**Supplementary Table 2** Description of Disinvestment Initiatives on the basis of the evidence review

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID (Ψ) | Year | Country | Financing & implementing organization | Scope | Name of the Disinvestment Initiative | Type of initiative and aims | Methodologies used for NLVT identification | Number(SRs cites)Ω |
| 1 | 1976 | USA | Blue Cross and Blue Shield’s Medical Necessity Project |  |  | Aim: to reassess and reinvest medical procedures |  | 1 (1) |
| 2 | 1984 | USA | Agency for Healthcare Research and Quality - U.S. Preventive Services Task Force. | National | US Preventive Services Task Force grade D recommendations |  |  | 1 (27) |
| 3 | 1989 | The Nether-lands | Dutch Health Insurance Council | National | Dutch Investigative MedicineProgram | Research Project | A list of 126 existing technologies of doubtful efficacy. Priority−setting was based on cost− effectiveness and societal relevance (burden of disease, uncertainty about the effectiveness and efficiency, potential benefits, potential impact) | 1 (8) |
| 4 | 1989 | United Kingdom Wales | National Health Service - Mid Glamorgan District | Regional | Mid Glamorgan District HealthAuthority program - Welsh Health Planning Forum - Glamorgan University | Program | Marginal Analysis: Ten Health gain areas were identified by the Welsh Health Planning Forum. A marginal analysis, leaded by Mid Glamorgan and involving working groups, proposed 10 programmes for investment and a **further 10 for disinvestment, which were then evaluated by a core evaluation team.** | 1 (8) |
| 5 | 19941995 | Scotland | The Grampian region | Regional |  | To prioritise & analyse resource allocation in relation to maternity services | PBMA | 1 (25) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number****(SR)**1 |
| 6 | 1995 | Scotland | Greater Glasgow Health Board |  |  | To prioritise and analyse resource allocation in relation to gynaecology services | PBMA | 1 (25) |
| 7 | 1996 | Scotland |  |  | The Tayside Experience | To provide a rigorous framework for purchasing services, using the child health services as a case study | PBMA | 2 (18, 25) |
| 8 | 19971998 | New Zealand | New Zealand Health System - The Southern and Midland health regions | Regional |  | To prioritise resource allocation within an existing budget, and to obtain specific recommendations regarding the optimal allocation of resources in the important programme area of respiratory diseases | PBMA | 1(25) |
| 9 | 1999 | Australia | Flinders Medical Centre | Institutio-nal |  | To provide a framework for rational resource allocation, using chronic airflow limitation as a case study | PBMA | 1 (25) |
| 10 | 1999 | Australia | National Health Priorities Committee - National Cervical Cancer Screening- The Centre for Health Program Evaluation (CHPE) | National |  | To address whether PBMA is an appropriate technique to include in Cancer Strategy Group’s strategic planning process, as well as assist with what specific options might be included in the next National Cancer Strategy. | PBMA | 1 (25) |
| 11 | 19992001 | France | Haute Autorité deSanté (HAS)- HTA Agency | National | The Transparency Commission (TC) | Project. The TC assesses adrug’s medical value in order to decide whether a drug should be included on the list of reimbursable drugs and to set prices | Listed drugs are reviewed to asess its medical value on the basis of four criteria: 1. Effectiveness and safety; 2. Availability of alternatives; 3. Disease severity; 4. impact on health of individual;5. impact on public health.  | 4(24, 27,28,29) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for LNVT identification** | **Number****(SR)**1 |
| 12 | 2002 | Canada | Alberta Government- The Calgary Health Region | Regional | An Urban Health Region Macro Marginal Analysis−MMA based program | Pilot ProjectAim: to reassess health technologies within Alberta | PBMA | 3 (1, 8, 29) |
| 13 | 2002 | Canada | Southern Alberta, Chinook HealthRegion (CHR) - Ambulatory Surgical Services | Institucional |  |  | PBMA | 2 (1, 25) |
| 14 | 2003 | Canada | Canmore General Hospital, Canmore, Alta | Institutio-nal | To determine how resourceswithin a surgical program in a Canadian rural hospital might be reallocated to better meet the needs of the local community |  | PBMA | 1 (25) |
| 15 | 20032006 | Argentina | Superintendence of Health Services, Ministry of Health | National |  | Aim: to perform an evaluation of 500 “controversial services”. The evaluation resulted in the exclusion of 10 percent of these technologies from the positive list and access to 2/3 of technologies restricted to specific clinical conditions or patient subgroups |  | 1 (30) |
| 16 | 2004 | Denmark | Danish Centre for Evaluation and Health Technology Assessment  | National |  | Pilot project Aim: to assess improper use or potentially obsolete technologies. | Not explained. Routine X-ray was selected as candidate for disinvestment. | 4 (18,1, 27, 29) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number****(SR)**1 |
| 17 | 2004 | Scotland | National Health Service | National | Scotland Disinvestment Project | ProjectAim: to stop and/or restrict interventions of low or no health gain. | Literature review and research into clinical practice variations | 2 (18,27) |
| 18 | 2005 | United Kngdom | National Health Service - Audit Commission - Primary Care Trusts | Local | Quality, Innovation, Productivity and Prevention (QIPP) Program | National Program including different PCT Plans which started at different points in time. Aim: to free up money spent on low clinical value treatments and use it either to deliver a PCT savings plan or to invest in services with better clinical outcomes. | Research into Clinical Practice Variation was used as a source to identify potential candidates (NHS Atlas of Variation in Healthcare). However, each PCTs developed its own approaches and lists.Some PCTs used *benchmarking mechanisms*, which allowed the comparison of technologies results and costs among different PCTs.Other PCTs used the Croydon list as a reference to identify potential candidates (this list contained 34 procedures grouped in four categories). | 5 (22,23,3, 8,32) |
| 19 | 2006 | United Kingdom | National Health Service | National |  | ProgramAim: to reduce spending ontreatments that do not improve patient care | Literature search: "Do not recommendations" based on NICE guidelines; results of Cochrane reviews and HTA reports. Effectiveness and costs / efficiency criteria are applied. | 12 (18,22, 23, 24, 1, 3,26, 27, 8, 28, 29,32) |
| 20 | 2006 | Australia, Western Australia | Western Australia- Western Australian Policy Advisory Committee on Clinical Practice and Technology | Regional |  | Aim: to assess both new and existing technologies interms of financial and clinical effectiveness, to monitor the use of health technologies currently in practice, and to disseminate this information to stakeholders | Not explained | 1 (1) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number SR****(cites)**1 |
| 21 | 20062007 | United Kingdom | National Health Service - Norfolk Primary Care Trust's National Health Service | National | Norfolk Mental Health pilot project | Pilot Project to test PBMA methodology | PBMA | 1 (25) |
| 22 | 2007 | Norway | The Norwegian Council for Quality Improvement and Priority Setting in Health Care | National | HTA reassement activities. Mandate of the agency |  | Not explained | 1 (1) |
| 23 | 20072008 | Canada | Northern HealthAuthority in British Columbia | Regional |  | Pilot Project: To use research evidence to identify and implement priority setting and resource allocation that incorporates both ethical practices and economic principles. | PBMA and Accountability for Reasonableness (A4R) | 1 (25) |
| 24 | 2008 | Spain | Basque Office for Health Technology Assessment (OSTEBA)Axencia de Avaliación de Tecnoloxías Sanitarias de Galicia (Avalia-T) | Nacional | Plan de Calidad del Sistema Nacional de Salud - “The Identification, Prioritization and Evaluation of PotentiallyObsolete Health Technologies.” | Project Aim: to identify, prioritise and assess obsolete technologies | OSTEBA: Development of a guideline (GuNFT): Proposes a nomination process for NLVT identification. Avalia-T: Development of a guideline and a web-based tool for the NLVT prioritization (PriTec). 4 approaches for identification: 1. Direct consultation of medical literature; b. Consultation of new and emerging technology databases; c. Consultation of SR published in the literature or by HTA agencies; d. Consultation with institutions responsible for updating portfolios of the National Health System, hospitals or regional services. | 10 (18, 22, 23, 1, 3, 26, 27, 8, 28, 29,32) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number SR****(cites)**1 |
| 25 | 2008 | Sweden | Swedish county council | Local |  | To prioritize resourses allocation in relation to in vitro fertilisation treatment | Accountability for Reasonableness Model: framework for the priority setting procedures both before and during evaluation of the process. | 1 (25) |
| 26 | 2009 | United States | National Government - Institute of Medicine - Patient-Centered Outcomes Research Institute (PCORI) | National | CER Program | Program  | List of priority topics gathered through a nomination process (IOM) involving health professionals, consumer advocates, policy analysts and others. Topics are assessed by means of Comparative Effectiveness Research, which allow the identification of candidates for disinvestment | 3 (18, 23, 29) |
| 27 | 2009 | Australia | Ministry of Health - Pharmaceutical Benefits Advisory Committee (PBAC) | National | Pharmaceutical Benefits Scheme Post-market Surveillance | Mandate of PBAC. Aim: to promote disinvestment of a pharmaceuticals and vaccines through its exclusion of the Pharmaceutical Benefit Scheme. | Potential candidates are identified through the application of explicit criteria and reviews of the evidence | 9 (18, 22, 23, 1, 26, 27, 8, 28, 29) |
| 28 | 2009 | Australia | Ministry of Health - Medical Services Advisory Committee (MSAC) | National | Medicare Benefits Schedule Review Task Force (previously named Quality Framework) | 2 years projectAim: to review services listed in the Medicare Benefit Scheme. It applies an evidence-based disinvestment framework | NLVT identification: Environmental Scanning Approach. Combines peer-reviewed literature search, targeted database search and opportunist sampling (nomination by key stakeholder with evidence). | 10 (18, 22, 23, 1, 3, 25, 26, 27, 8, 29) |
| 29 | 2009 | Australia | National Health and MedicalResearch Council (NHMRC) - Academic Institutions | National | Assessing Service and Technology Use to Enhance Health (ASTUTE Health) | Research ProjectAim: to trial and evaluate a model to refine the indications for resource allocation to ineffective or inappropriately applied health care practices | Assisted Reproductive Technologies & Pathology testing for vitamin B12- folate) were identified as candidates for disinvestment as they met multiple criteria on a proposed identification framework. | 4 (18, 23, 3, 8) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number SR****(cites)**1 |
| 30 | 2009 | Australia | Victorian Department of Human Services - Monash Health (the largest healthservice network in the state of Victoria) and the Clinical Effectiveness Centre. | Regional | VPACT - Sustainability in Healthcare by Allocating Resources Effectively (SHARE) program | ProgramAim: to establish organisation-wide, systematic, integrated, transparent, evidence-based systems and processes for decision-making about disinvestment in the context of resource allocation at Monash Health (previously Southern Health) | Candidates were identified through an Expression of Interest process and a non-systematic process of ad hoc submissions. | 4 (18, 1,27, 29) |
| 31 | 2009 | Italy | Veneto Health Autorithies- Agenzia Regionale Socio Sanitaria del Veneto | Regional | Veneto Region Disinvestment/Reallocation Program | Reallocation Program | Application of a set of triggers (Obsolescence criteria ofthe Italian National Federation of Electrotechnical and Electronics;Italian Society of Medical Radiology; Italian Association of Nuclear Medicine and Molecular Imaging, number of devices available at the health post, and regimen of use). | 1 (8) |
| 32 | 2009 | Canadá | Canadian Agency for Drugs and Technology in Health (CADTH) | National | Reassessment of Health Technologies: Obsolescence and Waste. | The Oversight Committee | CADTH does not have a formal process for NLVT identification. A committee (The Oversight Committee) apply a set of triggers: 1. Obsolescence forecasting of HT (horizon scanning);2. Reassessment of related or adjacent technologies activated by assessment or adoption of new HT; 3. Provincial or regional requests/decisions based on experience; 4. new evidence on safety, efficacy, cost-effectiveness; 5. Timed mechnanism | 6 (22, 23,24, 3, 28, 29) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number SR****(cites)**1 |
| 33 | 2009 | Canada | Vancouver Coastal Health Authority - Western Australian Policy Advisory Committee on Clinical Practice and Technology | Regional | Vancouver Coastal HealthAuthority−PBMA basedprogram | ProgramAim: to investigate options for resource re-allocation. | PBMA | 3 (22, 8, 29) |
| 34 | 2010 | Australia | Queensland Health - Queensland Policy Advisory Committee on New Technology (QPACT) | National | HealthPACT | Two-year work plan.Aim: to provide advice to encourage disinvestment opportunities that align at both the national and local levels. | Not explained | 2(1,29) |
| 35 | 2010 | Sweden | National Government - Swedish Council on Technology Assessment in Healthcare | National | SBU Uncertainties andDisinvestment project | Uncertainties and disinvestment projectAim: to increase patient care and safety; achieve cost reduction and promote research facilitation | Literature search and stakeholders consultation (online application) based on the application of effectiveness and costs/efficiency criteria. | 4(1, 26, 8, 29) |
| 36 | 2011 | Scotland | Scottish Health Technologies Group (SHTG) | National | Making Choices, Spending Wisely | Short-term disinvestment steering groupAim: to move SHTG and National Health Service forward in terms of reassessment and reinvestment | Proposed the SIGN guidelines be used to guide the identification of potential candidate technologies for disinvesment. | 4(23, 1, 29, 32) |
| 37 | 2011 | Canada | Canadian Foundation for Healthcare (HC) Improvement - CFHI EXTRA program for HC improvement | Regional | Ontario province Disinvestment Project | 2-year intervention project | Application of seven identification "criteria" adapted from Elsaugh´s framework (Ontario Reassessment Framework). Information source: previous no-value practices list (Elshaugh). | 5(3, 27, 8, 28, 29) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number SR****(cites)**1 |
| 38 | 2011 | USA | National Physicians Alliance (NPA) - The Good Stewardship Group | National | “PromotingGood Stewardship in Clinical Practice.” | Aim: to identify health technologies which are common but provide little benefit in primary care | The top 5 overused clinical activities across 3 primary care specialties (paediatrics, internal medicine, and family medicine) were chosen by physician panel consensus | 1 (1) |
| 39 | 2012 | International (Australia, Canada, England, Japan, the Netherlands, United States) | American Board of Internal Medicine - Professional Bodies | Interna-tional | "Choosing Wisely" Campaign | It is a campaign, which was originally developed by the American Board of Internal Medicine in USA, in conjunction with 20 medical specialty professional organizations. Then replicated in the other countries. Aim: To help providers and patients engage in conversations about avoiding the use of unnecessary treatments, tests, and procedures. | Each professional organization generated a list of five interventions that they considered to be over used in their field. Methods used for identifying candidates are delphi-groups; telephone conference and online survey. Effectiveness; costs/effectiveness and benefits criteria are applied for identification. | 5 (3, 26, 27, 8, 29) |
| 40 | 2012 | Italy | A. Gemelli University Hospital | Institutio-nal |  | Proactive Disinvestment Process (PDP) - embedded in the HTA hospital activities | Proactive Disinvestment Process (PDP) linked to routine HTAs for newtechnologies: clinicians identify medical device for removal/reduced use | 1 (24) |
| 41 | 2015 | Brazil | Collaborating Centre of SUS (Unified Health System) for Technology Assessment in Health and Excellence (CCATES); Brazilian MoH | National |  | Aim: to conduct several specific disinvestment initiatives on certain health technologies. Besides a methodological guideline on disinvestment was in development |  | 1 (30) |
| ID | Year | **Country** | **Financing & implementing organization** | **Scope** | **Name of the Disinvestment Initiative** | **Type of initiative and aims** | **Methodologies used for NLVT identification** | **Number SR****(cites)**1 |
| 42 | N/A | Canada | Atlantic provinces: Prince Edward Island, Newfoundland and Labrador, Nova Scotia and New Brunswick | Regional | Atlantic Common Drug Review | Review ProcessAim: to ensure that the drugs covered are current and based on the best available evidence.A review may be launched in response to changes in the scientific evidence, regulatory status, cost effectiveness or budget impact related to changes in the drug cost or the cost of its comparators. This process results in recommendations to the provincially funded drug plans in Atlantic Canada, with each province making their own decisions. | **Identification of potential candidates for disinvestment:** Ad hoc. Drugs considered where there have been changes in scientific evidence, regulatory status, cost effectiveness, or budget impact related to changes in the drug cost or the cost of its comparators. **Criteria for assessing candidates for disinvestment:** Drugs considered not sufficiently safe, sufficiently effective or sufficiently cost effective following multiple technology assessment | 1 (28) |
| 43 | N/A | New Zealand | Pharmaceutical Management Agency(PHARMAC) | National |  | Aim: to determine which drugs will be listed on the Pharmaceutical Schedule, and thus receive publicly funding, and under what conditions | Drugs facing price competition where there are alternatives that can deliver the same or similar health outcomes are considered potential candidate for disinvesment. | 1 (28) |
| 44 | N/A | Mexico | General Health Committee |  |  | No further information is provided |  | 1 (30) |
| 45 | N/A | Australia | Northern Sydney Central Coast Area Health Service (NSCCAHS) | Regional | Health Technology Evaluation and Approvals initiative | Aim: to ensure that decisions adoption of new HT and cessation of old ineffective ones are guided by evidence of effectiveness, safety and cost-effectiveness and a good understanding of the organisational impacts of the technologies | “Pasive” disinvestment | 1(18) |

*References:* **NLVT**: Non or Low Value Technologies; HT: Health Technology; MoH: Ministry of Health; SR: Systematic Review

**Notes:**

(Ψ) Another nine disinvestment initiatives were mentioned in Chambers review (27); however they were not included due to insufficient information to describe the initiative. Countries and names of these excluded initiatives were:

Autralia

1. National Medicines Policy Medicine Wise (1998)

2. New technology program reallocation (2012)

3. Selecting the most appropriate and relevant tests and treatments care (2013)

4. Life Saving Drugs Program Review (2014)

New Zealand

1. Pharmaceutical Management Agency Yearly Review (1993)

2. National Health Committee Reprioritization Program (2005)

United Kingdom

1. Wales Prudent Health Care (2013)

United States

1. Veterans Health Administration Comprehensive Review (1996)

**(Ω) SRs references:**

(1) Leggett L, Noseworthy TW, Zarrabi M, Lorenzetti D, Sutherland LR, Clement FM. Health technology reassessment of non-drug technologies: current practices*.* Int J Technol Assess Health Care. 2012; 28(3):220–7. doi:10.1017/S0266462312000438.

(3) Niven DJ, Mrklas KJ, Holodinsky JK, Straus SE, Hemmelgarn BR, Jeffs LP, Stelfox HT. Towards understanding the de-adoption of low-value clinical practices: a scoping review. BMC Med. 2015;13:255. DOI 10.1186/s12916-015-0488-z. (18) Gallego G, Haas M, Hall J, Viney R. Reducing the use of ineffective health care interventions: an Evidence Check rapid review brokered by the Sax Institute (www.saxinstitute.org.au), for the NSW Treasury, 2010.

(8) Orso M, de Waure C, Abraha I, Nicastro C, Cozzolino F, Eusebi P, Montedori A. Health technology disinvestment worldwide: overview of programs and possible determinants. Int J Technol Assess Health Care. 2017; 33(2):239-250. doi:10.1017/S0266462317000514.

(22) Gerdvilaite J, Nachtnebel A. Disinvestment: overview of disinvestment experiences and challenges in selected countries. HTA- Projektbericht. 2011; Nr. 57. Wien: Ludwig Boltzmann Institut für Health Technology Assessment.

(23) Valentín B, Blasco JA. Identificación de oportunidades de desinversión en tecnologías sanitarias. Madrid: Plan de Calidad para el SNS del MSSSI. Unidad de Evaluación de Tecnologías Sanitarias, Agencia Laín Entralgo; 2012. Informes de Evaluación de Tecnologías Sanitarias: UETS 2011/07

(24) Henshall C; Schuller T; Mardhani-Bayne L On behalf of the HTAi Policy Forum. Using Health Technology Assessment to support optimal use of technologies in routine clinical practice: the “challenge of disinvestment”. International Journal of Technology Assessment in Health Care, 28:3 (2012), 203–210. doi:10.1017/S0266462312000372

(25) Polisena J, Clifford T, Elshaug AG, Mitton C, Russell E, Skidmore B. Case studies that illustrate disinvestment and resource allocation decision-making processes in health care: A systematic review. Int J Technol Assess Health Care. 2013;29:174.

(26) Mayer J., Nachtnebel A. Disinvesting from ineffective technologies: lessons learned from current programs. International Journal of Technology Assessment in Health Care, 31:6 (2015), 355–362

(27) Chambers J et al. A Review of Empirical Analyses of Disinvestment Initiatives. Value in Health 2017; article in press.

(28) Parkinson B, Sermet C, Clement F, Crausaz S, Godman B, Garner S, et al. Disinvestment and Value-Based Purchasing Strategies for Pharmaceuticals: An International Review. PharmacoEconomics. 2015;33(9):905-24.

(29) Seo HJ, Park JJ; Lee SH. A systematic review on current status of health technology reassessment: insights for South Korea. Health Research Policy and Systems (2016) 14:82. DOI 10.1186/s12961-016-0152-x.

(30) Agirrezabal I; Burgon J; Stewart G; Gutierrez-Ibarluzea I. Status of disinvestment initiatives in Latin America: results from a systematic Literature review and a questionnaire. International Journal of Technology Assessment in Health Care, 33:4 (2017), 1-7. Cambridge University Press 2017. doi:10.1017/S0266462317000812

(32) Calabrò GE; La Torre G; de Waure C; Villari P; Federici A; Ricciardi W; Specchia ML. Disinvestment in healthcare: an overview of HTA agencies and organizations activities at European level. Calabrò et al. BMC Health Services Research (2018) 18:148. https://doi.org/10.1186/s12913-018-2941-0