

# Dialogue Summary

## Modernizing the Oversight of the Health Workforce in Ontario

21 September 2017



McMaster  
University 

McMaster  
HEALTH FORUM

EVIDENCE >> INSIGHT >> ACTION



**Dialogue Summary:  
Modernizing the Oversight of the Health Workforce in Ontario**

21 September 2017

McMaster Health Forum

The McMaster Health Forum’s goal is to generate action on the pressing health-system issues of our time, based on the best available research evidence and systematically elicited citizen values and stakeholder insights. We aim to strengthen health systems – locally, nationally, and internationally – and get the right programs, services and drugs to the people who need them.

Authors

Kerry Waddell, M.Sc., Co-lead Evidence Synthesis, McMaster Health Forum

Kaelan A Moat, PhD, Managing Director, McMaster Health Forum

John N. Lavis, MD, PhD, Director, McMaster Health Forum, and Professor, McMaster University

Funding

The stakeholder dialogue and the evidence brief that informed it were funded by the Government of Ontario and the Ontario SPOR SUPPORT Unit. The McMaster Health Forum receives both financial and in-kind support from McMaster University. The views expressed in the dialogue summary are the views of the dialogue participants and should not be taken to represent the views of the funders, McMaster University or the authors of the dialogue summary.

Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the dialogue summary. The funders reviewed a draft dialogue summary but the authors had final decision-making authority about what appeared in the dialogue summary.

Acknowledgments

The authors wish to thank Ileana Ciurea and the staff of the McMaster Health Forum for assistance with organizing the stakeholder dialogue.

Citation

Waddell K, Moat KA, and Lavis JN. Dialogue summary: Modernizing the oversight of the health workforce in Ontario. Hamilton, Canada: McMaster Health Forum, 21 September 2017.

Dialogue

The stakeholder dialogue about modernizing the oversight of the health workforce in Ontario was held on 21 September 2017 at the McMaster Health Forum in Hamilton, Ontario, Canada.

Product registration numbers

ISSN 1925-2234 (online)

**Table of Contents**

SUMMARY OF THE DIALOGUE ..... 4

SUMMARIES OF THE FOUR DELIBERATIONS..... 5

    DELIBERATION ABOUT THE PROBLEM ..... 5

    DELIBERATION ABOUT ELEMENTS OF A POTENTIALLY COMPREHENSIVE  
    APPROACH TO ADDRESSING THE PROBLEM ..... 7

        Element 1 – Use a risk-based approach to health-workforce oversight..... 7

        Element 2 – Use competencies as the focus of oversight ..... 9

        Element 3 – Employ a performance-measurement and -management system for the health  
        workforce and its oversight bodies ..... 10

        Considering the full array of options..... 11

    DELIBERATION ABOUT IMPLEMENTATION CONSIDERATIONS ..... 11

    DELIBERATION ABOUT NEXT STEPS FOR DIFFERENT CONSTITUENCIES..... 11

## **SUMMARY OF THE DIALOGUE**

Participants generally agreed with the evidence brief that there is a compelling set of factors that suggest the need to modernize the oversight of the health workforce in Ontario, including: 1) the existing oversight framework is no longer fit for purpose; 2) the media frequently draws attention to issues that may not warrant it; 3) politicians typically react to every issue regardless of its importance to the system as a whole; and 4) some professional associations are not advancing their members' understanding of the importance of protecting the public. The first factor closely aligned with many factors addressed in the evidence brief, including (among others): the oversight mechanisms in place have not kept pace with the changing health system; the current oversight framework is focused on regulating individual categories of health workers, rather than groupings of them, and captures some but not all health workers; and the oversight framework has a different focus than the framework used in the education and training of health workers.

In deliberating about how to modernize the oversight of the health workforce, most dialogue participants expressed support for drawing components from each of the three elements of the potentially comprehensive approach that was presented in the evidence brief: 1) use a risk-based approach to health-workforce oversight; 2) use competencies as the focus of oversight; and 3) employ a performance-measurement and -management system for the health workforce and its oversight bodies. Participants noted that the second element – using competencies as the focus of oversight – was the easiest transition given that competencies are increasingly the focus for education and training. As noted in the introduction to this section, dialogue participants generally embraced all three elements of the potentially comprehensive approach to modernizing workforce oversight, although for each element they noted three or four sub-elements that deserved more emphasis. Dialogue participants also identified five cross-cutting themes that should be kept in mind when working through each element: 1) engage employers in oversight; 2) engage patients in oversight; 3) be more proactive in providing oversight; 4) balance consistency and flexibility in oversight across categories of health workers; and 5) ensure health workforce oversight is attuned to the vision for the health system's future, including the increased delivery of interprofessional care.

While recognizing that modernizing the oversight of the health workforce was the purview of the Ministry of Health and Long-Term Care, dialogue participants indicated that they could play roles as individual leaders and as a group or sub-groups in pushing for action by government, advocating for changes to oversight that would yield measurable improvements in the health system, and building and maintaining support across their key constituencies. Some dialogue participants also noted the opportunity to complement a bolder vision with more incremental changes that yielded quick wins and created momentum for more.

# SUMMARIES OF THE FOUR DELIBERATIONS

## DELIBERATION ABOUT THE PROBLEM

Participants generally agreed that there is a compelling set of factors that suggest the need to modernize the oversight of the health workforce in Ontario, which include the six presented in the evidence brief: 1) the oversight mechanisms in place have not kept pace with the changing health system; 2) the current oversight framework is focused on regulating individual categories of health workers, rather than groupings of them, and captures some but not all health workers; 3) the oversight framework has a different focus than the framework used in the education and training of health workers; 4) the financing and funding of oversight bodies are not explicitly designed to optimize public-protection efforts; 5) it is difficult to find information on how the health workforce and its oversight bodies are performing; and 6) citizens are not consistently engaged in meaningful ways in oversight activities.

However, despite general agreement about these factors, participants gave particular attention to four factors, namely:

- 1) the existing oversight framework is no longer fit for purpose (which closely aligned with many of the factors addressed in the evidence brief);
- 2) the media frequently draws attention to issues that may not warrant it (which was given little attention in the brief);
- 3) politicians typically react to every issue regardless of its importance to the system as a whole (which was also given little attention in the brief); and
- 4) some professional associations are not advancing their members' understanding of the importance of protecting the public (which was only partly covered in the brief).

We describe each of these factors in turn below

*The existing oversight framework is no longer fit for purpose*

The first factor, and the one most emphasized by dialogue participants, was that in general the health-workforce-oversight framework is no longer fit for purpose. Participants identified five ways in which this is the case: 1) the framework has not supported key stakeholders to use a consistent definition of self-regulation; 2) the framework does not cover many categories of health workers; 3) the framework does not prioritize concepts related to 'good

### **Box 1: Background to the stakeholder dialogue**

The stakeholder dialogue was convened in order to support a full discussion of relevant considerations (including research evidence) about a high-priority issue in order to inform action. Key features of the dialogue were:

- 1) it addressed an issue currently being faced in Ontario;
- 2) it focused on different features of the problem, including (where possible) how it affects particular groups;
- 3) it focused on three elements (among many) for addressing the policy issue;
- 4) it was informed by a pre-circulated evidence brief that mobilized both global and local research evidence about the problem, three elements of an approach to addressing the problem, and key implementation considerations;
- 5) it was informed by a discussion about the full range of factors that can inform how to conceptualize the problem and possible elements of an approach to addressing it;
- 6) it brought together many parties who would be involved in or affected by future decisions related to the issue;
- 7) it ensured fair representation among policymakers, stakeholders and researchers;
- 8) it engaged a facilitator to assist with the deliberations;
- 9) it allowed for frank, off-the-record deliberations by following the Chatham House rule: "Participants are free to use the information received during the meeting, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed"; and
- 10) it did not aim for consensus.

The dialogue did not aim for consensus because coming to agreement about commitments to a particular way forward can preclude identifying broad areas of agreement, and understanding the reasons for and implications of specific points of disagreement, as well as because even senior health-system leaders typically need to engage elected officials, boards of directors and others on detailed commitments.

Participants' views and experiences and the tacit knowledge they brought to the issues at hand were key inputs to the dialogue. The dialogue was designed to spark insights – insights that can only come about when all of those who will be involved in or affected by future decisions about the issue can work through it together. The dialogue was also designed to generate action by those who participate in the dialogue, and by those who review the dialogue summary and the video interviews with dialogue participants.

governance'; 4) the framework does not enable the full engagement of a number of key organizations in the oversight of the workforce; and 5) the framework has not been adapted to account for system-wide trends towards interprofessional and collaborative care. We address each of these below in turn.

First, many dialogue participants noted that the existing oversight framework has not supported key stakeholders to use a consistent definition of self-regulation. Participants themselves had mixed views on whether and how the definition had evolved over time and what it should be now. Some dialogue participants argued that professional regulatory colleges had acquired more autonomy over time (and perhaps more than was intended when the framework was first developed), while others argued that the government and its agencies had increased their hold on the oversight of the health workforce (and perhaps more than would be expected given the term 'self-regulation'). As one example of the latter viewpoint, one participant described numerous rounds of government-driven revisions to what a newly regulated category of health workers would be allowed to do and how this would be enforced.

Second, as was documented in the evidence brief, many dialogue participants observed that the framework does not cover many categories of health workers. One dialogue participant recalled being surprised when they first started their role at how many categories of health workers were regulated by mechanisms other than the *Regulated Health Professions Act, 1991* (RHPA). Other participants expressed frustration that the framework creates such a clear distinction between those categories of health workers that are regulated under the RHPA and those that are 'unregulated,' rather than having categories of health workers arrayed along a continuum of oversight mechanisms. Further, several participants commented that this distinction could make it difficult for interprofessional teams to involve categories of health workers that are not regulated under the RHPA.

Third, several dialogue participants noted that the framework does not prioritize concepts related to 'good governance.' They expressed particular concern that the wide array of evidence on good-governance practices had not been systematically integrated into the oversight framework, particularly with regards to the governance of regulatory colleges and the appointment of members to professional regulatory college councils. A few participants indicated that they thought the current appointments process had become too political and had deviated from a public-protection mandate.

Fourth, a few dialogue participants suggested that the existing oversight framework does not enable the full engagement of a number of key organizations in the oversight of the workforce. In particular, these participants highlighted Local Health Integration Networks and health-service providers, such as hospitals and community-care organizations, as examples of organizations that have a key stake in workforce oversight, but no voice in important dimensions of this oversight.

Fifth and finally, a few dialogue participants observed that the framework has not been adapted to account for system-wide trends towards interprofessional and collaborative care. These dialogue participants recognized the ad hoc collaborative efforts made by some professional regulatory colleges to work together to permit some degree of interprofessional oversight, but argued that the existing oversight framework does not easily support shared accountability across a team of health workers.

*The media frequently draws attention to issues that may not warrant it*

The second factor that dialogue participants gave particular attention to was the role of the media. In particular, several participants expressed concern about how the media frequently draws attention to specific cases that are not reflective of system-wide challenges, or more specifically not reflective of issues where real or potential harms are significant, and the risk of these harms are unacceptably high. This media attention then draws the attention of the public and (as we return to below) politicians to less pressing challenges in workforce oversight. A few other dialogue participants countered this concern in part by noting both that the media fill a gap in the existing oversight system by providing a voice for patients and their families who have been poorly served by the health system or the health workforce-oversight system, and that the media has



contributed to the recent push towards greater transparency and accountability in health workers' performance.

*Politicians typically react to every issue regardless of its importance to the system as a whole*

Building on the second factor above, dialogue participants noted several types of examples of politicians' reactivity to emerging issues contributing to the problem with health-workforce oversight. One type of example was creating new roles (e.g., Fairness Commission) or adjusting mandates (e.g., Health Professions Regulatory Advisory Council) in the health-workforce oversight landscape, which were not always felt to add value. A second type of example was making incremental adjustments to the *Regulated Health Professions Act, 1991*, with the most recent adjustment being the *Protecting Patients Act, 2017*, which often appeared to further complicate the oversight landscape in the eyes of many health workers. A third type of example was prioritizing categories of health workers for consideration by the Health Professions Regulatory Advisory Council seemingly based more on their ability to mobilize for recognition as a regulated health profession than based on the risk of harm brought by their category of health worker.

*Some professional associations are not advancing their members' understanding of the importance of protecting the public*

Finally, a fourth factor that a number of dialogue participants identified as contributing to the need to modernize the oversight of the health workforce was the role of some professional associations. Participants highlighted the tensions that exist between workforce-oversight bodies (especially professional regulatory colleges) whose mandate is to protect the public, and the professional associations whose mandate is to advance their members' interests. One participant argued that professional associations often "stoke the fears of their members," both in terms of their own professional regulatory college and in terms of other colleges that may be considering changes that may touch on their members' areas of practice.

## **DELIBERATION ABOUT ELEMENTS OF A POTENTIALLY COMPREHENSIVE APPROACH TO ADDRESSING THE PROBLEM**

In deliberating about how to modernize the oversight of the health workforce, most dialogue participants expressed support for drawing components from each of the three elements of the potentially comprehensive approach that were presented in the evidence brief: 1) use a risk-based approach to health-workforce oversight; 2) use competencies as the focus of oversight; and 3) employ a performance-measurement and -management system for the health workforce and its oversight bodies. Participants noted that the second element was the easiest transition given that competencies are increasingly the focus for education and training. Dialogue participants identified four cross-cutting themes that should be kept in mind when working through each element, which we return to at the end of this section.

### **Element 1 – Use a risk-based approach to health-workforce oversight**

In discussing the use of a risk-based approach to health workforce oversight, most dialogue participants agreed that such an approach would be helpful to adopt for a number of steps, including:

- selecting categories of health workers for oversight;
- grouping categories under a smaller number of oversight bodies;
- designing different levels of oversight across oversight bodies; and
- allocating resources to oversight functions within different oversight bodies.

Additionally, participants identified four sub-elements that deserved more emphasis than was given to them in the evidence brief: 1) create a common definition of risk; 2) select categories of health workers for oversight, group them and design their oversight based on their level of risk; 3) recognize the role of

employers and work environments in determining risk; and 4) implement a duty of candour to help bring risks to attention.

*Create a common definition of risk*

Several dialogue participants argued that a common definition of risk was essential in reaching a common understanding of where the risks are in the health system and which of these risks should be prioritized. A few participants noted that asking where along the care pathway patients have the most complications, such as at the point of transitions in care, is just one of many questions that need to be asked to understand and prioritize risks. Another participant noted that risks can emerge even among health workers who are not in direct contact with patients, including both clinical risks (e.g., mis-interpreting diagnostic tests) and financial risks (e.g., billing patients for services that were not provided). A third participant noted that the risks aren't just to patients but also to health workers.

*Select categories of health workers for oversight, group them, and design and implement their oversight based on their level of risk*

Many dialogue participants added nuance to how risk could be better used in workforce oversight. First, a few participants noted that risk needs to be used more extensively in selecting categories of health workers for oversight, noting for example that while the Health Professions Regulatory Advisory Council uses risk explicitly in its work, the initial referral of a category of health worker to the council is made by the Ministry of Health and Long-Term Care, and doesn't use a transparent process. Second, dialogue participants generally agreed that a risk-based approach should be used to group categories of health workers under a smaller number of oversight bodies, although they cautioned against the creation of new silos that could undermine interprofessional oversight. Third, dialogue participants struggled with how to design and execute oversight based on level of risk given the many options available, both in terms of the lens brought to risk assessment for those with higher risks (e.g., employer, work environment, patient care pathway or health-worker career path), and in terms of the oversight options for those with lower risks (e.g., voluntary or registry-based mechanisms in the U.K.).

*Recognize the role of employers and work environments in determining risk*

Building in part from the preceding point, a few dialogue participants noted that employers and work environments deserve much greater attention in terms of how risk is defined and managed, both now and under a modernized oversight system. Two dialogue participants noted how some professional regulatory colleges have a dual responsibility for a category of health workers and for a category of care settings (e.g., Ontario College of Pharmacists with pharmacists and pharmacies; College of Physicians and Surgeons of Ontario with physicians and Independent Health Facilities). A few dialogue participants suggested that this model could be applied to employers in sectors like home and community care where agencies employ many nurses and personal-support workers. One dialogue participant suggested that there may be inspiration in the example of how Alberta Health Services as an employer undertakes work-environment reviews focused on the entire team.

*Implement a duty of candour to help bring risks to attention.*

Turning to the final sub-elements that deserved more emphasis, dialogue participants generally embraced the U.K.'s duty of candour that sets expectations for professional conduct with respect to proactively identifying and reporting (to both patients and to professional regulatory colleges) both harms and risk of harms. While participants recognized that a duty to report exists in the case of incapacity, incompetence and sexual abuse, many argued that this duty should be extended to include other harms as well. Moreover, several dialogue participants emphasized the importance of complementing the extension of a duty of candour among health workers with the adoption of a just culture by professional regulatory colleges, so that mistakes can be addressed and learned from without fear of punishment.

## Element 2 – Use competencies as the focus of oversight

Dialogue participants generally agreed that using competencies as the focus of health-workforce oversight would be helpful, acknowledging that this could assist in developing a common language and focus across:

- organizations involved in the planning and implementation of health-worker education, training and continuing professional-development programs;
- professional associations;
- regulatory bodies (i.e., government, government advisory bodies, and professional regulatory colleges);
- employers; and
- system planners (i.e., those who identify system challenges and propose ways forward for governance, financial and delivery arrangements).

Some dialogue participants argued that using competencies as the focus of oversight would allow health workers to deliver the full range of services they have been trained to provide (not just those permitted through controlled acts and scopes of practice), and thereby improve access to care for Ontarians. As with the first element, dialogue participants identified several sub-elements that deserved more emphasis, namely: 1) use competencies along the entire continuum of preparing for practice (education and training), providing oversight to practice, and improving practice (continuing professional development); 2) engage employers and educators in defining competencies; and 3) define competencies for teams as well as categories of health workers participating in these teams.

*Use competencies along the entire continuum of preparing for practice, providing oversight to practice, and improving practice*

Dialogue participants supported the use of competencies in:

- preparing future health workers for practice (i.e., education and training);
- providing oversight to practice (i.e., the principle focus of the dialogue); and
- improving practice (i.e., continuing professional development that supports re-skilling and up-skilling in light of new health-system needs).

Two participants noted that some categories of health workers are already quite advanced in using competencies, such as physicians in their education and training programs, and some professional regulatory colleges are already quite advanced in using competencies in their approach to oversight, such as the College of Physicians and Surgeons of Ontario, which provides an opportunity for learning by other groups.

*Engage employers and educators in defining competencies*

Dialogue participants also generally agreed that employers and educators need to be engaged in defining core competencies in order to minimize the gaps between what future health workers are being prepared to do and what they are then asked to do by employers, as well as between what health workers are now doing and what their patients and the health system need them to do.

*Define competencies for teams as well as categories of health workers participating in these teams*

Lastly, dialogue participants generally agreed that competencies needed to be defined for interprofessional care teams as well as for team members, with examples of the latter including communication and collaboration skills. One dialogue participant noted that the work on defining competencies in public health following the SARS outbreak was made easier by beginning with the question of “what competencies does the public health workforce need?” rather than “what competencies do different categories of public health workers need?” Two dialogue participants commended the CANMeds framework for giving attention to competencies that are critical to interprofessional team-based care, such as those linked to communicator and collaborator roles, although they noted that these competencies were not always given as much attention in practice as the competencies related to the medical expert role (e.g., applying medical knowledge, clinical skills and professional values in providing high-quality and safe patient-centred care).

### **Element 3 – Employ a performance-measurement and -management system for the health workforce and its oversight bodies**

Dialogue participants generally agreed that there is a need to employ a performance-measurement and -management system with the proposed system features described in the evidence brief, including performance metrics for both health workers and oversight bodies. They consistently returned in their deliberations to the need for increased data collection about and understanding of the current performance of the health workforce and its oversight bodies. As with the first and second elements, dialogue participants identified sub-elements, in this case four, that deserved more emphasis: 1) synthesize and fill gaps in the evidence base about the linkages between oversight mechanisms and performance indicators; 2) come to agreement on whether an existing or new independent body is needed to develop and implement the system; 3) give a role to employers in the system; and 4) engage patients in the system.

#### *Synthesize and fill gaps in the evidence base about the linkages between oversight mechanisms and performance indicators*

A few dialogue participants noted the need for evidence about the linkages between oversight mechanisms and performance indicators. One participant noted that it is currently left up to professional regulatory colleges to collect and analyze performance data, and to conduct research that would support them in determining whether to change or introduce oversight mechanisms. While several participants agreed that more work needs to be done on collecting and analyzing data that truly get at good performance, an even bigger challenge would be synthesizing and filling gaps in the evidence base that informs which oversight mechanisms yield the greatest improvements in which performance indicators.

#### *Come to agreement on whether an existing or new independent body is needed to develop and implement the system*

Dialogue participants engaged most extensively about whether an independent body is needed to develop and implement the performance-measurement and -management system and, if so, whether the body would be an existing organization or a newly created one, with:

- those who opposed an independent body expressing concern about redundancy and additional bureaucracy in a system that already has extensive stakeholder-engagement and other mechanisms in place, and about how the cost to fund the body would likely fall to health workers;
- those who supported an independent body noting that it could reduce political interference (and the effects of election cycles), increase coordination across professional regulatory colleges (particularly in areas involving interprofessional oversight), and reduce inconsistency in oversight mechanisms (in areas where common standards are possible); and
- those in favour of extending the mandate of an existing independent body giving Health Quality Ontario as an example of an organization with much of the needed capacity and many of the needed processes already in place.

#### *Give a role to employers in the system*

Building on the comments about the need to better engage employers in developing and implementing risk-based (element 1) and competencies-focused (element 2) oversight, here dialogue participants emphasized the need to also give a role to employers in the performance-measurement and -management system. Several dialogue participants suggested reasons for doing so, including that employers could then seek greater alignment with their own performance-measurement and -management systems, enter into data-sharing agreements with professional regulatory colleges, use these data to examine the role of individuals, teams and work environments in protecting the public, and establish relationships with colleges that make it easier for them to respond when they identify risks (beyond, for example, just revoking hospital privileges for a physician, which protects the hospital but not the broader health system).

*Engage patients in the system*

Several dialogue participants also supported engaging patients in the performance-measurement and -management system. While some dialogue participants meant this in the more passive sense of surveying patients about their experiences with health workers (e.g., in primary care) and their trust and confidence in these health workers and their oversight system, other dialogue participants meant a more active role in designing and governing the system.

**Considering the full array of options**

As noted in the introduction to this section, dialogue participants generally embraced all three elements of the potentially comprehensive approach to modernizing workforce oversight, although for each element they noted three or four sub-elements that deserved more emphasis. Dialogue participants also identified five cross-cutting themes that should be kept in mind when working through each element:

- engage employers in oversight, which has already been emphasized in relation to all three elements;
- engage patients in oversight, which has already been emphasized in relation to the third element;
- be more proactive in providing oversight (compared to the past where much activity has been reactive);
- balance consistency and flexibility in oversight across categories of health workers; and
- ensure health workforce oversight is attuned to the vision for the health system's future, including the increased delivery of interprofessional care.

**DELIBERATION ABOUT IMPLEMENTATION CONSIDERATIONS**

Dialogue participants agreed that there was an appetite for modernizing the oversight of the health workforce. A few participants suggested that the recent media attention given to incidents like the Wettlaufer case (which involved a nurse convicted of killing patients in a long-term care home, other healthcare facilities, and patients' homes) had opened a window of opportunity for change. Other participants noted two barriers that would need to be overcome, with the first being pressure from key stakeholder groups, including oversight bodies, particularly if there are felt to be winners and losers in which categories of health workers are covered or grouped together, and given the way that 'turf wars' have sprung up in the past. The second barrier was noted to be the pending provincial election, which could nullify any highly visible work undertaken before what could be a change in government or shift in the political agenda.

**DELIBERATION ABOUT NEXT STEPS FOR DIFFERENT CONSTITUENCIES**

While recognizing that modernizing the oversight of the health workforce was the purview of the Ministry of Health and Long-Term Care, dialogue participants indicated that they could play roles as individual leaders and as a group or sub-groups in pushing for action by government, advocating for changes to oversight that would yield measurable improvements in the health system, and building and maintaining support across their key constituencies. Some dialogue participants also noted the opportunity to complement a bolder vision with more incremental changes that yielded quick wins and created momentum for more.



**McMaster**  
**HEALTH FORUM**

**>> Contact us**

1280 Main St. West, MML-417  
Hamilton, ON, Canada L8S 4L6  
+1.905.525.9140 x 22121  
forum@mcmaster.ca

**>> Find and follow us**

[mcmasterforum.org](http://mcmasterforum.org)  
[healthsystemsevidence.org](http://healthsystemsevidence.org)  
[mcmasteroptimalaging.org](http://mcmasteroptimalaging.org)

• • • [mcmasterforum](https://www.facebook.com/mcmasterforum)

**FORUM+**

