

# A short list of high-priority indicators of health system responsiveness for aging: an eDelphi consensus study

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## ABSTRACT

The objective of this article was to provide a consensus-based short list of effective indicators to measure health system responsiveness to the needs of older adults which would be relevant to informing public policy. An e-Delphi study was done with no direct interaction between respondents. Virtual surveys were sent to 141 participants with experience in analysis and monitoring of health indicators, management of health systems, and health care of older adults. A baseline list of 24 previously published indicators was used. The criteria for selection as high priority indicators were: usefulness as a tracer of health system responsiveness and usefulness to inform policy. Consensus was defined as:  $\geq 70\%$  agreement among the participants that the indicator was very high or high priority; plus being benchmarked by  $\geq 50\%$  of respondents as having a higher relative weight than other indicators; plus being in the top 10 in the ranking list. The first round of the process included 38 participants with varied professional backgrounds. Consensus was reached for seven indicators after two rounds. Five indicators were related to distal outcomes (mortality, disability, or healthy life expectancy), one to monitoring functional assessments, and one to poverty levels. Health systems professionals should consider these comprehensive priority indicators in their efforts to provide a better health system for older people.

## Keywords

Health systems; health services surveillance; health of the elderly; Delphi techniques.

Adapting health systems to population aging is essential to foster healthy aging, which is defined as the process of developing and maintaining the functional ability that enables well-being in older age. The *World report on ageing and health* (2015) highlighted the importance of reorienting health systems towards maintaining functional ability (1). The *Global strategy and action plan on aging and health* (2016–2020) calls for the alignment of health systems to the needs of the older population (2). More recently, the United Nations Decade of Healthy Aging (2021–2030) has fostered action on providing integrated care and primary care that responds to older persons' needs. One way to support the orientation of health systems to serve an aging population better is through measuring and monitoring the responsiveness of health systems to the needs of older adults. Measuring and monitoring is an key process for health system improvement (3).

The first phase of the evidence generation involves measuring and monitoring as part of primary research, public health surveillance, implementation research, and national surveys (4). The second phase is evidence synthesis, that is, secondary research, and the third phase is evidence products, that is, tertiary research. Measuring and monitoring data, along with other primary research products, are more likely to be used by decision-makers if they address important problems (e.g., making health systems fit for aging people, as in our case) and are implementable (5). Additionally, measuring and monitoring can inform policy and guide new initiatives or actions (4); for instance, policy-makers might use the results from monitoring indicators to identify the priority areas that need intervention and to make evidence-based decisions.

However, the real-life decision-making process in health is complex. This process includes many contextual factors such as

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conflict of interests between the government and donors, resistance to change, and the lack of integration of the public and private sectors (6). Having sufficient data might help to overcome such difficulties (7).

Therefore, monitoring health system responsiveness to the needs of older adults is crucial in an aging world (8). Health system responsiveness includes user satisfaction with the health services, the feedback loops between users and the health system, and accountability of the health system to the population (9). The latest reviews on health system responsiveness have found the following gaps: 1) a lack of empirical studies that attempted to measure health system responsiveness – most studies focused on self-assessments of people's satisfaction and none targeted the needs of older adults (10); 2) lack of development of more complex indicators to measure health system responsiveness; and 3) no empirical testing of existing frameworks to verify if they are feasible and effective (9).

In a previous study, our team described a literature review and a series of expert meetings through which 24 indicators of health system responsiveness to the needs of older adults were selected (11). This first list is comprehensive. Yet, no consensus exists on which indicators can be most useful as tracers of health system responsiveness and can be used to inform public policy; for example, stakeholders have used the Delphi method to select indicators based on criteria such as importance and feasibility in the nursing home setting (12).

Thus, the objective of this article is to provide a consensus-based short list of indicators to measure health system responsiveness to the needs of older adults based on their usefulness as tracers of the health system responsiveness and their function to inform public policy. Specifically, our study objectives are to offer a set of indicators that can detect differences in access, coverage, or the effect of health system and social system services on health and social variables in older adults. These indicators could encourage effective and targeted action to improve health and social systems for older people.

## METHODS

This original research was an online Delphi study with no direct interaction between respondents (13).

### Participants and setting

Purposeful participant sampling was used to cover the following areas: analysis and monitoring of health indicators; management of health systems; and health care of older adults.

The desired profiles of participants were expertise in one or more of the following areas:

- responsiveness as demonstrated by authorship of at least one peer-reviewed published paper on health system responsiveness;
- health care of older people as shown by a career of 3 or more years in geriatrics;
- health system management as demonstrated by work experience in health system management at the national level;
- health information systems as demonstrated by work experience in management of health information systems at the national level;

- data management of healthy aging research in the academic field as demonstrated by authorship of at least three peer-reviewed papers on empirical studies that indicate work with quantitative indicators of healthy aging at the population level;
- health systems, data management, and healthy aging within international organizations as demonstrated by at least 3 years working in the Pan American Health Organization (PAHO) on projects related to measuring and monitoring health systems and healthy aging.

A list of names and email addresses was compiled based on the archives of previous participants in activities promoted by the healthy aging team at PAHO, e.g., technical meetings and training programs. In addition, an invitation was sent to the first authors of conceptual reviews that had been published and indexed in PubMed recently on health system responsiveness.

The initial list of 62 indicators was prioritized to 24 indicators through a literature review and meetings with international experts, as described in a previous report (11). Briefly, the list of the 62 indicators was reviewed in two expert meetings and 24 priority indicators were shortlisted based on their usefulness to inform policy and their wide availability in national health information systems. The meetings included experts from Latin America and the Caribbean and were conducted mainly in Spanish. However, indicators were received from experts in both Spanish and English.

Our study followed good practices of data protection and was not subject to an ethics review, because data collection posed little or no risk for participants. Respondents gave their informed consent at the moment of completing the online survey.

### Definition of consensus

The Delphi study was designed to reach a consensus on the indicators with higher priority through the collection of iterations of informed judgements on two factors: 1) the usefulness of the indicator as a measure of health system responsiveness; and 2) the usefulness of the indicator to inform policy.

Three criteria were used to reach consensus on prioritizing indicators from the baseline list. For each of the 24 baseline indicators, participants were asked to:

- assign a priority level from a Likert-type scale: very high, high, average, low, very low (% of participants assigning very high or high priority was calculated for each indicator).
- benchmark the relative importance of the indicator against the other indicators: higher than the others, equal to the others, or lower than the others (% of participants rating the indicator higher than the others).
- rank the indicators from 1 to 24, starting with the one with the highest priority (mean ranking score: lower mean score indicates a higher ranking).

Consensus was defined as:  $\geq 70\%$  level of agreement on very high/high priority among the Delphi participants; plus being benchmarked by  $\geq 50\%$  of the participants as having a higher relative weight than other indicators; plus being among the top 10 in the ranking list. The final criterion was that consensus

was to be reached for at least seven indicators. The organizers stopped the rounds if consensus was not reached after three rounds.

Indicators were excluded from the following rounds if they reached consensus or if they did not reach a minimum of 50% of consensus in the first round (except for indicators the respondents suggested).

## Procedures

The smartsurvey platform (Tewkesbury, England) was used to send the survey to the participants and to collect their responses. The software shuffled the order of the indicators presented to respondents to avoid a bias towards the first or last indicators appearing on the list.

Participants remained anonymous to avoid domination of the consensus process by one or a few experts (14). One member of the research team was responsible for collecting and analyzing the results to produce a summary aggregate report without personal information, i.e., controlled feedback. The consensus criteria were respected in all rounds with repetitive and interactive surveys, i.e., iterative discussion (15).

Delphi rounds were conducted with a 4-week separation from each other. Before each round, we sent the participants a document with relevant information (e.g., a summary of the results of the first round before the second round) and the survey's virtual link and quick response (QR) code.

Participants were allowed to suggest new indicators during the Delphi rounds, which were included in following rounds.

## Statistical analyses

Percentages and mean scores were used to summarize the frequency of responses per Delphi round and per indicator. We used STATA version 15 (StataCorp. LP, College Station, United States of America) for data management and estimations.

## RESULTS

The invitation was sent to 141 people, 38 of whom replied to the first round and 30 to the second round, who constituted our final sample.

The participants had varied professional backgrounds, the greatest proportion were specialists in geriatrics (15 respondents), followed by researchers in healthy aging with quantitative methods (14 respondents), and health system managers (nine respondents). The respondents lived in 11 countries of the Americas and one in Europe. Most respondents (23 of 38) were women (Table 1).

Consensus was reached on seven indicators after two rounds.

1. Disability-free life expectancy at age 60 years (healthy life expectancy).
2. Proportion of older people 60 years and older who have had a functional evaluation in the past year.
3. Prevalence of disability in the population aged 60 years and older.
4. Potentially avoidable premature death rate in the population aged 60 years and older (mortality rate attributable to low-quality health care).

**TABLE 1. Characteristics of the Delphi survey respondents**

Characteristic	n (%) (n=38)
<b>Sex</b>	
Female	23 (60.5)
<b>Country</b>	
Argentina	9 (23.7)
Austria	1 (2.6)
Brazil	2 (5.3)
Chile	5 (13.2)
Costa Rica	2 (5.3)
Ecuador	1 (2.6)
Guatemala	1 (2.6)
Mexico	8 (21.1)
Peru	2 (5.3)
United States of America	3 (7.9)
Uruguay	1 (2.6)
Venezuela (Bolivarian Republic of)	3 (7.9)
<b>Profile<sup>a</sup></b>	
Gerontologist	6 (15.8)
Geriatrician	15 (39.5)
Manager of health system (national)	9 (23.7)
Manager of health system (local)	5 (13.2)
Informatics and health indicators management	6 (15.8)
Informatics and social indicators management	4 (10.5)
Research in healthy aging with quantitative methods	14 (36.8)
Research in healthy aging with qualitative methods	8 (21.1)
Research in health system responsiveness with quantitative methods	7 (18.4)
Research in health system responsiveness with qualitative methods	6 (15.8)
International cooperation in health systems	7 (18.4)
International cooperation in healthy aging	6 (15.8)

<sup>a</sup> Not mutually exclusive

Source: prepared by authors based on the study results.

5. Percentage of the population aged 60 years and older living in poverty.
6. Premature mortality from noncommunicable diseases (mortality occurring at an age younger than life expectancy).
7. Mortality rate due to falls in the population aged 60 years and older.

Additionally, another indicator reached consensus based on two of the three criteria: out-of-pocket spending on health as a proportion of the total expenditure on health in the population aged 60 years and older (rate of out-of-pocket spending on health by total health spending, ratio 60 years and older versus 59 years and younger, if available).

Table 2 shows the results of each round, with the indicators organized according to impact, results, inputs, and intersectoral coordination indicators (3).

The indicators excluded with less than 50% agreement were: suicide rate in the population aged 60 years and older; percentage of health system users aged 60 years and older who reported a high level of satisfaction with the health services

**TABLE 2. Summary of the results of the two rounds of the Delphi survey by indicator**

Indicator	Three criteria for consensus						Consensus reached <sup>d</sup>	
	Priority <sup>a</sup>		Benchmark <sup>b</sup>		Rank <sup>c</sup>		R1	R2
	R1	R2	R1	R2	R1	R2		
<b>Impact indicators</b>								
Premature mortality from noncommunicable diseases (mortality occurring at an age younger than life expectancy)	✓	✓		✓	✓	✓		Yes
Disability-free life expectancy at age 60 years (healthy life expectancy)	✓		✓		✓		Yes	
Prevalence of disability in population aged 60 years and older	✓		✓		✓		Yes	
Out-of-pocket spending on health in the population aged 60 years and older as a proportion of total spending on health (rate of out-of-pocket health spending to total health spending, ratio 60 years and older versus 59 years and younger)	✓		✓	✓		✓		
Potentially avoidable premature death rate in the population aged 60 years and older (mortality rate attributable to low-quality health care)	✓		✓		✓		Yes	
Mortality rate due to falls in the population aged 60 years and older		✓	✓	✓	✓	✓		Yes
Percentage of the population aged 60 years and older experiencing catastrophic out-of-pocket health expenses	✓				✓		Partially	
Suicide rate in the population aged 60 years and older								
Effective coverage of cataract surgery in the population aged 50 years and older							✓	
Percentage of health system users aged 60 years and older who reported a high level of satisfaction with the health services received								
Percentage of household expenses allocated to long-term care	✓			✓				
<b>Results indicators</b>								
Prevalence of obesity in population aged 60 years and older								
Proportion of the population aged 60 years and older who received the influenza vaccine	✓				✓	✓		
Proportion of the population aged 60 years and older with health coverage through financing schemes					✓	✓		
Proportion of people aged 60 years and older who have had a functional evaluation in the past year	✓		✓		✓		Yes	
Proportion of the population aged 60 years and older with insufficient physical activity (less than recommended)	✓						✓	
Percentage of population aged 60 years and older who have had a periodic health assessment							✓	
<b>Input indicators</b>								
Percentage of health care units using tools to reduce inappropriate polypharmacy							✓	
Number of undergraduate medical and nursing programs including geriatrics								
Density and distribution of health workers (geriatricians, health caregivers and interdisciplinary health teams)								
Number of persons aged 75 years and older who would be hypothetically assigned to each geriatrician if there was an even distribution (also nurse/caregiver/interdisciplinary health care team)					✓			
Indicators of intersectoral – social/education – context and access barriers								
Percentage of the population aged 60 years and older receiving a non-contributory pension								
Percentage of population aged 60 years and older living in poverty		✓		✓	✓	✓		Yes
Average number of years of schooling in the population aged 60 years and older								
Percentage of the population aged 60 years and older living alone		✓						

R1, first Delphi round; R2, second Delphi round.  
<sup>a</sup> ≥70% level of agreement by the participants on the indicator being very high/high priority.  
<sup>b</sup> Benchmarked by ≥50% of the participants as having a higher relative weight than other indicators.  
<sup>c</sup> Ranked by the participants among the top 10 priority indicators.  
<sup>d</sup> The indicator needed to fulfill all three criteria in R1 or R2 for overall consensus to be reached.  
**Source:** prepared by authors based on the study results.

received; prevalence of obesity in the population aged 60 years and older; number of undergraduate medical and nursing programs that included geriatrics; percentage of the population aged 60 years and older receiving a non-contributory pension; and average number of years of schooling in the population aged 60 years and older.

Detailed data on the ranking of each indicator for each round can be provided upon request to the authors.

## DISCUSSION

The Delphi study reached a consensus on a short list of seven indicators of health system responsiveness to the needs older adults after two iterations. Five indicators are related to distal outcomes (mortality and disability) or its reciprocal (healthy life expectancy). One intermediate indicator monitors a concrete service provided by the health system (functional assessments) and the other relates to socioeconomic context (poverty). The selected indicators achieved a balance between a comprehensive view of health system responsiveness and a manageable number of indicators.

In the context of monitoring and improving the health system, it is crucial to decide which indicators to monitor. The people and systems in charge of monitoring the health system at the regional or national level are often overburdened. Having a short list of comprehensive indicators such as the one presented in this article can help make the monitoring process more efficient. In this study, participants reached a consensus predominantly on impact indicators, which are the most “downstream” in monitoring frameworks, in other words, they reflect the more distant consequences of the health system’s actions. Thus, the participants recognized them as good indicators and sound to inform policy. However, great effort is required to improve indicators such as healthy life expectancy and the prevalence of disability. From the advocator’s perspective, this is advantageous because it supports advocacy for improving the health systems for aging people. From the perspective of managers and decision-makers, these might not be appealing indicators because they will not immediately respond to specific health system investments or interventions.

Mortality attributable to low-quality health care has recently started to be studied in low- and middle-income countries (16). This indicator is a powerful tracer of cross-cutting processes in the health system closely related to conditions frequently seen in older adults, such as cancer. Improvements in the health care quality are directly in the hands of the health care providers, and would benefit not only older adults, but most users of the health system – for example vaccination against influenza (and now potentially COVID-19), timely cancer screening, and a multidisciplinary approach to cardiovascular diseases.

Our results indicate particularities in the interactions of older adults with the health system, for instance, the selection of indicators related to falls and functional assessment. Researchers and clinicians have called for attention to these topics (17). Falls are considered a preventable and treatable geriatric problem (18). An older person dying from falls can be regarded as a failure of the health system, not only in terms of the quality of health care provided but in terms of the system’s inability to improve the environment and support network of older persons.

The proportion of older people who have had a functional assessment in the past year indicates that the health

system is trying to change its focus from controlling non-communicable diseases to preserving functionality in older adults. Similarly, functional assessment is an activity that can strengthen the link between the health system and older adults. Carrying out periodic functional assessments benefits both the older adults and the health system because it helps prevent the high caring demand imposed by disability. For instance, WHO’s integrated care for older people guidance provides a feasible approach to implement periodic functional assessment (19) and there are published examples of its implementation (20).

The participants in the Delphi study recognized poverty levels and out-of-pocket spending on health as high-priority indicators of the health system response to older adults. The effect of economic hardship on health is well known by many people in our region. However, consensus was not reached with our study’s three criteria for the out-of-pocket indicators. Yet, out-of-pocket spending was selected based on two of the criteria in each round. This result is in line with the function of the health system to provide financial protection towards universal health coverage (21).

Our results provide a well balanced shortlist of indicators to monitor health system responsiveness for older adults. The scope of the indicators tends to cover the macro-structural level of the health system. Consensus was not reached on the high priority of very specialized topics, such as effective coverage of cataract surgery, polypharmacy-limiting tools, and geriatric education. This does not imply that those areas are unimportant, but that participants did not value their usefulness as highly as indicators or to inform policy.

In the future, we expect that new priorities will emerge and other indicators will gain consensus as high priority for monitoring, for example, demand and costs of long-term care, and effective coverage of interventions (e.g., cataract surgery).

Our study achieved a strong consensus definition corroborated by three criteria. However, it has some limitations which include recruitment problems because of busy end-of-year schedules of potential participants and a loss to follow-up of 21% of the baseline participants, although this is expected in e-Delphi studies (15).

## Conclusion

Consensus was reached for seven indicators for health system responsiveness for older adults: five related to distal outcomes (mortality, disability, and life expectancy); one related to health services (functional assessment); and one related to socioeconomic environment (poverty). Health system professionals should consider these seven priority indicators in their efforts to provide a better health system for older people.

**Author contributions.** EGB conceived the original idea, collected and analyzed the data, interpreted the results, and wrote the paper. PM collected the data and interpreted the results. EV conceived the original idea and interpreted the results. All authors reviewed the paper and approved the final version.

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**Conflicts of interest.** None declared.

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## Una lista breve de indicadores de alta prioridad relativos a la capacidad de respuesta del sistema de salud frente al envejecimiento: un estudio de consenso con el uso de eDelphi

### RESUMEN

El objetivo de este artículo es proporcionar una lista breve y consensuada de indicadores eficaces para medir la capacidad de respuesta del sistema de salud al atender las necesidades de las personas mayores que sean pertinentes para fundamentar las políticas públicas. Se realizó un estudio con el uso de eDelphi (el *software* para el método de Delfos), sin interacción directa entre las personas encuestadas. Se enviaron encuestas virtuales a 141 participantes con experiencia en el análisis y el seguimiento de indicadores de salud, la gestión de sistemas de salud y la atención de salud de las personas mayores. Se utilizó una lista de referencia de 24 indicadores publicada con anterioridad. Los criterios para seleccionar los indicadores de alta prioridad fueron: utilidad como elemento de medición de la capacidad de respuesta de los sistemas de salud y utilidad para fundamentar las políticas. El consenso se definió como lo siguiente: un acuerdo  $\geq 70\%$  entre los participantes de que el indicador era de prioridad muy alta o alta; que  $\geq 50\%$  de los encuestados consideraran que tenía un mayor peso relativo que otros indicadores; y que estuviera entre los diez primeros lugares de la lista. En la primera ronda del proceso intervinieron 38 participantes con distintas competencias profesionales. Después de dos rondas, se llegó a un consenso respecto a siete indicadores. Cinco indicadores estaban relacionados con resultados a largo plazo (mortalidad, discapacidad o esperanza de vida sana), uno con el seguimiento de evaluaciones funcionales y uno con los niveles de pobreza. Los profesionales de los sistemas de salud deberían tener en cuenta estos indicadores prioritarios integrales al adoptar medidas tendientes a proporcionar un mejor sistema de salud para las personas mayores.

**Palabras clave** Sistemas de salud; vigilancia sanitaria de servicios de salud; salud del anciano; técnica Delfos.

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## Uma breve lista de indicadores de alta prioridade da capacidade de resposta de sistemas de saúde para o envelhecimento: um estudo de consenso eDelphi

### RESUMO

Este artigo tem como objetivo fornecer uma breve lista consensual de indicadores efetivos para medir a capacidade de resposta de sistemas de saúde às necessidades das pessoas idosas, relevante para informar políticas públicas. Foi realizado um estudo eDelphi sem interação direta entre os entrevistados. Questionários virtuais foram enviados a 141 participantes com experiência em análise e monitoramento de indicadores de saúde, gestão de sistemas de saúde e atenção à saúde de pessoas idosas, tendo como base uma lista de 24 indicadores publicados anteriormente. Os critérios para seleção como indicadores de alta prioridade foram sua utilidade como marcador da capacidade de resposta do sistema de saúde e utilidade para informar políticas públicas. O consenso foi definido como:  $\geq 70\%$  de concordância entre os participantes de que o indicador tinha prioridade muito alta ou alta; avaliação por  $\geq 50\%$  dos entrevistados de que tinha um peso relativo maior do que outros indicadores; e posicionamento entre os 10 primeiros na lista de classificação. A primeira rodada do processo incluiu 38 participantes com diversos perfis profissionais. Após duas rodadas, chegou-se a um consenso sobre sete indicadores. Cinco estavam relacionados a resultados distais (mortalidade, incapacidade ou expectativa de vida saudável), um ao monitoramento de avaliações funcionais e o último aos níveis de pobreza. Os profissionais de sistemas de saúde devem considerar esses indicadores prioritários abrangentes em seus esforços para oferecer um sistema de saúde melhor para as pessoas idosas.

**Palavras-chave** Sistemas de saúde. vigilância de serviços de saúde; saúde do idoso; técnica Delfos.

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