologies are considered for evaluation at the right time
  - protecting patients from ineffective and potentially unsafe health technologies
  - supporting the development and uptake of innovative, cost effective health technologies
- Alert policy makers and health services to technologies that could
  - change current options or decisions,
  - require revision of current guidelines, and/or
  - require further planning or commissioning of activities e.g. research
- Planning for infrastructure changes – staff, equipment etc.

# History
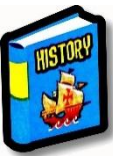
- 1980s: Banta and Gelijns recommended systematic approach to the identification and early assessment of new health technologies

- Early 1990s: discussed the feasibility and benefits of an international horizon scanning network

- 1993: unsuccessful proposal to establish European system submitted to EU (EUR-ASSESS)

- 1995 Danish Hospital Institute meeting: 'International collaboration concerning monitoring of emerging medical technologies' (7 countries)

- 1997 European workshop: 'Scanning the horizon for emerging health technologies' (12 countries)

  - Strongly recommended collaboration and cooperation:
  - Activities focused on sharing information, identification of relevant technologies, defining terminology, developing methods for early assessment
  - Early assessment should be perceived as an iterative evaluation process
  - Different perspectives and preferences (including users) should be identified
  - Identified different levels of collaboration, up to a single international centre with no national centres

# Establishment of EuroScan

- Feb 1998: initial meeting of working group (7 countries)
  - ➢ Aim: to enhance the exchange of information on new and emerging health technologies among members
- Oct 1999: EuroScan International Network formally established
- 2016-17: Establishment of the EuroScan International Network Association – a legal entity
  - ➢ Scientific-focused network and association open for members of public agencies and academic areas, with working groups open to for non-members

# EuroScan inauguration, 1999



Andrew Stevens, NHSC, UK

Per Carlsson, SBU, Sweden

Torben Jørgensen, DIHTA, Denmark

Gebriel ten Velden, Health Council, the Netherlands

Julian Shilling, SFOSS, Switzerland

Claire Packer, NHSC, UK (Secretary)

José Asua, Basque Office for HTA, Spain

Jill Sanders, CCOHTA, Canada

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# 1999 action plan

| | Task | 2006 status |
|---|---|---|
| | Task | 2006 status |
| 1 | Develop a common terminology, classification and understanding | Complete |
| 2 | Identify, evaluate, and monitor the quality of sources of information concerning new and changing health technology | Operational and ongoing |
| 3 | Identify, and if appropriate develop, methods for early assessment of new and changing health technology | Operational and ongoing |
| 4 | Pilot the exchange of information | Complete |
| 5 | Establish a common database | Complete |
| 6 | Publish the results of EuroScan's activities | Ongoing |
| 7 | Identify areas for further research | Current |
| 8 | Design and implement a permanent system | Ongoing |

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# EuroScan Goals (2011)

- Establish a system to **share skills and experience** in early awareness and alert activities.

- Strengthen activities for the **development of methodological** approaches to the identification, description and assessment of emerging technologies.

- Improve the **exchange of information** about new and emerging health technologies and their potential impact on health services and existing health technologies.

- **Increase the impact** of EuroScan International Network's output.

- **Identify relevant not-for-profit public partners** to share the results of work with partners/members of the EuroScan International Network collaboration.

- **Advise not-for-profit organisations** within public administrations who wish to establish of early awareness and alert activities.

# EuroScan key achievements: shared understanding



www.euroscan.org/about-us/glossary/
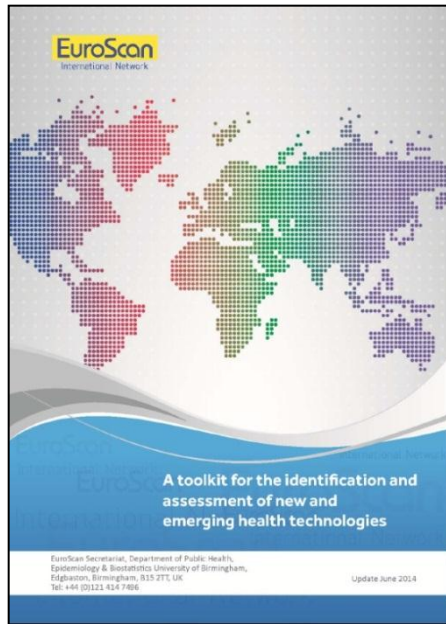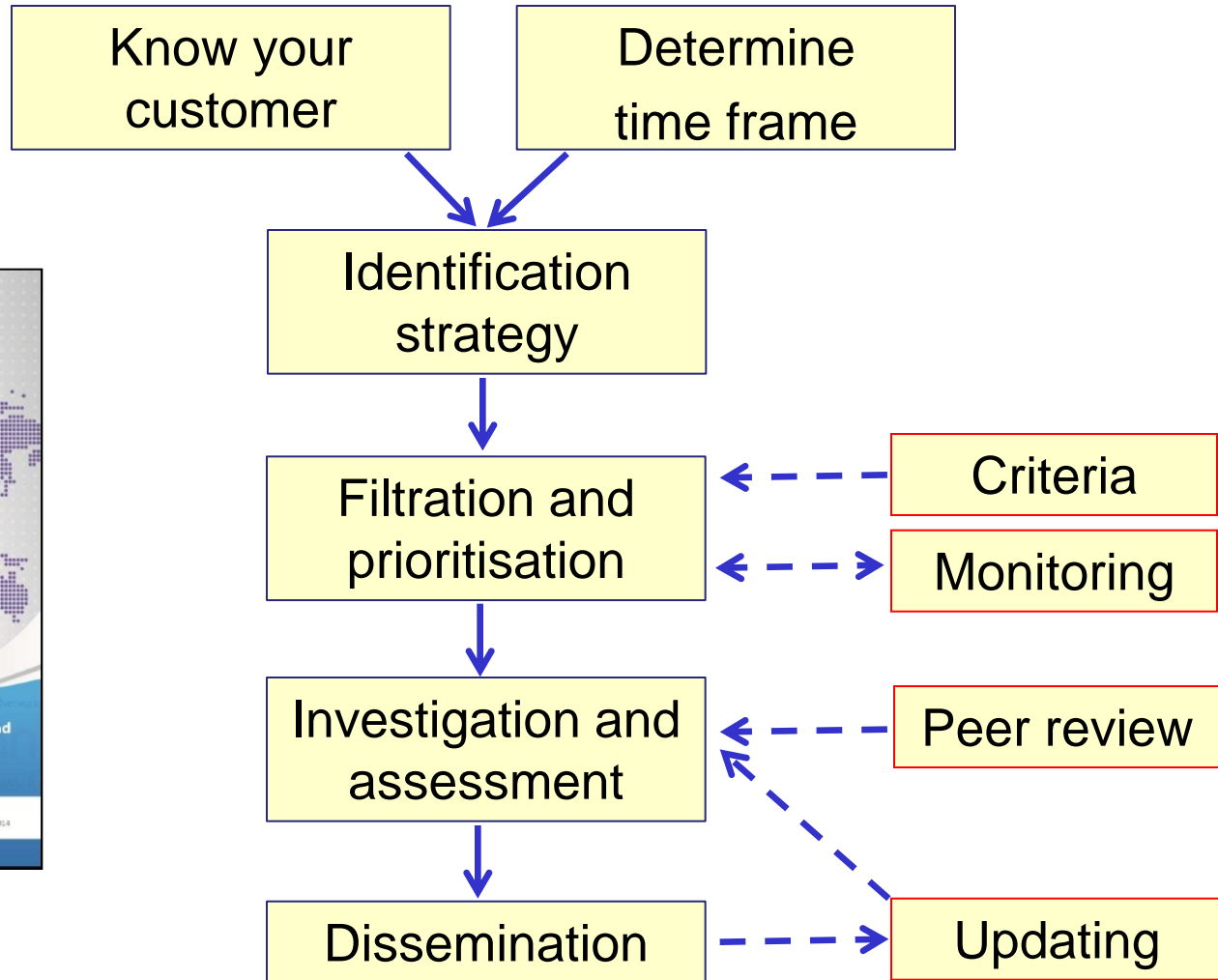
# Methods toolkit

- Collaborative document covering all approaches used by members
- Sets out stages found in EAA systems to:
  - find
  - select, and
  - evaluate ... important emerging health technologies
- Incorporates a checklist of key questions
- Provides valuable information to those interested in establishing, or improving an existing, early awareness and alert system



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A toolkit for the identification and assessment of new and emerging health technologies

EuroScan Secretariat, Department of Public Health, Epidemiology & Biostatistics University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK
Tel: +44 (0)121 414 7496

Update June 2014

https://www.euroscan.org/methods/methods-toolkit/

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# EuroScan website www.euroscan.org

# Database of new & emerging technologies

- A web-based database of information on key health technologies
- Contains information on almost 3,000 technologies - 50% are pharmaceuticals
- Access to the EuroScan data:

| | Basic technology details (technology name, type of technology, patient indications, source agency) | Full record – if record is publicly available | Full record – if record is not publicly available | Ability to add technologies to database |
|---|---|---|---|---|
| Member | ✓ | ✓ | ✓ | ✓ |
| Non- member | ✓ | ✓ | x | x |

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# EuroScan Newsletter

- [www.euroscan.org/news/newsletters](www.euroscan.org/news/newsletters)
- Bi-annual
- Contributions from members on:
  - EAA systems
  - EAA activities and methods
  - Interesting emerging health technologies
- News from collaborating organisations
- Related news stories

# Workshops & presentations

- HTAi pre-conference workshops

  - 2010: Maximising the value of HTA: The contribution of EAA systems

  - 2011: Establishing a sustainable EAA system

  - 2012: Identification sources and processes

  - 2013: Filtration and prioritisation of emerging health technologies

  - 2014: Evaluation of EAA systems

  - 2015: The EuroScan methods toolkit (2014)

  - 2016: Managing emerging health technologies: An introduction to early awareness and alert systems

- Training, workshops and presentations

# Collaboration with other organisations

EuroScan is happy to collaborate in order to:

- Disseminate information and increase understanding of early awareness and alert systems and activities
- Share experiences, methods and outputs; and avoid duplication
- Promote the introduction and diffusion of safe, effective and cost effective health technologies in health systems around the world

EuroScan has Memorandum of Understandings with:

- International Network of Agencies for Health Technology Assessment (INAHTA)
- World Health Organisation (WHO) Dept. of Essential Health Technologies
- Health Technology Assessment International (HTAi)
- HTAsiaLink www.htasialink.org
- RedETSA www.redetsa.org

EuroScan has links to:

- EUnetHTA www.eunethta.eu

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# EAA system impact

# EAA evaluation – key relevant elements from HTA evaluation models

- Buxton, Hanney and colleagues – 'Payback model', impact of health research
  - Knowledge development
  - Benefits to future research – better targeting of future research
  - Political and administrative benefits – improved information base
- Wanke (2006) and Lafortune (2008) – generic evaluation framework for HTA agencies
  - Goal attainment
  - Production of outputs
  - Adaptation to the environment and responsiveness to change
  - Culture and values including leadership and communication
  - Political credibility
- Structure - process - output - outcome

# Evaluation dimensions (1)

| Dimension | Examples |
|---|---|
| Structure | Funding<br>Governance – independence,<br>Staffing – skills<br>Facilities – information system, access to sources |
| Process – generic | Responsiveness to funder requests<br>Financial management<br>Staff management – objectives, review<br>Project management – tools |
| Process – specific to EAA | Timely identification,<br>Use of agreed identification criteria<br>Use of agreed filtration/prioritisation criteria<br>Timely updating of information |
| Process – system accuracy | Accuracy of identification and reporting – sensitivity & specificity<br>Accuracy of prediction  - technologies, timeframes, diffusion and impact |

# Evaluation dimensions (2)

| Dimension | Examples |
|---|---|
| Outputs - direct | Number and type of output<br>Relevance to users<br>Quality – readability, based on evidence, timeliness, independence<br>Accessible<br>Coverage across all relevant patient groups |
| Outputs - indirect | Workshops & training<br>Visitors and other enquiries<br>Student placements |
| Outcomes | Awareness of agency<br>Satisfaction with agency or products<br>Agency credibility and respect<br>Utility of information – change in awareness, change in knowledge, information considered by decision makers, information changed decision taken |

# Horizon Scanning Research & Intelligence Centre – 5 years from 2012 to 2017
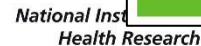
Claire Packer, Derek Ward, Sue Simpson, Andrew Stevens and the HSRIC team

# Identification: 2012/3 to 2016/7

The HSRIC team identified almost 6,000 new and emerging technologies and new indication for currently available products since 2012

| Technology type | TOTAL |
|---|---|
| **Pharmaceuticals and cell therapies** | 4,132 |
| **Devices and biotechnology** | 716 |
| **Diagnostics and imaging** | 750 |
| **Other technology types** <br> e.g. surgical and non-surgical procedures | 212 |
| **TOTAL** | 5,810 |

# Identified technologies by ICD

| Chapter | Codes | Title | Number | % |
|---------|-------|-------|--------|---|
| I | A00–B99 | Certain infectious and parasitic diseases | 209 | 3.60 |
| II | C00–D48 | Neoplasms | 1915 | 32.96 |
| III | D50–D89 | Blood and blood-forming organs and certain disorders involving the immune mechanism | 133 | 2.29 |
| IV | E00–E90 | Endocrine, nutritional and metabolic diseases | 364 | 6.27 |
| V | F00–F99 | Mental and behavioural disorders | 201 | 3.46 |
| VI | G00–G99 | Nervous system | 536 | 9.23 |
| VII | H00–H59 | Eye and adnexa | 184 | 3.17 |
| VIII | H60–H95 | Ear and mastoid process | 30 | 0.52 |
| IX | I00–I99 | Circulatory system | 334 | 5.75 |
| X | J00–J99 | Respiratory system | 304 | 5.23 |
| XI | K00–K93 | Digestive system | 281 | 4.84 |
| XII | L00–L99 | Skin and subcutaneous tissue | 220 | 3.79 |
| XIII | M00–M99 | Musculoskeletal system and connective tissue | 361 | 6.21 |
| XIV | N00–N99 | Genitourinary system | 124 | 2.13 |
| XV | O00–O99 | Pregnancy, childbirth and the puerperium | 22 | 0.38 |
| XVI | P00–P96 | Conditions originating in the perinatal period | 19 | 0.33 |
| XVII | Q00–Q99 | Congenital malformations, deformations and chromosomal abnormalities | 54 | 0.93 |
| XVIII | R00–R99 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified | 116 | 2.00 |
| XIX, XX, XXI, XXII | S00–Z99 | Injury, poisoning and external causes other miscellaneous factors and codes | 203 | 3.49 |
|  |  | Unclassified | 200 | 3.44 |
|  |  | Total | 5,810 | 100.00 |

# Technology outputs: 2012/3 to 2016/7

25,
~4-5 p.a.

197,
~40p.a.

611,
>100 p.a.

1,068
~200 p.a.
restricted



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# Accuracy of identification and filtration

| | Technologies likely to have a significant impact on patients, services or finance | | |
|---|---|---|---|
| | **Yes** | **No** | |
| **Identified and filtered correctly** | True positives | False positives | All topics identified and filtered by EAA system |
| **Not identified and/or not filtered correctly** | False negatives | True negatives | All topics not identified or eliminated in filtration |
| | New technologies with signification impact | New technologies without signification impact | **Every new health technology** |

Simpson S, Hyde C, Cook A, Packer C, Stevens A. Assessing the accuracy of forecasting – applying standard diagnostic assessment tools to a health technology early warning system. IJTAHC 2004;20(3): 381-384.

Packer C, Fung M, Stevens A. Analyzing 10 years of early awareness and alert activity in the United Kingdom. IJTAHC 2012;28(3):308–314. doi:10.1017/S026646231200030X

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# Analysing 10 years of HSC activity - results

- **Results:**

  - We estimate that overall HSC identification, filtration and reporting had a <u>positive predictive value</u> of 0.39 (95% CI, 0.36 to 0.43) and a <u>false positive rate</u> of 60%. Using NICE appraisals and EuroScan's database as proxies for pharmaceuticals of significance, we estimate the HSC <u>sensitivity</u> over the 10-year period at 0.92 (95% CI, 0.89 to 0.95) and 0.89 (95% CI, 0.82 to 0.96) respectively.

- **Conclusion:**

  - Our results suggest that the HSC has performed well in terms of sensitivity over the past decade, but that the false positive rate of 60% may indicate that the filtration criteria for pharmaceuticals could be tightened for increased efficiency.

  - Future evaluations of EAA systems should include an element of external review and explore the level of accuracy acceptable to funders and customers of such systems.

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# Burden of disease, research funding and innovation in the UK
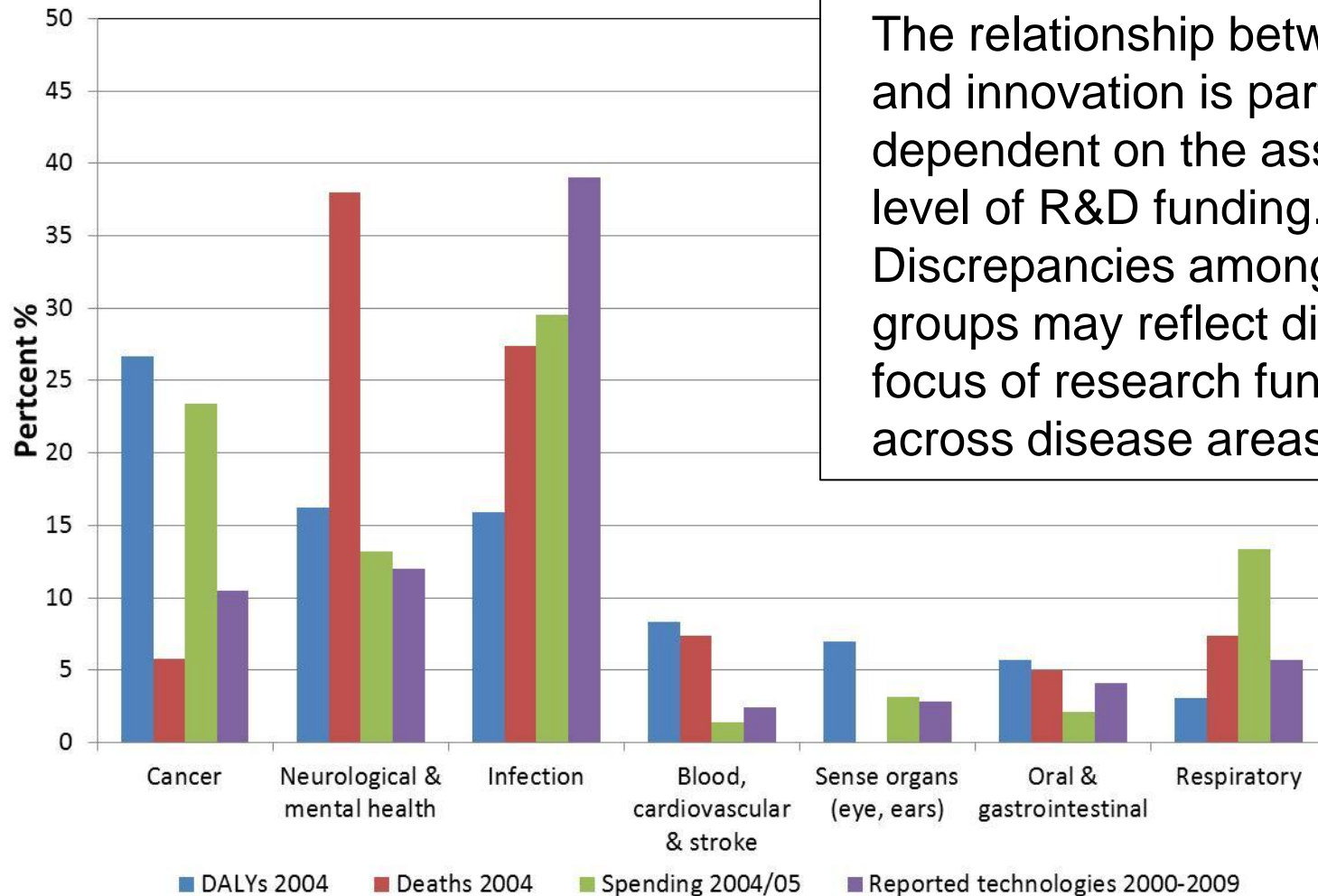


❖ ***Conclusions:***

The relationship between BoD and innovation is partly dependent on the associated level of R&D funding. Discrepancies among key groups may reflect differential focus of research funding across disease areas.

Ward DJ, Martino OI, Packer C, Simpson S, Stevens A. Burden of disease, research funding and innovation in the UK: do new health technologies reflected by research inputs and need? Journal of Health Services Research & Policy 2013:18(Suppl. 1):7-13. DOI: 10.1177/1355819613476015

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# Evaluation: notice period to NICE (drugs)

| Year (number of topics audited) | New products: 20 month target | New indications: 15 month target | TOTAL |
|---|---|---|---|
| 2016/17 (158) | 25.3 months | 17.1 months | 78% within target |
| 2015/16 (131) | 23.7 | 19.2 | 71% within target |
| 2014/15 (97) | 22.6 | 14.0 | 67% within target |
| 2013/14 (100) | 26.1 | 16.0 | 70% within target |
| 2012/13 (94) | 22.4 | 16.9 | 71% within target |

# Evaluation: HSRIC website visitors and downloads

| | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 |
|---|---|---|---|---|---|
| **Sessions - visits** | 27,795 | 36,385 | 39,624 | 38,457 | 64,868 |
| **Unique users** | 20,723 | 28,739 | 29,296 | 28,987 | 50,106 |
| **Downloads (total)** | 8,593 | 7,228 | 9,378 | - | - |
| **Downloads (users self-reporting from England)** | - | 3,150 | 5,096 | 6,161 | 7,627 |

\* Due to changes in software and analytic tools over time, we cannot directly compare between some years for some of the numbers presented, in particular the numbers of downloaded reports in 2015/16 are estimated from part-year figures.

# Reported use of LBI-HTA Horizon Scanning reports (2009-2012)
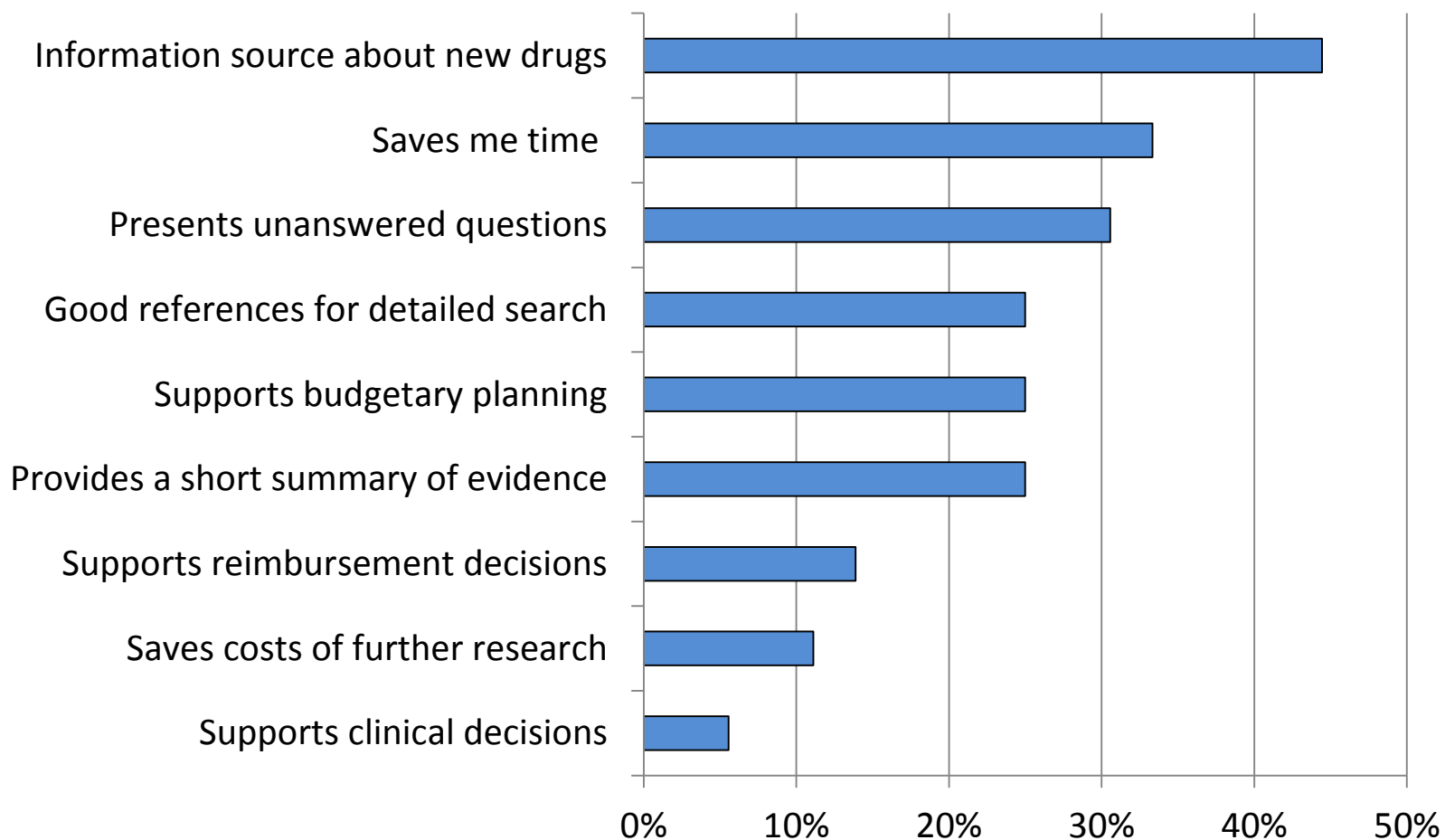
# Sildenafil: DDDs per 1,000 population per quarter;



Packer C Simpson S, Stevens A. IJTAHC 2006; 22(4): 419-428.
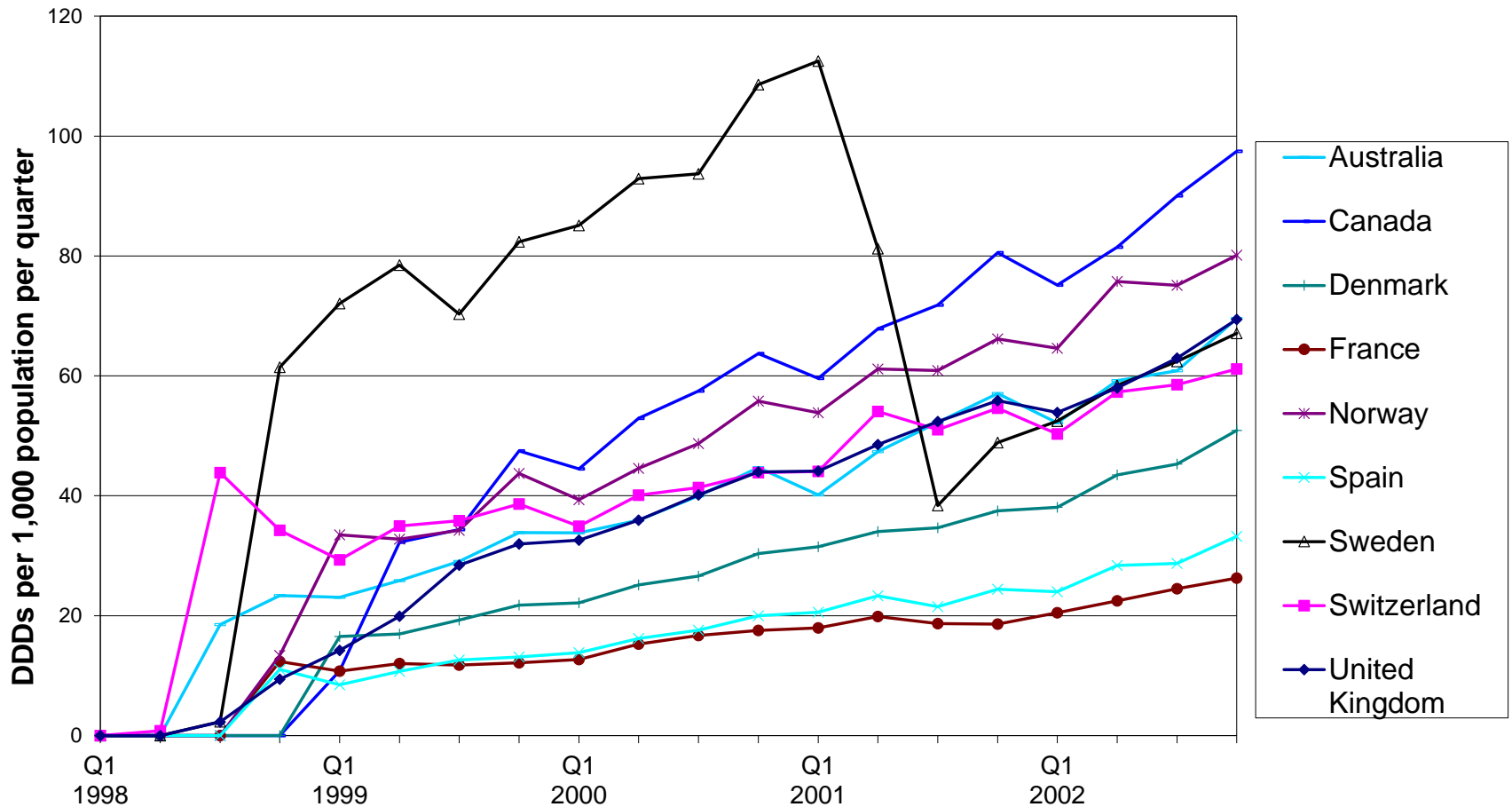
# Challenge: How to measure end-impact of EAA systems?

- Patients
  - Access to new, effective interventions – variability, time frames
  - Reduced uncertainty and improved risk-benefit ratio
- Health services
  - Timely decision making and policy development
  - Timely identification and access to finance
  - Development of appropriate services and training
  - Additional local research and modelling
- Developers and manufacturers
  - Supporting innovation
  - Supporting applicable research and data collection
  - Identifying the less economically sensible at an early stage

# ANY QUESTIONS?

# THANK YOU