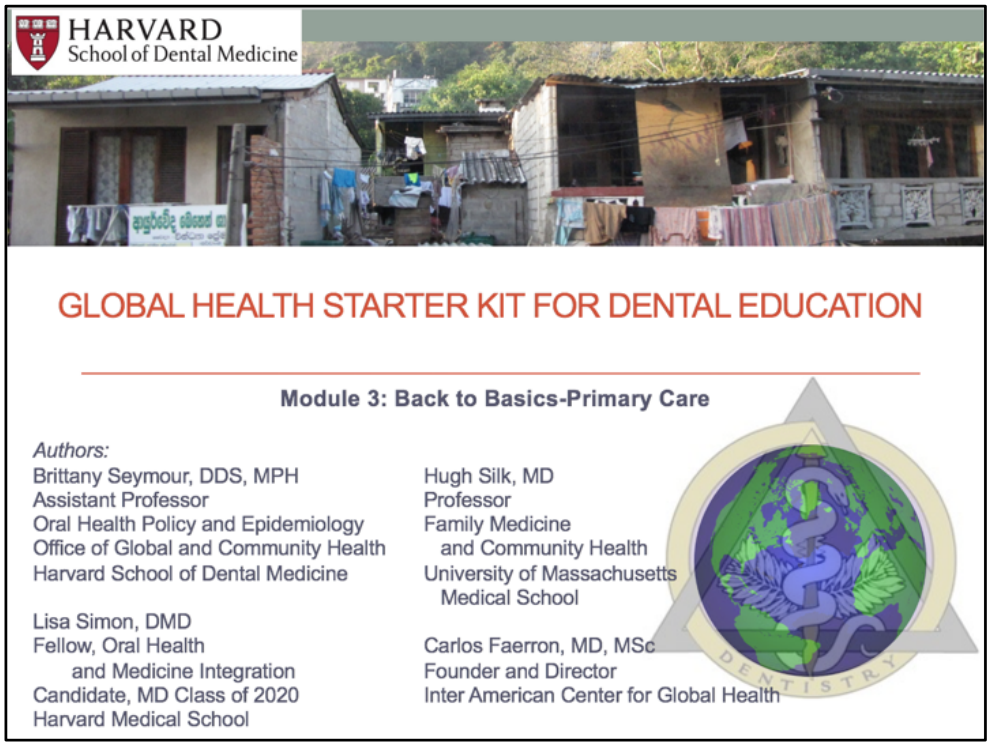
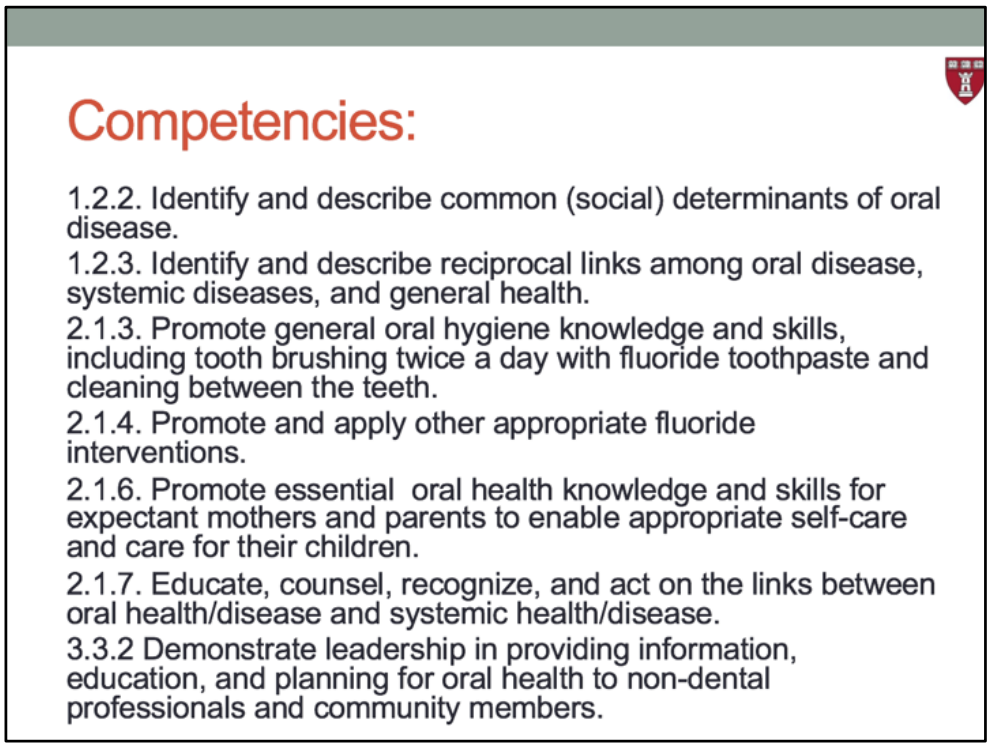


This module introduces the connection between oral health and overall health, including oral and systemic disease associations, the integration of oral health and primary care, and workforce and policy implications.

While there are numerous resources and references available about these topics, for the purpose of this module, we have curated a small sample of high quality resources to support the learning outcomes. We encourage learners (and educators) to explore the literature further, beyond what is contained in this module.

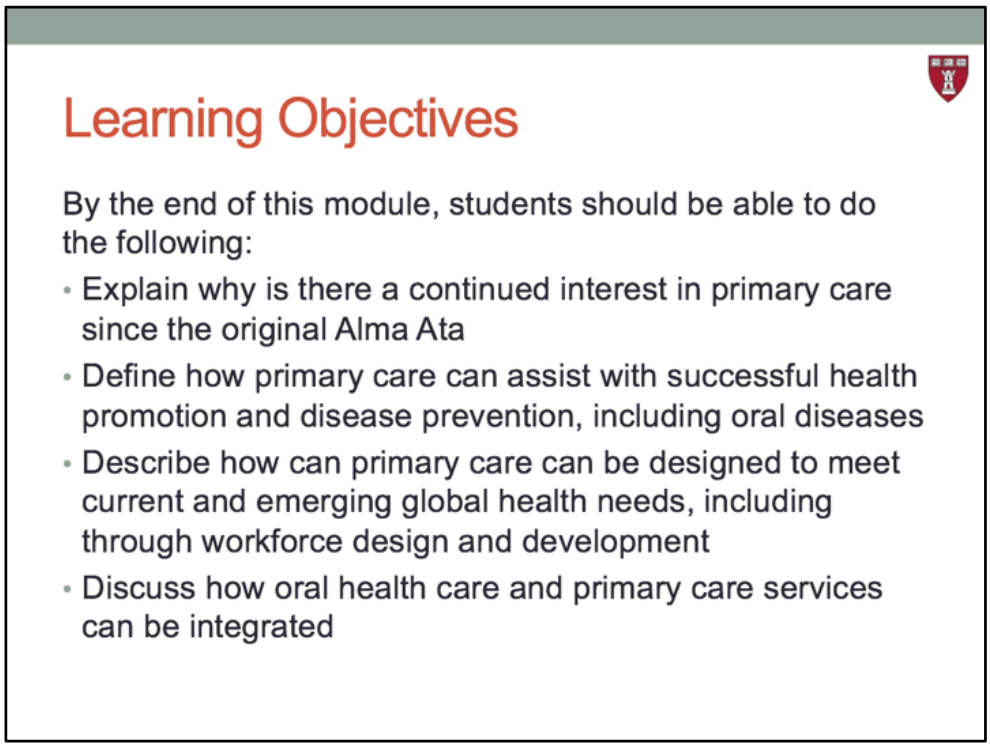
This module is designed to be presented in less than one hour. To extend the learning experience, **OPTIONAL IN-CLASS ACTIVITIES** have been inserted along the way. These learning activities allow for up to one additional hour of active learning during the module.



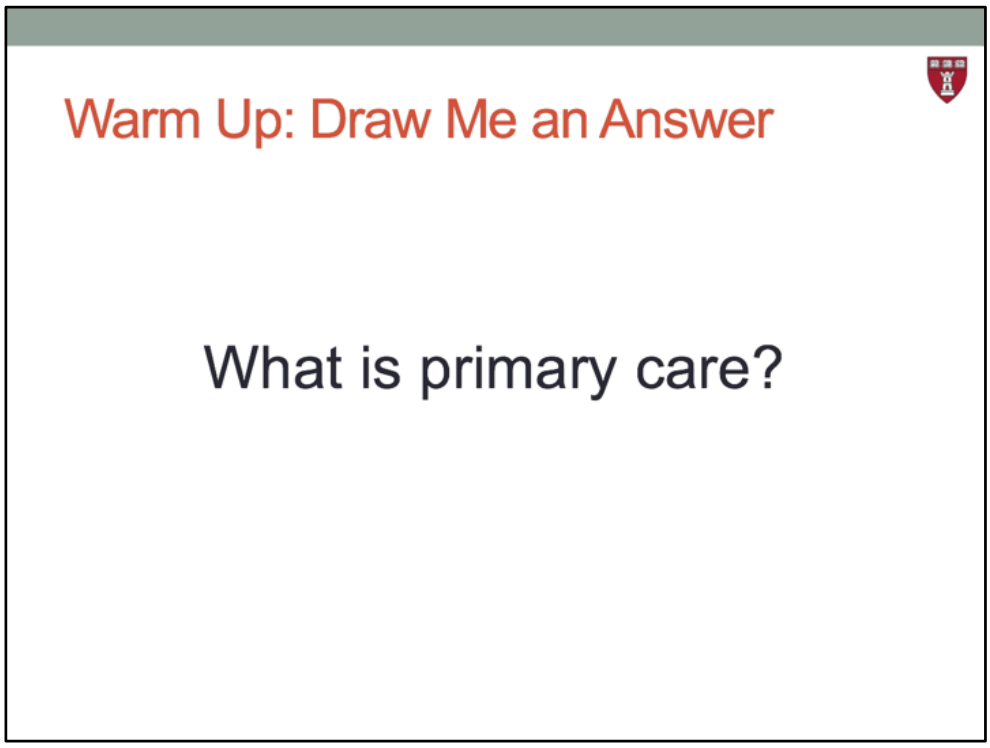
This module is related to the above competencies. While these competencies cannot be met through a single teaching module, this module is working toward competency-based best practices in global health for dental education.

From:
Benzian, H., Greenspan, J.S., Barrow, J., Hutter, J.W., Loomer, P.M., Stauf, N. and Perry, D.A., 2015. A competency matrix for global oral health. Journal of dental education, 79(4), pp.353-361

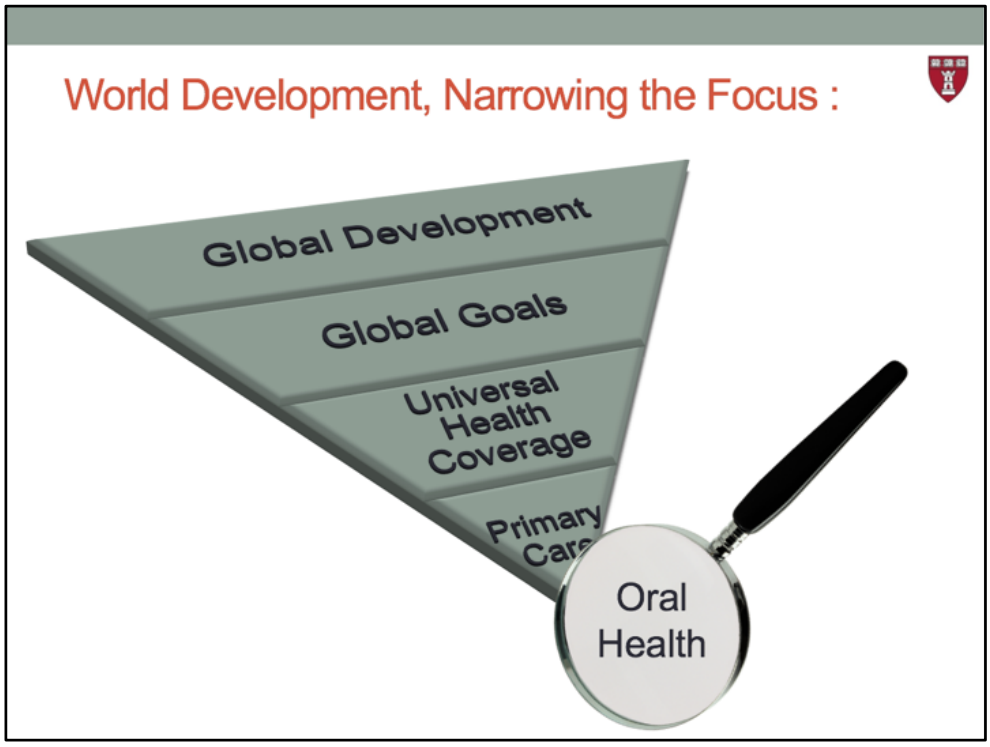
Seymour B, Shick E, Chaffee B, Benzian H. Going global: toward competency-based best practices for global health in dental education. J. Dent. Educ. 2017;18(6):707-15.



(Note: The Alma Ata was a key international primary care conference in 1978; information on the conference is found in this module)

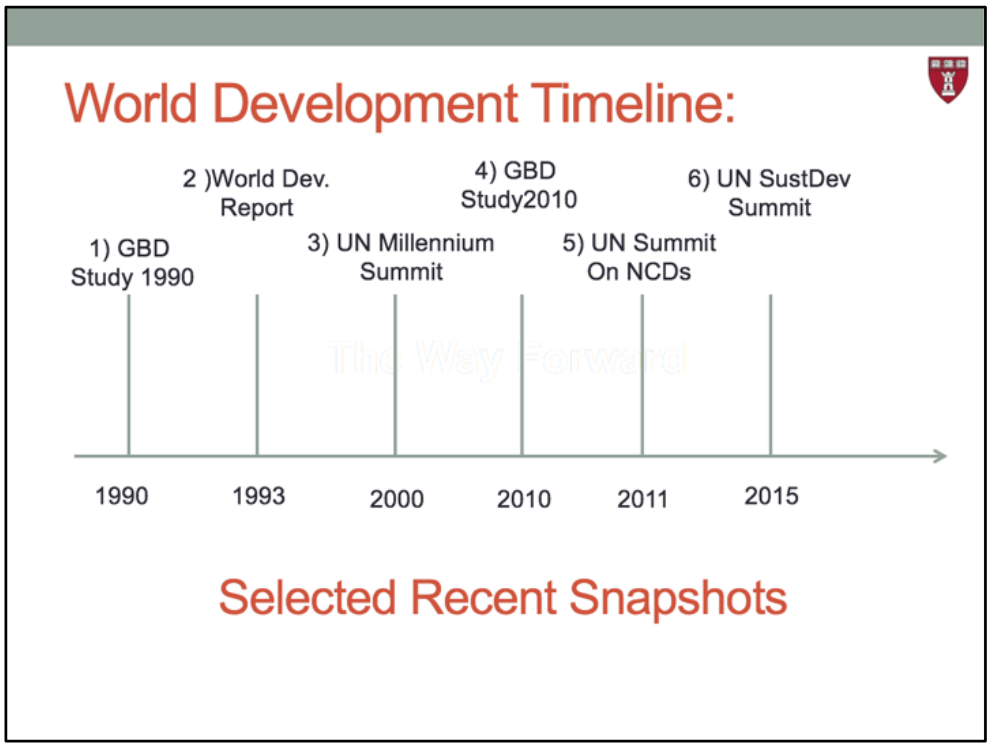


For this warm up activity, use the board to *draw* a definition of primary care. There are no right or wrong answers, it is merely an exercise to get students thinking about what primary care looks like in practice, beyond words on a page.
For a couple minutes, have students discuss in pairs how they define primary care in the form of a picture. Then ask each group to draw their picture on the board that represents primary care to them. This warm up is intended to get them thinking about aspects of primary care such as prevention, the patient-provider relationship, a medical/dental home, early intervention, among many others. It may also reveal any views or pre-existing biases they may have about primary care that can be addressed though discussion during the module.



The global health and development agenda presents numerous opportunities for improved oral health. This module focuses on one example: the integration of oral health and primary care. We will narrow the broad focus of global development down from the global goals (Module 1), to the specific target for universal health coverage (Module 2), to UHC's essential component of primary care, and finally to the integration of oral health. Although this module narrows the focus of global development to one highly specific component, this example is anything but small.

Key Message: In fact, the integration of oral health and primary care is an enormous task that requires substantial shifts in how we think about financing and payments for services, workforce development and scope of practice, and policy. Each of these sub-components is in and of itself a monumental undertaking and detailing these is beyond the scope of this module.



This timeline is covered in more detail in Module 2. For the purpose of this module, we will discuss how key events in the timeline have lead to current needs for primary care services and oral health integration.

1990: The first global burden of disease (GBD) data dates back to 1990, when data about the risks and determinants of morbidity and mortality were systematically collected across 8 regions of the world through 1990.

1993: The 1993 World Development Report, grounded in GBD data, has become highly influential because it was among the early data and evidence linking an investment in health to improved economic outcomes, and introduced new methods for measuring the burden of disease.

2000: In September 2000, world leaders convened for the United Nations Millennium Summit, where the Millennium Development Goals were born, several of which had a direct focus on investing in health in order to eliminate poverty.

2010: The Institute for Health Metrics and Evaluation and other academic partners collaborated on a follow up global burden of disease study. Data continues to be updated.

2011: As evidence continued to mount from the GBD study, among other sources,

global leaders began to recognize that NCDs required more attention and a place on the global stage. The UN High-Level Summit for Non-communicable Diseases was held in September 2011, which included a side session devoted to oral health.

2015: World leaders convened at the UN headquarters in New York City for the UN Sustainable Development Summit. A new set of global goals emerged, designed to carry forward the global development agenda as it moved from the MDG era (2000-2015) into the sustainable era (2015-2030). These are known as the Sustainable Development Goals.

References:

World Health Organization Health Statistics and Information Systems. About the Global Burden of Disease Study. ©WHO 2018.
http://www.who.int/healthinfo/global_burden_disease/about/en/

World Bank. 1993. World Development Report 1993 : Investing in Health. New York: Oxford University Press. © World Bank.
https://openknowledge.worldbank.org/handle/10986/5976 License: CC BY 3.0 IGO

United Nations. Past conference. Millennium Summit (6-8 September 2000). Accessed on January 22, 2018 at:
http://www.un.org/en/events/pastevents/millennium_summit.shtml

Institute for Health Metrics and Evaluation. GBD History. Accessed on January 22, 2018 at: http://www.healthdata.org/gbd/about/history

UN events press release. "Leaders Gather at UN Headquarters for a High-Level Meeting on Non-communicable Diseases (NCDs)." Not dated. Accessed on January 28, 2018 at: http://www.un.org/en/ga/ncdmeeting2011/.

UN New Centre. Sustainable Development Goals kick off with start of the new year. News, Secretary-General, Sustainable Development Agenda. Published December 30, 2015.
Accessed January 23, 2018 at:
http://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/

Initiated through the Millennium Development Goals and continued through the Sustainable Development Goals, investing in, implementing, and monitoring poverty reduction strategies with a direct focus on health has lead to remarkable progress globally. Although gains have been uneven between and within countries, the global goals have resulted in unprecedented coordination among world leaders, a surge in global funders of development assistance for health, and impressive political prioritization of risks and causes of morbidity and mortality around the world.

Reference:

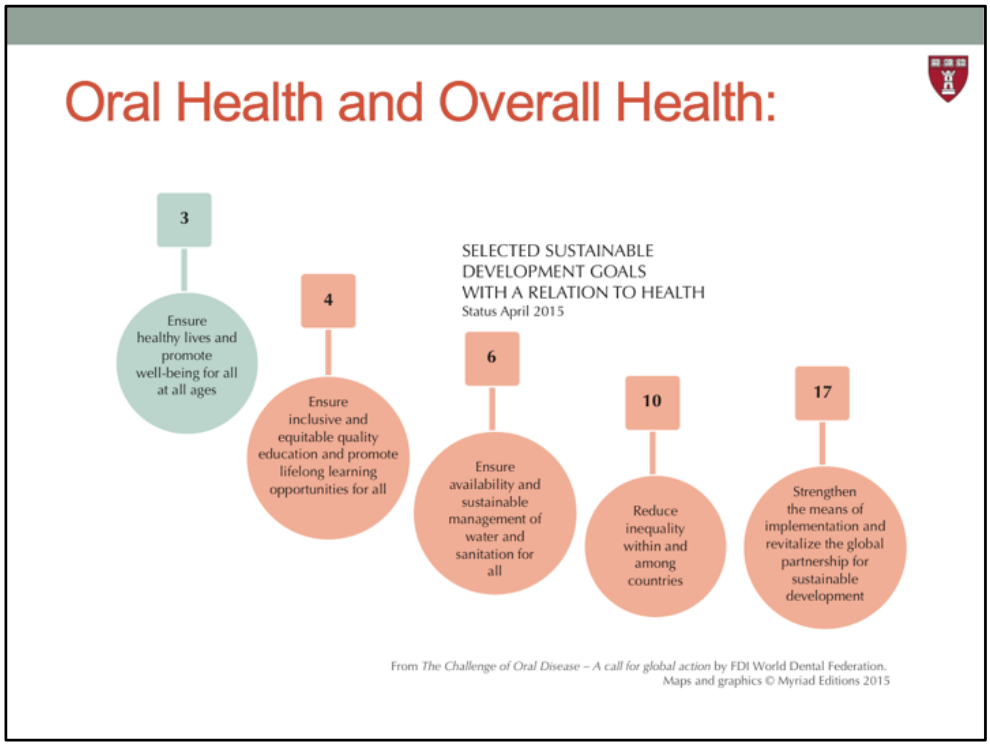
Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, et al. Global health 2035: a world converging within a generation. Lancet. 2013 Dec 7;382(9908):1898-955

Although none of the goals, targets, or indicators specifically addressed the burden of oral diseases, all 8 of the MDGs had links to oral health. The MDGs provided valuable opportunities to the global oral health community regarding the importance of identifying common linkages between oral health and the global health and development agenda, even when not explicitly recognized by global leadership charged with setting the MDG agenda at the time. As with the MDGs, oral health is not explicitly addressed in the SDGs. Global oral health leaders continue to draw links in their political and advocacy efforts. This work to integrate the MDGs, SDGs, and oral health is paving the way for recognition and improved political prioritization of oral health at the global level.

Key Message: Oral health is linked to the global goals in many important ways. The goals focus on many social determinants of health that are also relevant for oral health, including ability to attend school and get an education, improved maternal and child health, and improved nutrition. Furthermore, the goals focus on addressing common risk factors for multiple diseases, particularly NCDs, including tobacco, alcohol, and sugar.

Graphic Sources and References:
The Oral Health Atlas- Mapping a neglected global health issue. Geneva: FDI World Dental Federation; 2009. (MDGs)

The Challenge of Oral Disease – A call for global action. The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015. (SDGs)
Accessed January 28, 2018 at: http://www.fdiworlddental.org/resources/oral-health-atlas/oral-health-atlas-2015.



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The Oral Health Atlas- Mapping a neglected global health issue. Geneva: FDI World Dental Federation; 2009. (MDGs)

The Challenge of Oral Disease – A call for global action. The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015. (SDGs)
Accessed January 28, 2018 at: http://www.fdiworlddental.org/resources/oral-health-atlas/oral-health-atlas-2015.

The global goals have even more specific links to poor oral health and systemic diseases. Evidence demonstrates clear linkages between oral and systemic health, and if the global goals are to be achieved, oral health must be included in the efforts underway. In other words, the global goals are not achievable without addressing poor oral health. The global goals are covered in more detail in Module 2.

Examples:
Maternal and Child Health: Mothers with untreated periodontal disease are at increased risk for pre-term birth, lower birth-weight babies and pre-eclampsia.

Diabetes: People with diabetes are more likely to develop periodontal disease. Those who receive periodontal treatment are better able to control their blood sugar levels, less likely to be admitted to the hospital, and see reduced annual healthcare costs for their diabetes.

Cardiovascular Disease: Those with periodontal disease are at increased risk for cardiovascular disease, and periodontal treatment has been shown to improve cardiovascular health.

Aging: Seniors with poor oral health and edentulism have poorer nutritional status.

Respiratory Disease: The risk for aspiration pneumonia increases with poor oral

health status.

Graphic sources:
Green, D. Have the MDGs affected developing country policies and spending? Findings of new 50 country study. World Bank- Public Sphere blog. August 20, 2015. Accessed on January 22, 2018 at: https://blogs.worldbank.org/publicsphere/have-mdgs-affected-developing-country-policies-and-spending-findings-new-50-country-study.

UN New Centre. Sustainable Development Goals kick off with start of the new year. News, Secretary-General, Sustainable Development Agenda. Published December 30, 2015.
Accessed January 23, 2018 at:
http://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/

References:
Jeffcoat MK, Jeffcoat RL, Gladowski PA, Bramson JB, Blum JJ. Impact of Periodontal Therapy on General Health: Evidence from Insurance Data for Five Systemic Conditions. *Am J Prev Med*. 2014 Jun 18.

Merchant AT, Georgantopoulos P, Howe CJ, Virani SS, Morales DA, Haddock KS. Effect of Long-Term Periodontal Care on Hemoglobin A1c in Type 2 Diabetes. *J Dent Res*. 2015 Dec 23

Goepfert AR, Jeffcoat MK, Andrews WW, et al. Periodontal disease and upper genital tract inflammation in early spontaneous preterm birth. Obstet Gynecol 2004;104:777-783

Boggess KA, Lieff S, Murtha AP, Moss K, Beck J, Offenbacher S. Maternal periodontal disease is associated with an increased risk for preeclampsia. Obstet Gynecol 2003;101:227-231

Corbella S, Taschieri S, Del Fabbro M, Francetti L, Weinstein R, Ferrazzi E. Adverse pregnancy outcomes and periodontitis: A systematic review and meta-analysis exploring potential association**.** *Quintessence Int*. 2015 Oct 26**.**

Lockhart PB, Bolger AF, Papapanou PN, Osinbowale O, Trevisan M, Levison ME, Taubert KA, Newburger JW, Gornik HL, Gewitz MH, Wilson WR, Smith SC Jr, Baddour LM; American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular Disease in the Young, Council on Epidemiology and Prevention, Council on Peripheral Vascular Disease, and Council on

Clinical Cardiology. Periodontal disease and atherosclerotic vascular disease: does the evidence support an independent association?: a scientific statement from the American Heart Association. *Circulation*. 2012 May 22;125(20):2520-44. Epub 2012 Apr 18.

Tonetti MS, D'Aiuto F, Nibali L, Donald A, Storry C, Parkar M, Suvan J, Hingorani AD, Vallance P, Deanfield J. Treatment of periodontitis and endothelial function. N Engl J Med. 2007 Mar 1;356(9):911-20.

Marshall TA, Warren JJ, Hand JS, Xie XJ, Stumbo PJ. Oral health, nutrient intake and dietary quality in the very old. J Am Dent Assoc. 2002 Oct;133(10):1369-79.

El-Solh AA. Association between pneumonia and oral care in nursing home residents. Lung. 2011 Jun;189(3):173-80. Epub 2011 Apr 30.

The evidence is mounting that poor oral health results in higher health care costs overall. In the United States, over $1billion is spent annually managing dental infections in the emergency room. People living with chronic illnesses have fewer hospitalizations and their total medical costs are lower if they receive regular dental care.

References:

Allareddy V, Kim M K, Kim S *et al*. Hospitalizations primarily attributed to dental conditions in the United States in 2008. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2012; 114: 333–337.

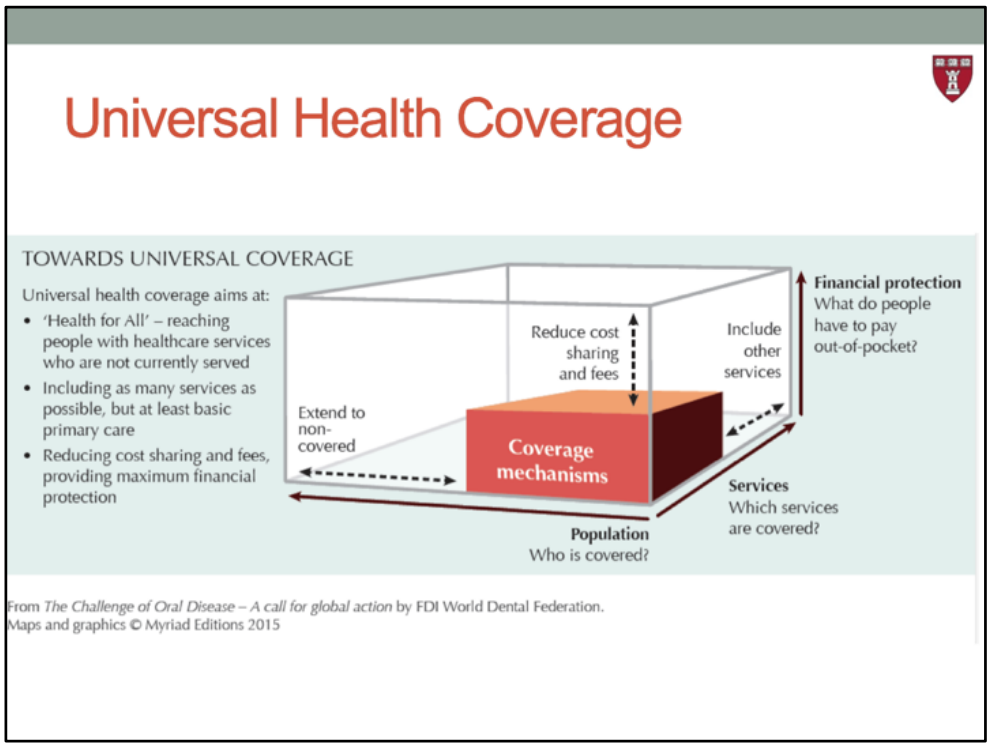
Nasseh K, Vujicic M, Glick M. The Relationship between Periodontal Interventions and Healthcare Costs and Utilization. Evidence from an Integrated Dental, Medical, and Pharmacy Commercial Claims Database. Health Econ. 2017 Apr;26(4):519-527. doi: 10.1002/hec.3316. Epub 2016 Jan 22.

Humana Healthcare, Medical Dental Integration Study 2013.

United Concordia Oral Health Study Results White Paper, 2014

Allareddy V, Rampa S, Lee MK, Allareddy V, Nalliah RP. Hospital-based emergency department visits involving dental conditions: profile predictors of poor outcomes

and resource utilization. J Am Dent Assoc. 2014 Apr;145(4):331-7.



SDG Goal 3, target 8: Achieve universal health coverage.

Universal health coverage is defined by the WHO as all people having the ability to access health care services without incurring financial hardship.

The overall aim of universal coverage is to reach as many people as possible with essential health services, particular people who otherwise do not have access, to include coverage for as many services as possible, and to cover as much of those services as possible. These aims overall will assist to reduce out-of-pocket spending on health care by individuals, especially those who can least afford it. Universal Health Coverage is also discussed in Module 2.

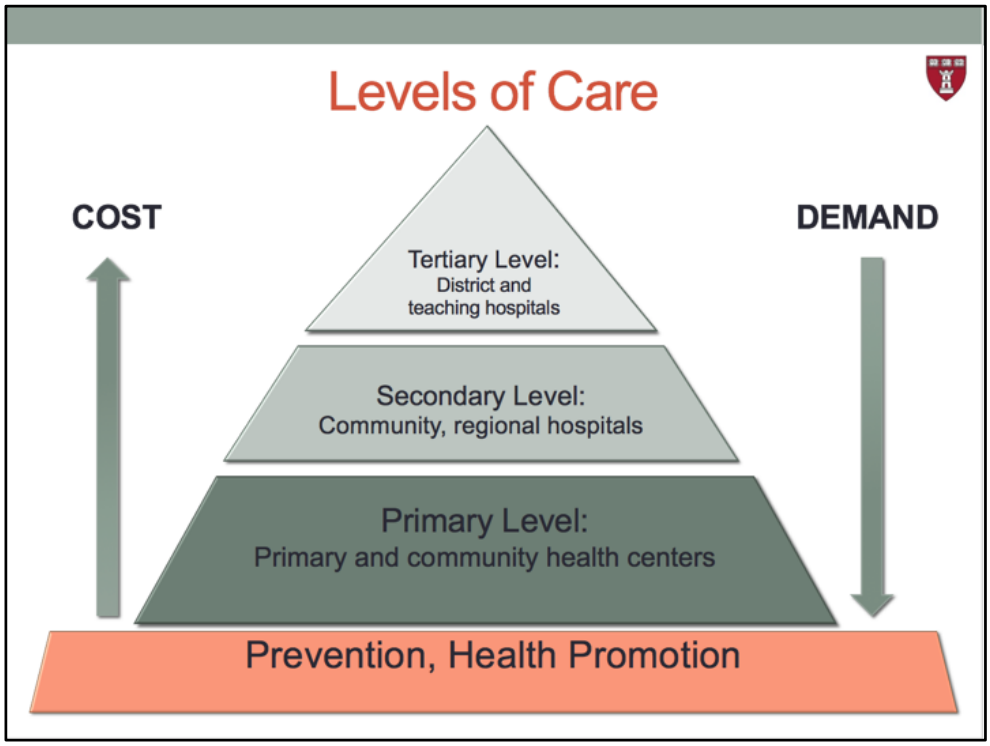
References:

Statistical Commission- 2030 Agenda for Sustainable Development. Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development. https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework_A.RES.71.313%20Annex.pdf. Last accessed on January 18, 2018.

The Challenge of Oral Disease – A call for global action. The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015 .
Accessed January 28, 2018 at: http://www.fdiworlddental.org/resources/oral-health-

atlas/oral-health-atlas-2015.

Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, et al. Global health 2035: a world converging within a generation. Lancet. 2013 Dec 7;382(9908):1898-955



In order to achieve universal health coverage, a well-functioning health system is necessary, where cost of care to individuals is kept to a minimum and costs to the health care system are reduced through a tiered approach to care delivery.

A well functioning health system capable of delivering universal coverage to its population must rest on a foundation of prevention and health promotion. This foundation mitigates costs by addressing preventable illnesses before they occur, and sustains these cost reductions through ongoing health promotion efforts. The World Health Organization has identified essential packages of population-based interventions designed to tackle the main common risk factors for multiple diseases and conditions; these risk factors include sugar/poor diet, tobacco, alcohol, and physical inactivity.

When preventive efforts are not enough and individuals show preliminary signs of or are at risk for illness, they can seek early, efficient care in primary care centers. The World Health Organization has also identified essential packages of clinical interventions, nicknamed ‘best buys’ due to their cost-effectiveness, effect on health, feasibility, and low implementation costs.

When early clinical intervention is insufficient, more advanced care is available at local hospitals by specialists. As needs progress and become increasingly complex, further specialized care is available at district and university hospitals. In an ideal

model, while costs increase at each tier higher on the pyramid, demand for services is reduced.

References:

Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, et al. Global health 2035: a world converging within a generation. Lancet. 2013 Dec 7;382(9908):1898-955.

The Challenge of Oral Disease – A call for global action. The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015.
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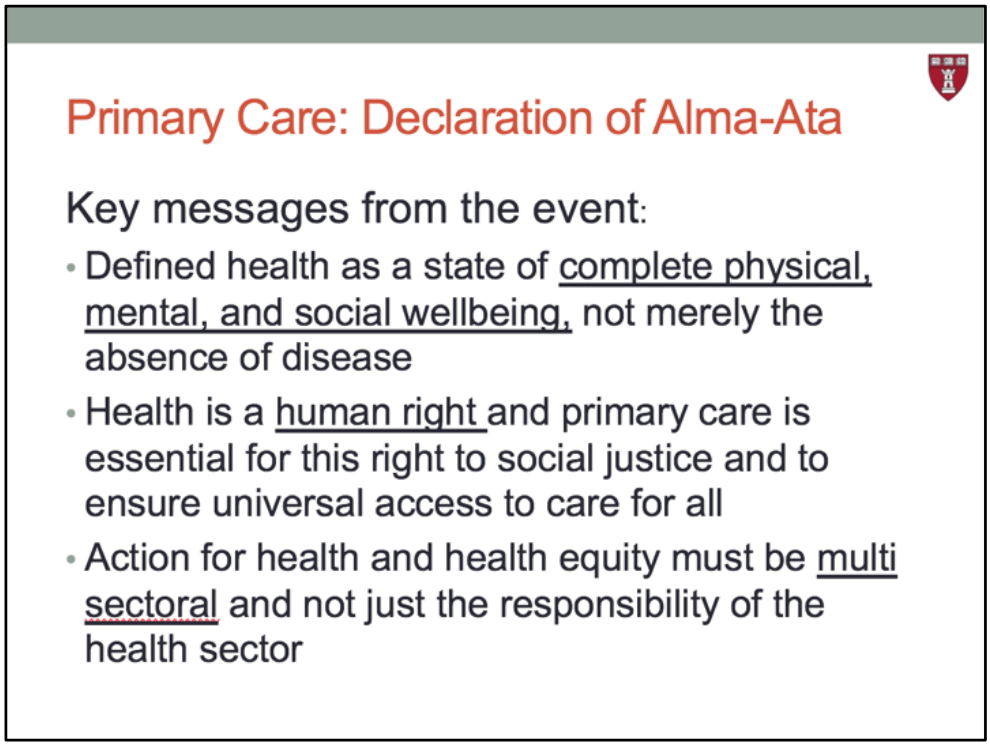
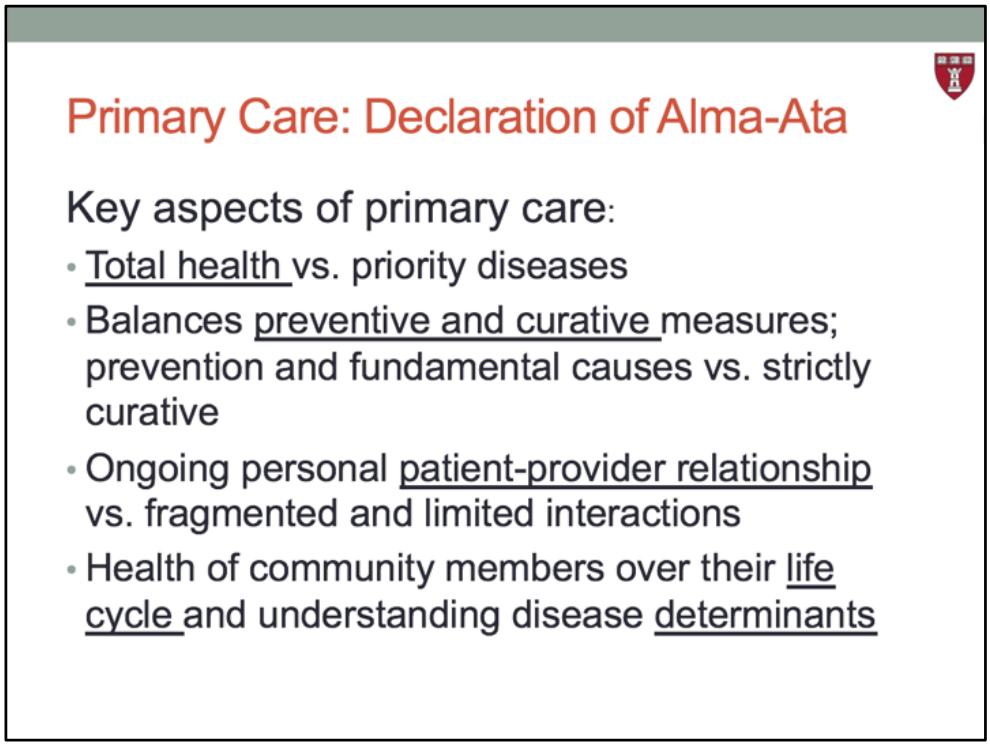


In 1978, the International Conference on Primary Health Care was held to urge governments and global actors such as governments and the WHO and UNICEF to increase support for primary care services through increased technical and financial resources. The Declaration of Alma-Ata (the city where the meeting was held) focused on redefining health not just as the absence of disease, but as a state of complete physical, mental, and social well-being. It described health as a human right that requires collaboration between multiple sectors including but not limited to the health sector.

References:

WHO, UNICEF. Declaration of Alma-Ata. International Conference on Primary Health Care, Alma-Ata, USSR, Sept 6–12, 1978. http://www.who.int/publications/almaata_declaration_en.pdf (accessed January 7, 2018).

Primary Health Care, Now More Than Ever. WHO: The World Health Report 2008. World Health Organization website. http://www.who.int/whr/2008/whr08_en.pdf. Accessed October13, 2010.



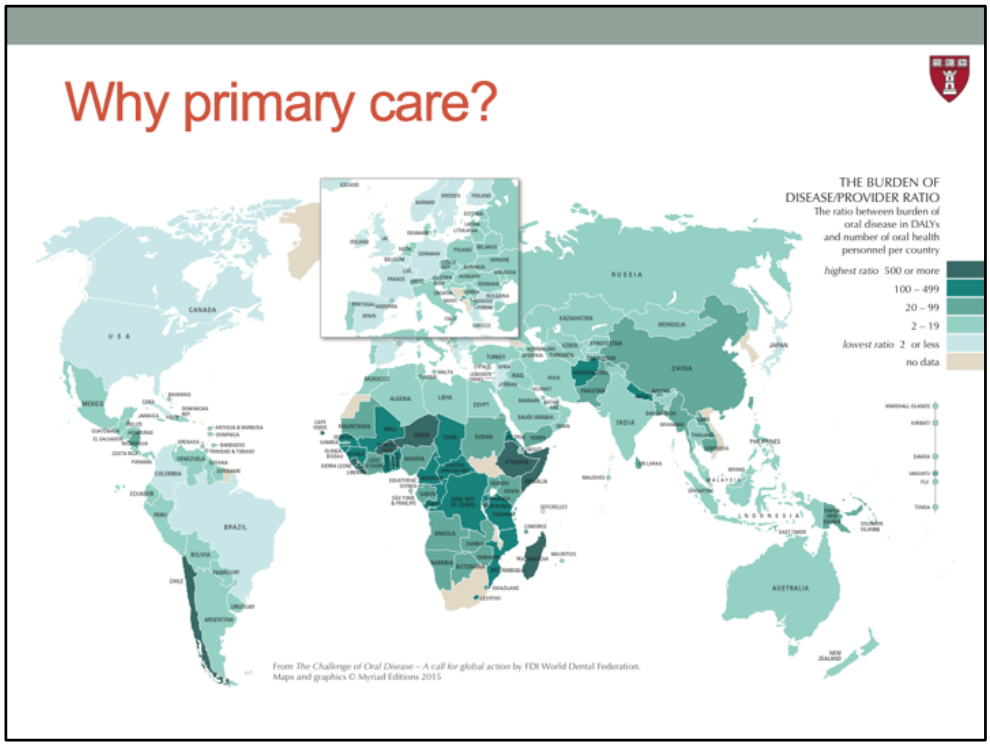
The Declaration of Alma-Ata created a paradigm shift in how we think about health and health care. The values placed on whole person health over the course of their lifetime, through ongoing patient-provider relationships and an proper balance between prevention and clinical care, have resulted in a stronger focus on health equity today by global leaders, governments and ministries of health, as well as local organizations.

References:

WHO, UNICEF. Declaration of Alma-Ata. International Conference on Primary Health Care, Alma-Ata, USSR, Sept 6–12, 1978. http://www.who.int/publications/almaata_declaration_en.pdf (accessed January 7, 2018).

Primary Health Care, Now More Than Ever. WHO: The World Health Report 2008. World Health Organization website. http://www.who.int/whr/2008/whr08_en.pdf. Accessed October13, 2010.

WHO: Declaration of Alma-Ata , International Conference on Primary Health Care, Alma-Ata, USSR, 6-12 September 1978. http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf



Global trends and transitions are changing disease and demographic patterns, as we explored in detail in Module 1. The world is also facing serious oral health workforce shortages, which reduces the ability of health systems to respond to growing oral health challenges and leaves large population groups without access to essential oral health care services. Traditionally, the ratio of patients to providers has been used to measure the workforce's ability to response to patient needs. However, global trends indicate that there are more people in the world, they are living longer, and are requiring more complex dental care, and more of it. Thus, if patients' needs are higher and more complex today than previously, the patient-provider ratio may have limitations in its ability to gauge how many providers are needed to meet today's challenges.

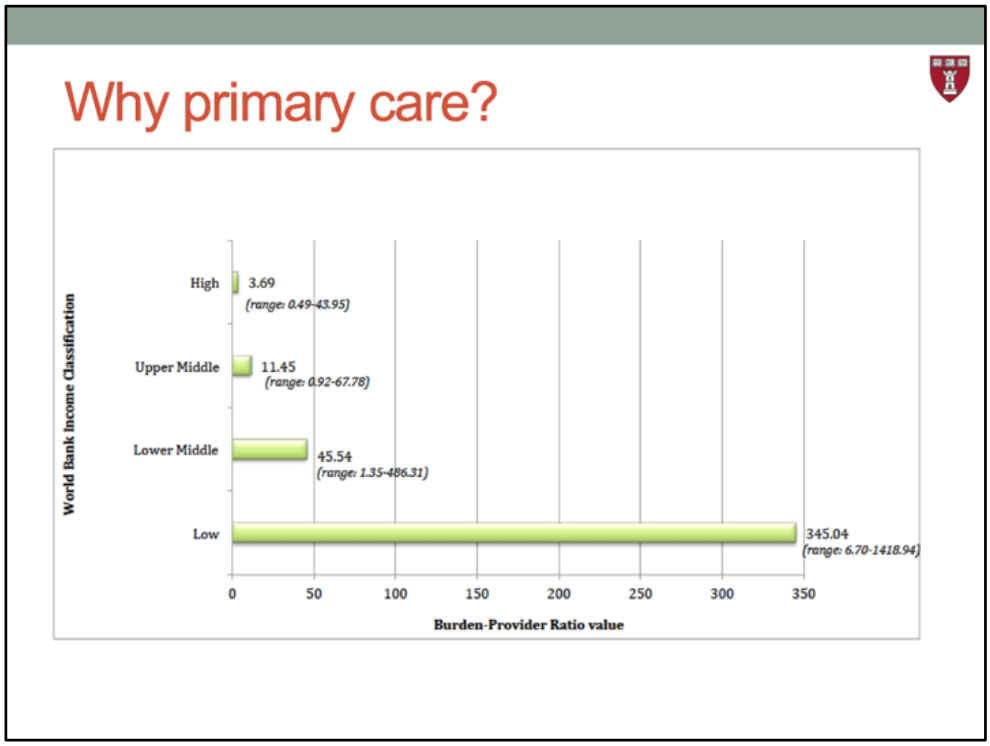
A new metric for quantifying this challenge was published by the FDI in the Oral Health Atlas in 2015. The metric analyzes the mismatch between the burden of disease and persisting shortages of the oral health workforce– the "Burden/Provider Ratio" (BPR). BPR was calculated by dividing the sum of all disability-adjusted-life-years (DALYs) lost to oral diseases (in this case periodontal disease and dental caries) by the number of providers able to provide disease treatment in each country. Total global BPR is 5.3 and the average BPR across countries is 90, demonstrating that highest values are heavily skewed toward the poorer countries, which are characterized by a combination of a high disease burden and a low provider availability. The United States exhibits the lowest BPR of 0.49 and Ethiopia the highest

BPR of 1418.9. It should be noted that even with the lowest BPR, the United States has severe challenges in oral health workforce distribution, compounding regional oral health disparities.

Key Message: In today's evolving world, global trends are illuminating the fact that there are not enough dentists to treat the needs of all patients who need care globally, and that's likely to worsen as global trends continue. Innovative solutions will be required to meet the challenges posed by the global disease burden.

References and Graphic Source:

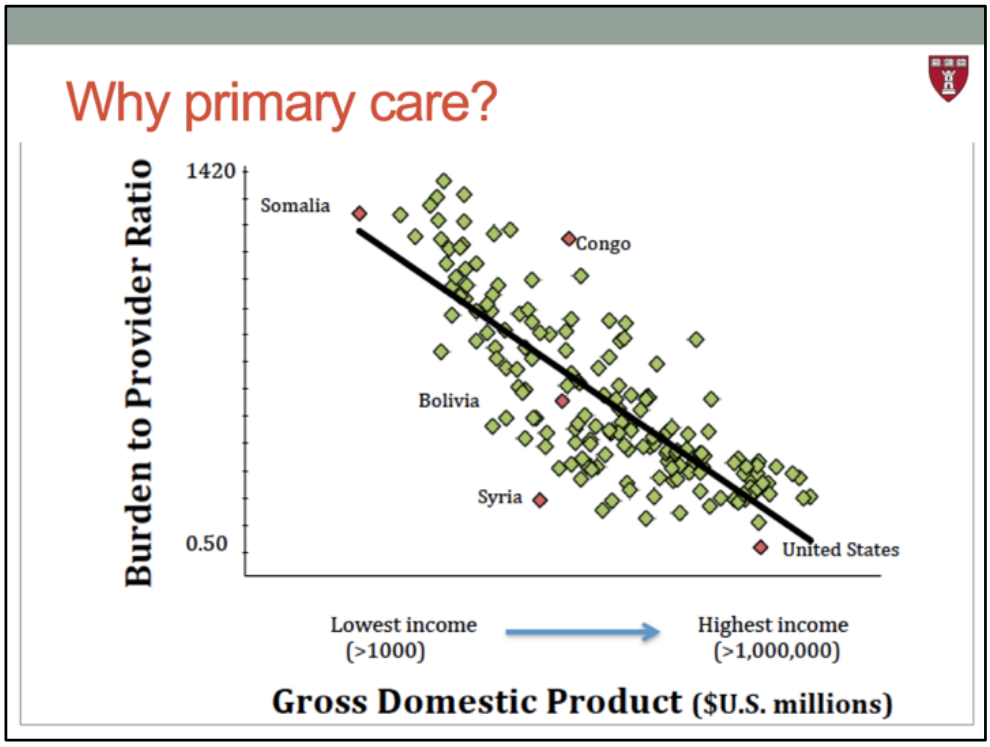
The Challenge of Oral Disease – A call for global action. The Oral Health Atlas. 2nd ed. Geneva: FDI World Dental Federation; 2015.
Accessed January 28, 2018 at: http://www.fdiworlddental.org/resources/oral-health-atlas/oral-health-atlas-2015.



BPR calculations for each nation were plotted against that nation's annual Gross Domestic Product (GDP.) As the GDP of countries increases, the BPR decreases, with a correlation of approximately 81% ($r=-0.81$, p-value <0.05). The BPR can be a useful metric because it emphasizes the multiple ways oral disease can be addressed in the primary care setting, either through prevention/reducing disease incidence, increasing available workforce, or through expanding the knowledge base of the existing workforce (e.g. training nurses or other medical providers to provide oral care and prevention.)

Key Message: In summary, the mismatch between high disease burden and low provider availability worsens for the lowest income nations who are least equipped to manage it.

(This graphic is an original figure produced as part of the BPR ratio project and published here for the purpose of this module. We wish to acknowledge Habib Benzian and Alfa Yansane for their contributions to the project.)



The linear relationship between country income and oral health-related BPR shows the extent of the double challenge that low-income countries in particular are generally facing, which is characterized by a high disease burden and low health provider numbers, compounded by weak protective legislations or absence of health promoting environments. These obstacles can also be found within countries, demonstrating major oral health inequities both between and within nations.

The themes of the Declaration of Alma-Ata are underscored through these findings. In order to effectively reduce the burden of oral disease and reduce oral health inequities both between and within countries, interdisciplinary efforts must focus on prevention, addressing determinants of oral diseases, and the relationship between oral health and overall health. In other words, the integration of primary care and oral health is needed.

OPTIONAL IN-CLASS ACTIVITY: Have the students pair up and brainstorm answers to questions such as “Why are there such disparities in BPR values? What factors play a role in these disparities?”

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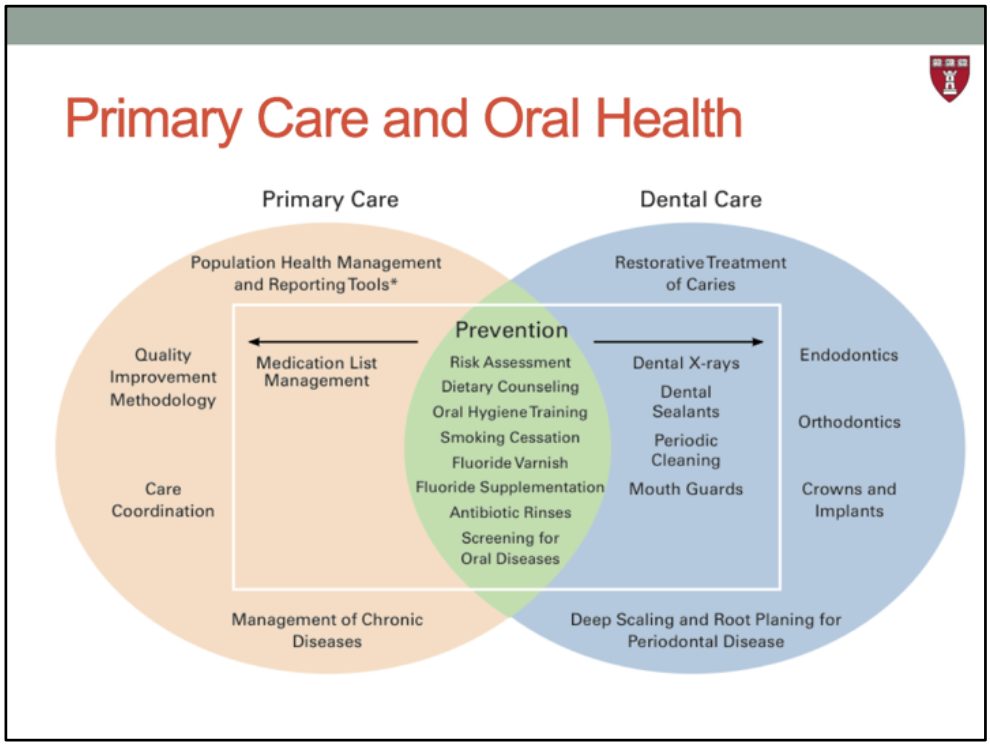
Benzian and Alfa Yansane for their contributions to the project.)



There is natural overlap between key concepts of primary care and dental care (more appropriately named oral health care, which includes more than just the teeth). This overlap consists largely of primary and secondary prevention. Currently, the dental profession is trained to deliver services most heavily emphasized in the blue bubble, with the strongest focus on curative care.

Have the students brainstorm in small groups where, how, and by whom the services in the green and peach colors could be delivered. How will they be paid? Have the groups share their thoughts with the class.

Key messages: Challenges to the status quo by considering new and alternative workforce, finance, and payment schemes are underway. These include alternative, oral health focused workforce models and task-shifting that may include preventive and clinical services delivered by dental therapists, dental nurses, community health workers, nurses, and physicians, with improved communication between and among providers. Oral health care reimbursement may come through medical insurance payments, eliminating the separation between medical and dental insurances. Workforce and health system financings will become more integrated to support oral health services, with dentists providing specialized and curative care as part of the medical system. Oral health training will be provided to non-dental professionals, and dentists will receive stronger training in medicine and overall health. Improved integration of medical and dental care in health care settings is also increasingly

possible. This aligns with the FDI Vision 2020, where dentists are the leads over an interdisciplinary, team-based approached to whole patient dental care, oral health improvement, and oral disease reduction globally.

Graphic Source:
Hummel J, Phillips KE, Holt B, Hayes C. *Oral Health: An Essential Component of Primary Care.* Seattle, WA: Qualis Health; June 2015.

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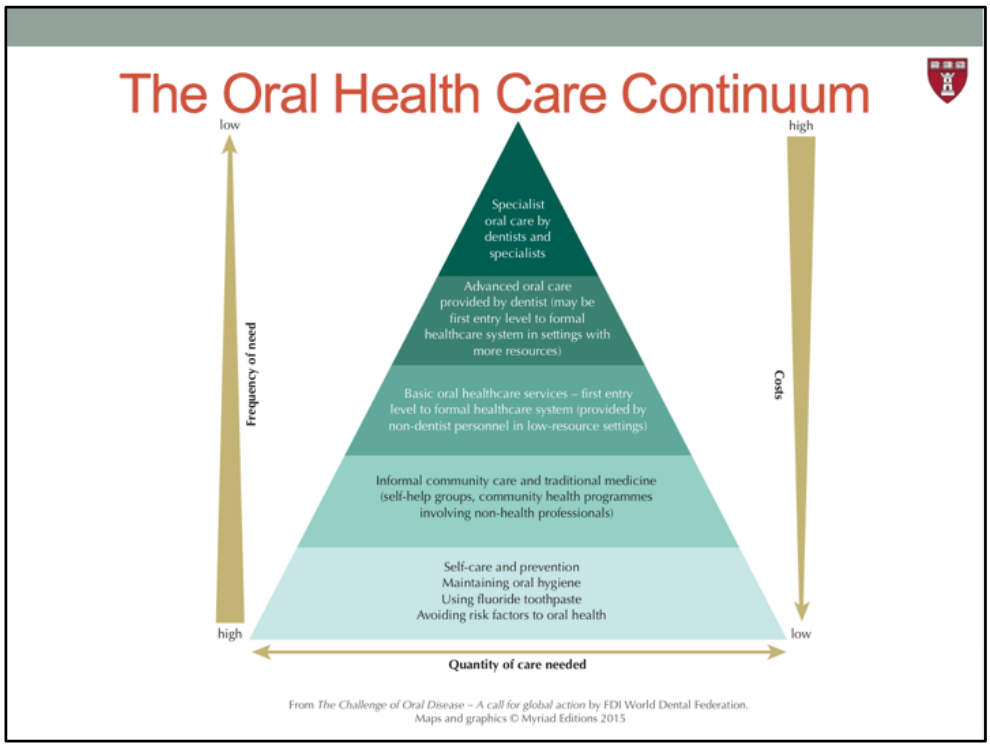

In the Oral Health Atlas, the FDI has illustrated the Oral Health Care Continuum, which begins to dissolve the boundaries between oral health and overall health, removing the historical separation of medicine and dentistry. It illuminates an ideal system where efforts are cost-effective, focus on where the greatest needs are for the most people, and reduce the amount of costly, specialized care that is needed.

This continuum brings together oral health, primary care, and universal health coverage. It ensures a people-centered approach based on need for care, and benefits more of the population than restrictive, expensive, curative-only approaches.

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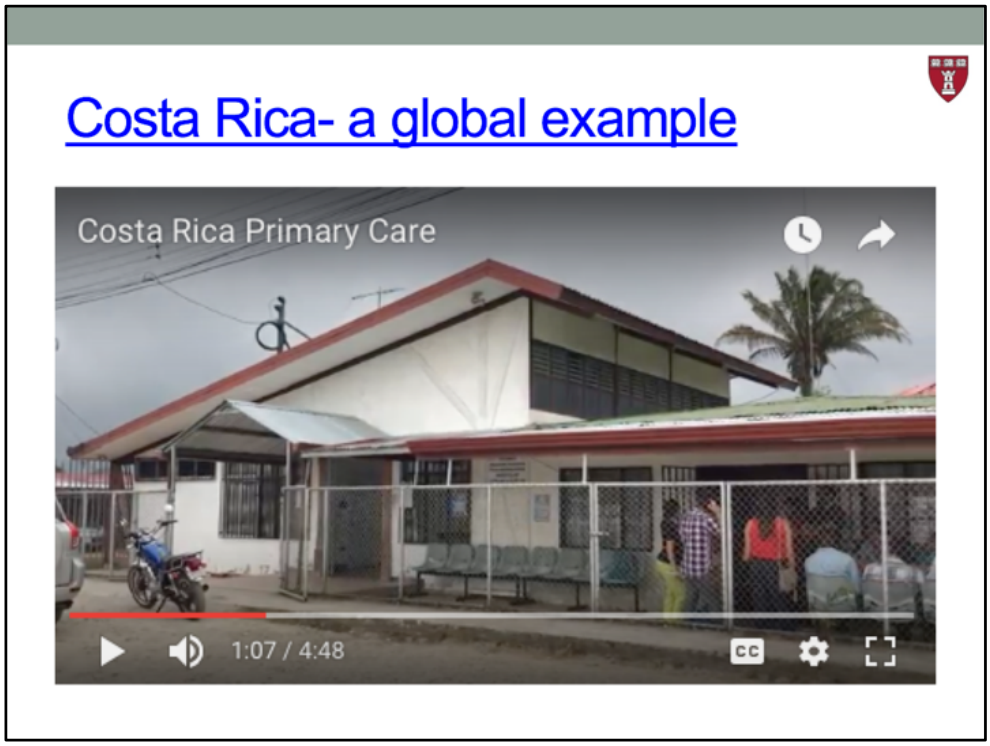

Costa Rica is known for its successful implementation of universal health coverage through a strong primary care system that includes oral health.

Original video by HSDM and CISG: https://youtu.be/qdraFoLMf4Y

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OPTIONAL IN-CLASS ACTIVITY:
After viewing the video, have the students review the original Declaration of Alma-Ata. Task them to reconvene the International Conference on Primary Care, and each of them will be attending. As a group, have them draft the Declaration of (insert your

location)- Primary Care and Oral Health. Ask them to review the major components of the original declaration and edit them to have a direct oral health focus. At the end of the activity, they should have a draft version of their own declaration, the oral health version of the Declaration of Alma-Ata. To extend the activity further, have the group begin to brainstorm on implementation strategies for their declaration.

WHO, UNICEF. Declaration of Alma-Ata. International Conference on Primary Health Care, Alma-Ata, USSR, Sept 6–12, 1978. http://www.who.int/publications/almaata_declaration_en.pdf (accessed January 7, 2018).

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Module 2: Global Goals
Module 4: Social Determinants and Risks
Module 5: Ethics and Sustainability

Global Health Starter Kit for Dental Education

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