

Assessment

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Exploring the identification, validation, and categorization of the cost and benefits of criminal justice in mental health: the PECUNIA project

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Background. Mental health disorders and their treatments produce significant costs and benefits in both healthcare and non-healthcare sectors. The latter are often referred to as intersectoral costs and benefits (ICBs). Little is known about healthcare-related ICBs in the criminal justice sector and how to include these in health economics research.

Objectives. The triple aim of this study is (i) to identify healthcare-related ICBs in the criminal justice sector, (ii) to validate the list of healthcare-related ICBs in the criminal justice sector on a European level by sector-specific experts, and (iii) to classify the identified ICBs.

Methods. A scientific literature search in PubMed and an additional grey literature search, carried out in six European countries, were used to retrieve ICBs. In order to validate the international applicability of the ICBs, a survey was conducted with an international group of experts from the criminal justice sector. The list of criminal justice ICBs was categorized according to the PECUNIA conceptual framework.

Results. The full-text analysis of forty-five peer-reviewed journal articles and eleven grey literature sources resulted in a draft list of items. Input from the expert survey resulted in a final list of fourteen unique criminal justice ICBs, categorized according to the care atom.

Conclusion. This study laid further foundations for the inclusion of important societal costs of mental health-related interventions within the criminal justice sector. More research is needed to facilitate the further and increased inclusion of ICBs in health economics research.

Background

The economic burden that mental disorders put on society can be explained only partially by healthcare costs such as medicine intake and healthcare visits. As the costs borne are not limited to the individual, neither are they limited to the healthcare sector; other sectors may also account for a large part of the burden (1). The criminal justice sector is one of the sectors outside the healthcare sector that may be affected by individuals with a mental health disorder. Costs in the criminal justice sector can be a consequence of someone's (mental) health status; for example, police services can be necessary for managing individuals' mental health state crises, especially when these crises put the individual or others (e.g. relatives) in direct danger (2). Several studies address the issue of individuals with a mental health disorder having encounters with the criminal justice system (3–5). The societal costs associated with these encounters can be substantial.

In the case of some mental health conditions, estimating the societal costs without including criminal justice costs may be regarded as insufficient. Healey *et al.* calculated the costs of drug dependency and compared the costs per sector for different sectors. They concluded that for every £1 incurred in the healthcare sector as a consequence of the disorder, an additional £13 was incurred in the criminal justice sector (6). Furthermore, in addition to the high

prevalence rates of individuals with a mental health disorder encountering the criminal justice system, research shows that the costs of crimes committed by an individual with a mental health disorder are higher than for a similar individual without a mental health disorder (7).

Therefore, in order to obtain societally relevant outputs in health economics research, it may be necessary to conduct research from a societal perspective, meaning “all costs and benefits should be included, no matter on whomever they may fall” (8,9). This encompasses the costs and benefits that occur in non-healthcare sectors, also referred to as intersectoral costs and benefits (ICBs) (10). The inclusion of relevant ICBs in health economics research has proven to be essential when conducting it from a societal perspective, as the outcomes may be significantly affected (8,11). While research including the ICBs of some sectors outside the healthcare sector (e.g. the labor sector, the patient, and family sector) is available in health economics research, so far little research has been done on identifying healthcare-related ICBs in the criminal justice sector. Validated tools for including criminal justice ICBs in health economics research are scarcely available. Consequently, adopting a societal perspective is often limited to the inclusion of costs associated with productivity losses in addition to direct healthcare costs (8); the criminal justice sector has been overlooked in health economics research (12). Some national guidelines recommend conducting health economics research from a societal perspective, but little guidance is given on including ICBs from all sectors (8,13).

Drost et al. (10) developed a scheme of ICBs and identified twenty-five ICBs in the criminal justice sector. ICBs cover a broad range within the sector, addressing the costs of violence and crime (e.g. domestic violence), the consequences of crime (e.g. pain and suffering of victims), and law enforcement costs (e.g. police services). While this is a first step in the identification of criminal justice ICBs, this list provides limited guidance on including them in health economics research, and the ICBs have not been properly tested in terms of their transferability into a broader international context. This highlights the need for a methodologically sound approach to the identification of criminal justice ICBs.

In short, while literature addresses the need to include criminal justice ICBs in health economics research, guidance for facilitating this is lacking. An internationally validated comprehensive list of criminal justice ICBs can be a first step toward the inclusion of criminal justice ICBs in health economics research. Accordingly, the triple aim of this study is (i) to identify healthcare-related ICBs in the criminal justice sector, (ii) to validate the list of healthcare-related ICBs in the criminal justice sector on a European level by sector-specific experts, and (iii) to classify the validated ICBs.

Methods

This exploratory review consists of a systematic literature search including scientific literature and an exploratory search of multi-national grey literature. Literature analysis resulted in a list containing criminal justice ICBs. International field experts validated the ICBs by means of a survey. Finally, validated ICBs were categorized to increase the legibility of the list. Although many different definitions for the criminal justice system exist, for this study, it is defined as “the set of legal and social institutions for enforcing the criminal law in accordance with a defined set of procedural rules and limitations” (14).

Context: PECUNIA Project

This study was conducted alongside the “ProgrammE in Costing, resource use measurement and outcome valuation for Use in multi-sectoral National and International health economics research: PECUNIA” (GA No. 779292), which aims to establish standardized costing and outcome assessment measures for optimized national healthcare provision in the European Union (15). The PECUNIA consortium is a network of health economics and HTA experts from ten academic institutions in six European countries, namely: Austria, Germany, Hungary, Spain, the Netherlands, and the UK. Throughout the project, three mental health disorders—depression, schizophrenia, and post-traumatic stress disorder (PTSD)—are used as exemplar diseases, as together they represent the great societal and economic burden mental health disorders can have on society, affecting a variety of individuals. As part of the European PECUNIA project, methods for this study were developed in close collaboration with the PECUNIA consortium. Additional information on the project can be found elsewhere (15).

Identification

The twenty-five criminal justice ICBs identified by Drost et al. (10) were used as a starting point for this study. Additional criminal justice ICBs were identified by means of a scientific search in PubMed and a grey literature search in all PECUNIA countries. The scientific literature search was conducted in September 2018 and contained a societal perspective component and a cost component (Supplementary File 1). Selection criteria were restricted to publications in peer-reviewed journals in the English language published after June 2012, as relevant articles published before June 2012 were included in Drost et al. (10). Studies were not restricted to a specific study design; articles describing various types of research could be included. All hits were screened on title and abstract by one author (IP), and any article which addressed costs or benefits in the criminal justice sector in any section was eligible for full-text screening. Full-text screening was done by two researchers (LJ and IP). Articles were included if they contained at least one item in the criminal justice sector that could be caused by persons with a mental illness. All items that were mentioned were extracted and listed. Due to the large number of hits ($n = 13,137$), it was decided not to use additional databases.

To improve the transferability of the results and to mark national differences, the PECUNIA consortium conducted a multi-national grey literature search, covering national language literature from six countries (Austria, Hungary, Germany, Spain, the UK, and the Netherlands). To harmonize data extraction, a template was developed by two researchers (LJ and IP) and provided to the consortium (Supplementary File 2). The template furthermore suggested where relevant information might possibly be found. Examples of relevant grey literature are ministry (annual) reports, national guidelines on conducting health economics research, reports of (semi) public organizations, protocols, and unpublished articles. Researchers had to scan information to retrieve criminal justice items. They were asked to provide the name of the item in English and in the national language, provide a short definition in English and in the national language, to define to which of the three exemplar diseases the reference is applicable, to provide the type of data source, and add a reference/link to the source. Criminal justice ICBs were extracted

from the grey literature sources and translated into the English language. While it was advised to use the most up-to-date documents for the grey literature search, there was no timeframe nor were there language restrictions. The list with both the English and national language name of the extracted ICBs was sent to two authors of this article (LJ and IP).

The data (i.e., extracted ICBs from both scientific and grey literature searches) was grouped into one list of items. First, two researchers (LJ and IP) looked for recurring themes. Second, the recurrent themes were operationalized by attaching labels during discussions with all authors. Third, existing classifications aiming to categorize cost items in the criminal justice sector were identified during the item extraction and served as input for creating main and sub-categories for the item list in this study. Adding categories increased the readability of the list and resulted in the draft list of criminal justice ICBs.

Validation of ICBs by Sector-Specific Experts

In close collaboration with the PECUNIA consortium, two researchers (LJ and IP) developed the expert survey. The aim of the survey was to validate the criminal justice ICBs by gaining more insight into the clarity and relevance of each item, and into the completeness of the whole list. The questionnaire consisted of three questions, addressing item validation. Q1: "Is it clear to you what the item entails?"; Q2: "Do you think that this item is applicable to persons with mental disorders?"; Q3: "Do you think the list of ICBs is complete?"

Individuals eligible for participation were experts in the field of criminal justice, operating on any level. In-depth knowledge of the national criminal justice system was a requirement, although specific types of expertise varied widely. Examples of occupations include policy jobs at the Ministry of Safety and Justice or forensic psychiatrists. All six participating countries (Austria, Hungary, Germany, Spain, the UK, and the Netherlands) used snowball sampling to recruit national experts between September 2018 and November 2018. The survey was sent to the experts by e-mail between November 2018 and February 2019.

Answers to Q1 and Q2 were used to calculate the clarity and relevance per item. Answers to Q3 were used to complete the list. All expert comments were extracted and two researchers (LJ and IP) analyzed these to incorporate them in the final list.

Categorization

Within the PECUNIA project, a conceptual framework for semantic standardization was developed to structure the resource use items of multiple sectors, including ICBs in the criminal justice sector (16). Within this conceptual framework, the PECUNIA care atom, the standard and transferable units of resource use and consequences are defined. "Care" encompasses the organized service for an individual and is broader than healthcare sector alone. The care atom divides the delivery of care into three phases: input, throughput, and output. Input-related ICBs in the criminal justice sector are services provided for both perpetrators and victims of crime (e.g. police services). Throughput-related ICBs are activities involved in the delivery of the input-related ICBs (e.g. organized transport). Throughput-related ICBs refer to the resource use by consumers, and cover activities following up on the delivery of services (such as interventions). Output-related ICBs include consequences and outcomes such as pain and suffering, or change

in the quality of life. The identified and validated criminal justice ICBs in this study were categorized according to this framework.

Results

Identification

The scientific literature search in PubMed yielded 13,137 hits. Due to a large number of hits, the search was limited to articles concerning the three illustrated diseases from the PECUNIA project: depression, PTSD, and schizophrenia. After screening titles and abstracts, 196 journal articles were eligible for the full-text screening. After full-text screening, 151 articles were excluded because they did not contain criminal justice ICBs. As displayed in Figure 1 below, fifty-six documents in total (forty-five journal articles, eleven grey literature sources) were used to develop the list of criminal justice ICBs. The list of the included studies can be found in Supplementary File 3. The eleven grey documents included four ministry/national reports, four governmental Web sites, one master's thesis, one non-English written article, and one unpublished article.

The full-text analysis resulted in a draft list with thirty-five ICBs. Of those thirty-five ICBs, twenty-four originate from Drost et al. (10), seven ICBs were added from the scientific literature search, and four ICBs were added from the grey literature search. To improve the legibility of the list of criminal justice ICBs, a distinction was made between costs incurred as a consequence of crime, and costs incurred in response to crime. The former consists of five subcategories, inspired by the categories used in the literature: (1A) Offences against a person, (1B) Offences against property, (1C) Crime consequences psychological, (1D) Crime consequences material, and (1E) Crime consequences other. The latter consists of three subcategories: (2A) Law enforcement, (2B) Victim/witness support, and (2C) Other. ICBs are categorized in one single category; it was not possible for an item to be listed in more than one category.

Validation and Finalization

The expert survey took place in November 2018. In total, twelve responses were obtained, with at least one response per country. This was equal to the minimum amount of responses set beforehand by the PECUNIA consortium. All twelve experts were able to answer Q1 regarding the clarity of each item. Table 1 displays the results of Q1 and Q2. Of the thirty-five ICBs, eight ICBs were clear to all experts. Eleven ICBs were clear to eleven experts (corresponding with 92 percent). Eight ICBs were clear to ten experts (corresponding with 83 percent). Five ICBs were clear to eight experts (corresponding with 75 percent), and three ICBs were clear to less than eight experts (percentages below 75 percent). The ICBs clear to all experts were "theft," "loss of property of victims," "lost work/productivity of victims," "lost work/productivity of offender," "prison expenditures," "forensic (psychiatric) services," "victim/witness protection," and "victim compensation." The most unclear ICBs were "lost freedom to the offender," "pain and suffering of others," and "housing stock lost."

The responses to Q2 were used to calculate the relevance of the ICBs. All twelve experts were able to answer this question. Twenty ICBs were considered relevant by all experts, ten ICBs were considered irrelevant by one expert; five ICBs were considered irrelevant by two experts. The least relevant ICBs were "lost work/productivity of offender," "illegal untaxed income by primary

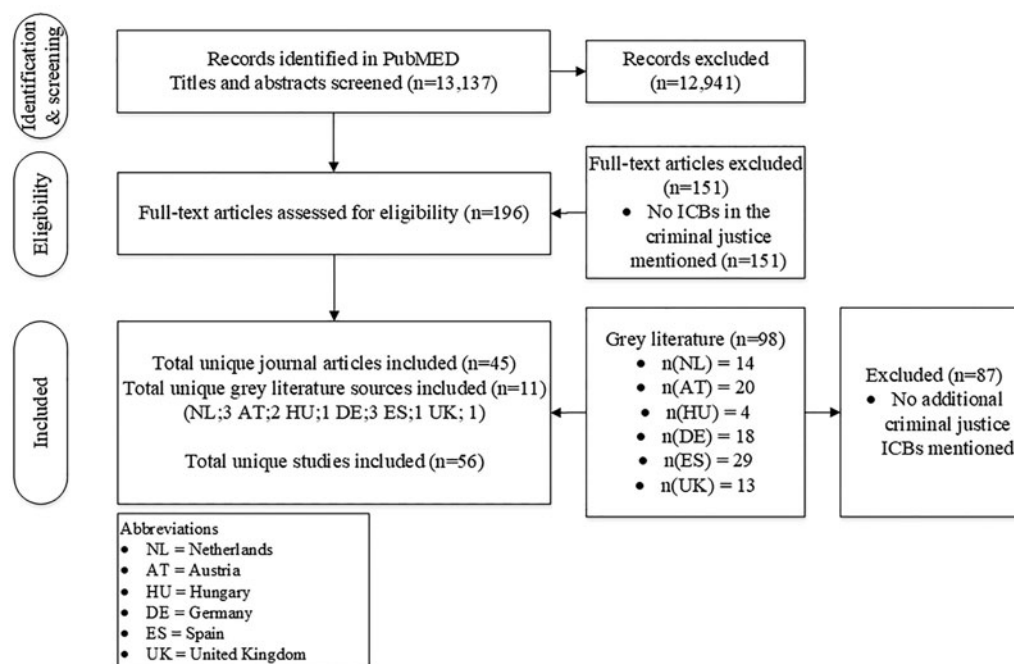


Figure 1. PRISMA flowchart of the selection of documents eligible for data analysis.

person,” “housing stock lost,” “costs of correctional institutions,” and “decreased chance of committing a crime as a consequence/effect of mental health programs/interventions.”

Q3 offered the possibility of suggesting additional ICBs. No experts mentioned any additional ICBs. Two experts considered the list complete; two experts did not make any comments; eight experts listed one or more comments. The comments mentioned in Q3 did not lead to the inclusion of additional ICBs, but were used for developing the final list.

In addition to answering yes/no/I don’t know to Q1 and Q2, experts also made comments to explain their answers. These comments were also used to finalize the list. Two researchers (LJ and IP) analyzed the comments and developed the final list. For the final list, the main categories and subcategories remained the same. However, a rearrangement of ICBs was needed to decrease an existing overlap and to make the ICBs mutually exclusive. It is necessary to decrease/eliminate existing overlap to prevent double counting at a later stage.

Two experts mentioned that there is little to no difference between probation and parole in Europe. Also, experts mentioned that the ICBs addressing imprisonment, for example, institutionalization and costs of correctional institutions, could be presented more transparently by making a more clear distinction between the different types of correctional institutions. In addition, for some ICBs, experts recommended a slight change in wording. For example, a distinction between short-term and long-term pain and suffering was suggested in the subcategory “crime consequences psychological”.

Furthermore, some experts raised questions regarding the different levels of domestic violence, and whether this was limited to partner abuse, as child abuse was listed as a separate violence item. In addition, experts mentioned overlap between ICBs categorized as “offences against a person,” for example, between domestic violence and assaults. However, after in-depth discussions with the authors, it was decided to remove all the crimes,

as the crimes themselves are not the costs ICBs that should be included in the list. The crimes represent “the happening,” which leads to the costs and benefits that should be measured. The act of vandalism is therefore not a cost item, but its consequences such as property damage/loss and police services are. Eliminating crimes from the list put more emphasis on the services and their settings, so an additional search was done to better distinguish all services and institutions in the criminal justice sector.

The list with items was checked by all authors during online group discussions. It was then decided that only costs occurring in the criminal justice sector will be included in the final list of ICBs. Therefore, productivity losses of victims and/or offender are deleted, as they actually occur in the employment sector. Incorporating all comments, together with the new insights from in-depth discussions, resulted in the final list with twelve unique ICBs, presented in [Table 2](#).

Categorization

As the last step for this study, the final list was categorized according to the conceptual framework of the PECUNIA project. Of the twelve ICBs, six were categorized as input, three ICBs were categorized as throughput, and three ICBs were categorized as output. These results are displayed in [Table 2](#) below.

Discussion

As stated in the introduction, little is known about the ICBs in the criminal justice sector which occur as a consequence of mental health disorders. Therefore, criminal justice ICBs are often left out of mental health economics research conducted from a societal perspective, even though research has already shown that mental health disorders may produce costs and benefits in the criminal justice sector (3–5). Accordingly, it is important to include relevant

Table 1. Results of expert survey: draft list of ICBs, including clarity and relevance (in percentage of respondents) per item

ITEM	Percentage of respondents who considered the item clear	Percentage of respondents who considered the item relevant
<i>1. Costs incurred as a consequence of crime</i>		
(A) Offences against a person		
1 Domestic violence	75	100
2 Unlawful threats	92	92
3 Assaults (offences)	92	100
4 Violence toward officials	92	100
5 Drunk driving (accidents)	83	92
6 Child maltreatment (including abuse and neglect)	92	100
7 Sexual assaults	92	100
8 Homicide	92	100
(B) Offence against property		
1 Vandalism	92	100
2 Theft	100	92
(C) Crime consequences psychological		
1 Pain and suffering of victims	83	100
2 Pain and suffering of others	58	92
3 Long-term consequences of victimizations	75	100
4 Victimization of offenders while incarcerated	92	92
(D) Crime consequences material		
1 Loss of property of victims	100	100
2 Loss of property of others	75	100
(E) Crime consequences other		
1 Lost work/productivity of victims	100	100
2 Lost work/productivity of offender	100	83
3 Illegal untaxed income by primary person	83	83
4 Lost freedom to the offender	67	92
<i>2. Costs incurred in response to crime</i>		
(A) Law enforcement		
1 Police services/interventions	92	100
2 Prison expenditures	100	100
3 Judicial expenses (including lawsuits, custody, prosecution, fines and transactions, tort claims, offender costs, legal defense, criminal sanctions, jury services, mediation and trustee fees)	83	100
4 Institutionalization/incarceration of juveniles or adults	75	100
5 Housing stock lost	67	83
6 Services for children of incarcerated	83	100
7 Probation	92	100
8 Parole (including electronic monitoring)	83	100
9 Fire and rescue services	92	92
10 Forensic (psychiatric) services (including aftercare)	100	100
11 Costs of correctional institutions	75	83
(B) Victim/witness support		
1 Victim/witness protection	100	92

(Continued)

Table 1. (Continued.)

ITEM	Percentage of respondents who considered the item clear	Percentage of respondents who considered the item relevant
2 Victim compensation	100	92
(C) Other		
1 Programs regarding improvement of mental health of the offender	83	92
2 Decreased chance of (committing a) crime as a consequence/effect of mental health programs/interventions	83	83

Table 2. Final list of ICBs, categorized according to the PECUNIA care atom

Final list	Categorization
Police services ^a	Input
Fire and rescue services ^b	Input
Legal services (including court expenses) ^{a,b}	Input
Services for children/spouse of incarcerated ^{a,c}	Input
Victim support services ^c	Input
Services provided in correctional facilities ^c <ul style="list-style-type: none"> • Institutions without mental health provision (e.g. jail, prison) • Institutions with mental health provision (e.g. forensic hospitals) 	Input
Organized transport ^c	Throughput
Other costs of correctional facilities ^{a,d} <ul style="list-style-type: none"> • Institutions without mental health provision (e.g. jail, prison) • Institutions with mental health provision (e.g. forensic hospitals) • Probation/parole 	Throughput
Shelters ^b <ul style="list-style-type: none"> • Domestic violence shelters • Victim protection • Witness protection 	Throughput
Pain and suffering (including short-term and long-term consequences) ^{a,d} <ul style="list-style-type: none"> • Of victims • Of others 	Output
Lost freedom of offender ^d	Output
Material losses ^a <ul style="list-style-type: none"> • Property loss of individuals • Property loss of others (e.g. community) 	Output

^aICBs from the scheme by Drost et al. (10).

^bICBs extracted from grey literature.

^cICBs added based on the expert survey.

^dICBs extracted from peer-reviewed literature.

criminal justice ICBs in health economics research conducted from a societal perspective, to ensure that it is complete. The first step in facilitating the inclusion of criminal justice ICBs in health economics research is the identification of all relevant criminal justice ICBs. This prompted the triple aim of this study. First, it sought to identify ICBs in the criminal justice sector that are relevant to health economics. Second, the ICBs were validated in a broader European context by sector-specific experts in several European countries. Last, it aimed to classify these ICBs. To this end, we performed both a literature review, including a search of scientific and grey literature, and an expert survey.

The main result of the study is the list with twelve unique criminal justice ICBs, categorized according to the PECUNIA

care atom. The list of ICBs supports previous literature findings that mental health disorders also affect the criminal justice sector (12,17,18). New ICBs, such as “fire and rescue services,” “shelters,” and “victim support services,” were found in addition to those previously identified by Drost et al. (10). This study identified ICBs (“fire and rescue services” and “victim support services”) that are not yet included in existing resource-use measurement (RUM) questionnaires, according to the review by Mayer et al. (19). This indicates that the impact of mental health disorders on costs and benefits in the criminal justice sector is even broader than previously accounted for. Furthermore, this categorized list of ICBs complements national guidelines of countries that recommend conducting health economics research from

a societal perspective (e.g. the Baltic states, Norway, Portugal, Sweden, the Netherlands) and advises including criminal justice ICBs when they are relevant (20).

The distinction between input, throughput, and output reveals the variety of ICBs, as the list includes ICBs for both costs (e.g. services) and outcome (e.g. quality of life). In addition, the draft list revealed several spillover effects, including effects that spillover to other people (e.g. pain and suffering of victims, witnesses, and relatives) and to other sectors (e.g. lost work/productivity of victims and offender). Spillover costs affecting other sectors were excluded from the final list of criminal justice ICBs, as the aim of the current study was to identify costs and benefits occurring in the criminal justice sector. However, all identified spillover costs and benefits do emphasize that the effect of a mental health disorder is not limited to the healthcare sector, nor to the individual.

Methodological Reflection

An extensive methodology was used to develop the final list of criminal justice ICBs. A thorough literature study included both scientific literature and grey literature from six European countries (Austria, Germany, Hungary, the Netherlands, the UK, and Spain). Furthermore, twelve experts in the field from the same six countries validated the list. Looking at the sources from the final list of ICBs, the combination of both a literature search and an expert survey proved to be an optimal combination to derive a complete list of criminal justice ICBs. The expert survey furthermore contributed to the face validity of all mental health-related criminal justice ICBs.

Due to recruitment difficulties, German and Hungarian experts provided only one expert response each. However, since two countries exceeded the target, the sufficient number of twelve responses was obtained. Furthermore, the recruitment of one to three experts per country made it impossible to distinguish cross-country differences, keeping in mind that criminal justice systems may vary in Europe. Moreover, while in this paper we discuss costs and benefits in the criminal justice sector, we have to acknowledge that the criminal justice sector is only a smaller part of the entire justice sector. Some of the ICBs in the list can also be relevant in a non-criminal justice setting. For example, persons with a mental health disorder divorce more often (21) and are therefore more likely to hire a lawyer when they do. Future research could focus on all the ICBs in the justice sector—in a broader perspective than the criminal justice sector alone.

Research Implications

This study demonstrates that the impact of mental health disorders is not limited only to the healthcare sector, but also affects the criminal justice sector. The developed list is applicable for all mental health disorders; however, the relative importance per item can differ, depending on the disease in question. Future research could focus on further identifying the relevance per item, e.g. by conducting a best–worst scaling. While sound methods and tools are still lacking for the inclusion of ICBs in health economics research, there might also be other barriers (e.g. attitude, lack of data) to their inclusion. These barriers could be identified further in a qualitative study. In addition to the current categorization, future studies could further define and classify the identified ICBs, to improve their transferability and the shared understanding of them. The identified ICBs could be transformed into a formal ontology, a formal and explicit specification of a

shared conceptualization that contributes to the comparability of costs and outcomes assessments in different countries (22). In general, additional research is needed to go from the list of ICBs developed in this study to a criminal justice RUM questionnaire including unit prices. While doing this, it is important to map the different ways one can encounter the criminal justice system, as individuals can be a perpetrator and/or a victim of crime. This complicates the accurate measurement of total costs and benefits when relying on self-reported data alone.

Policy Implications

The inclusion of criminal justice ICBs in health economics research contributes to decision making in Health in All Policies (HiAP). HiAP recognizes that health outcomes are interrelated with factors and sectors beyond health care (23). The validation and categorization of the mental health-related ICBs identified in the criminal justice sector maps the overlap between the healthcare sector and the criminal justice sector. The results of this study can stimulate policy decision makers to look at the impact of diseases encompassing a broader perspective than health alone.

Conclusion

In conclusion, this study gives an overview of the most important criminal justice ICBs according to scientific and grey literature, and experts in the field. As such, this study represents an important step toward the inclusion of criminal justice ICBs in health economics research. As mental health disorders may produce significant costs and benefits in the criminal justice sector, it is essential that these be taken into account when conducting health economics research from a societal perspective. However, more research is needed before ICBs can be fully included in health economics research. Therefore, future research of the PECUNIA project is focusing on transforming the current list into a shorter and measurable one.

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