Implementing health reform at the community level is a challenging endeavor. Many communities don't even attempt reform and continue with the same fragmented patterns of care delivery, waiting for some change in national policies. Those brave enough to attempt meaningful change have difficulty deciding on shared objectives among stakeholders, where to concentrate their efforts, and how to fund change efforts. With these challenges, it's not surprising that many communities adopt reform strategies with fatal flaws, what we call “pitfalls”.

Pitfalls are elements of strategy that are well-intentioned, but lead to change efforts that fall short of their objectives and possibly make things worse or create new problems. At best, they characterize strategies that are lopsided, fail to fully take advantage of opportunities, and don't achieve the Triple Aim of better health and better care at lower cost. (Berwick, 2008) These pitfalls are generic. They can occur in communities of any size and demographic composition and with any array of health resources.

This paper enumerates a number of the pitfalls. A structural explanation of how a strategy with this characteristic can fall short of its objectives is provided for each pitfall. These explanations are often based on the presence of feedback loops, closed loops of causality that work to resist or amplify change in systems. Some of these loops are described in common parlance as “vicious circles” that cause systems to go out of control and become unsustainable. Other loops maintain balance within systems by pushing back against any change including those changes desired as part of a reform effort. This sort of push back is referred to as policy resistance. (Sterman, 2006)

Sometimes, the pitfalls are the result of viewing a system boundary too narrowly, developing strategies that ignore important relationships among factors that are critical to a strategy's success. A common example is the concentration of strategy on care delivery without regard to the potential for preventive interventions to reduce costs as well as improve a community’s health. Another might be focusing on a single variable such as health care costs without realizing other benefits of health and health care to a community such as improved productivity of its workforce.

Each failure mode will be demonstrated using a community level simulation model called ReThink Health Dynamics. That model was created as part of a larger effort supported by the Fannie E. Rippel Foundation to provide communities with the tools to
support local health reform efforts. It is a system dynamics model, a type that has been extensively applied in health policy. (Homer and Hirsch, 2006; Homer et al, 2010; Milstein et al, 2011) The model simulates the evolution of a community’s health status and health care system over a number of years. It contains a number of initiatives designed to improve a community’s health and the performance of its health care delivery system. Users create strategies by choosing different combinations of these initiatives and deciding when to introduce each one. (ReThink Health, 2013)

Doing a number of simulations with the model enables users to better understand the consequences of various change strategies for those communities. The model has been calibrated for eight communities of varying sizes in the US and used to better understand the dynamics of local health reform. The “Anytown” version of the model will be used for this paper. It has the characteristics of the US as a whole and a hypothetical population of 300,000. Where relevant, we will comment on how different characteristics of the communities where the model has been calibrated affect their vulnerability to these pitfalls.

Figure 1: Overview of the ReThink Health Model Used to Demonstrate Pitfalls

Figure 1 provides an overview of the ReThink Health model. It begins on the left hand side with the behavioral and environmental risks that strongly influence a community’s health. Health is reflected in such terms as the prevalence and severity of chronic illness and frequency of acute episodes arising from both chronic and intermittent health problems. The community’s demographics and health status and capacities of its health care system determine the volumes of care that are provided. Utilization of care will produce health care costs.

The model lets users capture savings achieved with various initiatives and reinvest a portion of them in program development if desired. Users can also specify the size of innovation funds and the mix of payment models to be used. Users can also
experiment with assumptions about exogenous trends such as the effect the ACA will have on insurance coverage.

The following list provides an overview of the pitfalls we will be discussing in this paper.

- Unsustainable program financing with fixed budget
- Exacerbating care delivery bottlenecks by placing new demands on resources with limited capacity
- Missing Opportunities to Reduce Costs with Upstream Interventions
- Failing to invest enough in high leverage initiatives or spreading resources over too many of them
- Supply Push responses to declining utilization
- Comparing alternative strategies using only a short time horizon
- Overemphasis in upstream programs on
  - Children or
  - Seniors
- Improving overall health, care, or cost while perpetuating inequities

References


ReThink Health: See [http://rippelfoundation.org/rethink-health/dynamics](http://rippelfoundation.org/rethink-health/dynamics) for more information on the model, how it has been used, and online access to the models.

Pitfall #1: Unsustainable program financing with fixed budget

Communities are often tempted to undertake programs once they have lined up financing for the first year or couple of years. What will happen if we depend solely on this upfront investment without establishing a mechanism for providing sustainable funding well into the future?

To find out, we start with a generous initial budget of $22 Million per year for five years or $110 Million in total is allocated to Anytown. That seems to be enough to finance an ambitious program of health system change for our population of 300,000. We then undertake a strategy of health risk reduction, care improvement for physical illness, and care coordination is undertaken that should save money while making people healthier. Ambitious, yet only concentrated on a few initiatives. We expect some significant improvements. The results are revealed by the dashboard shown in Figure 1.
The changes shown are small compared to what we would have expected. Key indicators such as death and illness rates and per capita costs hardly move at all. The fact that the entire $110 Million budget has been spent provides a hint about what happened. Figure 2 confirms that the basic problem is running out of money. Spending relative to desired with the fixed budget (red line) covers a portion of needs for a while. It recovers temporarily only because some investment needs are met and desired funding falls. Spending continues to meet most needs for a couple of years, but ends entirely once the money runs out. Programs end when the money runs out.

![Program spending ratio to desired](image)

**Figure 2: Spending Relative to Desired for Fixed (Red) Funding**

Figure 3 helps to explain what is going on. Program investments using the initial investment fund begin to have a positive effect in reducing illness incidence and severity, care utilization, and health care costs. However, there is a balancing loop at the right-hand side of the diagram that depletes funds available for investment as they are spent on programs. As funds are depleted, smaller amounts are spent on programs, causing them to fall further below their potential for producing the desired impacts. Without a way of benefiting from the cost reductions produced by the investments, the fixed investment fund eventually runs out of money and initiatives fall far short of their intended objectives. Figure 4 suggests a mechanism by which program financing can become sustainable.
As highlighted in Figure 4, a mechanism for making program spending sustainable would calculate the savings produced by programs and allocate a fraction of those savings to the investment fund. The calculation of savings might use a benchmark gradually adjusted to reflect changing health care costs. Inserting this mechanism will create a set of reinforcing loops in which programs produce savings and a portion of those savings maintain funding over time after the initial investment fund has run out. As a result, programs will be sustained and can continue to produce savings.
Figure 5 shows the effect on deaths when sustainable funding is added to the strategy simulated earlier promoting healthier behavior, improved care of physical illness, and coordinating care. While the same strategy produced minimal and disappearing results with a fixed budget (red line), the ambitious strategy together with sustainable funding based on reinvesting savings (green line) produces a significant decline in death rates that continues to grow through the end of the simulation. Similar improvements are seen in other performance measures with the sustainable funding. Figure 6 shows the impact on per capita healthcare costs.

Creation of a savings and reinvestment mechanism or other means of sustainable funding is a challenge when savings are produced by providers, but accrued by third party insurers. Proposed Accountable Care Organizations (ACOs) may provide one vehicle for crafting such arrangements. (Fisher, 2009; Berwick, 2011) However it is accomplished, some sort of sustainable financing is essential.
Pitfall #2: Exacerbating care delivery bottlenecks by placing new demands on resources with limited capacity

Some initiatives may improve certain conditions while worsening or creating other problems such as bottlenecks in the care delivery system. For example, improving care for chronic physical illness, in line with the recommendations of the Institute of Medicine’s report “Crossing the Quality Chasm” (Institute of Medicine, 2002) is a natural focus for health reform. However, doing so may overwhelm a community’s primary care providers. Figures 1 and 2 display results of two simulations that illustrate what can happen when efforts to improve care are initiated without regard to their effect on the community’s primary care providers. They also demonstrate how increases in capacity can alleviate the bottleneck that is created when those providers are overloaded.

- In the first simulation, care is improved by promoting greater adherence to guidelines and support for patient self-care. For the purposes of this experiment, we allow unlimited investment funds to avoid confounding the results by running out of money.

- The second simulation adds two initiatives to the first: 1) expanding capacity for the disadvantaged by redesigning care at FQHC’s by means that have been suggested such as greater use of teams and non-physician personnel and electronic communication and 2) recruiting more primary care providers for the FQHC. (Green et al, 2013) Again, we allow for unlimited investment funds.

In Figure 1, the green line indicates that care improvement and self-care support will reduce the sufficiency of PCP capacity for the uninsured disadvantaged who depend heavily on FQHC’s for their care and for whom care capacity was inadequate to begin with. Efforts to improve care by adhering more strictly to guidelines require more and longer visits per person and result in fewer people being served, given a fixed capacity to provide care. One result is that unmet demand for primary care will lead to more visits to ER’s for non-urgent conditions, as shown in Figure 2. The green line in Figure 2 rises quickly and then comes down a bit as improved care for physical illness reduces the number of episodes leading to ER visits. However, it stays above baseline ER visit rates for the remainder of the simulation.

The red lines in figures 1 and 2 indicate that initiatives to expand capacity through FQHC recruiting and redesign of will help to overcome the bottleneck created by the expansion of care, make PCP care more available for the disadvantaged uninsured, and reduce the utilization of ER’s for non-urgent care. Figure 3 shows that much of the additional visit volume comes from FQHC’s that serve the uninsured disadvantaged. Figure 4 shows the structures that create and relieve the capacity bottleneck. Improved
care for physical illness and self-care support directly affect illness prevalence and severity, leading to fewer acute episodes and lower utilization and health care costs. However, these initiatives also increase the demand for primary care with more and longer visits and, in turn, the primary care workload relative to PCP capacity. One consequence is higher costs for preventive and chronic care visits and medications.

The other consequence is that greater workload creates a bottleneck by reducing the sufficiency of PCPs relative to demand for the disadvantaged uninsured. Lower sufficiency drives more people to ERs for non-urgent care which increases costs. Gradually, improved care for physical illness reduces episodes and ER visits which causes the green line to drop a bit, but it still remains above the baseline visit rates. As shown in Figure 4 and demonstrated in Figures 1 and 2, the way of avoiding this bottleneck is to invest in capacity together with improvements in care.

Figure 1: Sufficiency of PCPs for Demand from Disadvantaged Uninsured with Care Improvement and Self-Care Support Alone (Green) and Together with Primary Care Redesign and Recruiting for FQHC’s (Red)
Figure 2: Non-urgent Episodes to the ER with Care Improvement and Self-Care Support Alone (Green) and Together with Primary Care Redesign and Recruiting for FQHC's (Red)

Figure 3: Visits to FQHC's with Care Improvement and Self-Care Support Together with Primary Care Redesign and Recruiting for FQHC's (Red)
Another initiative that will produce the same increase in workload for primary care providers is the movement toward creating medical homes. Medical homes are defined as primary care providers that provide patient centered, comprehensive, coordinated, and accessible care with a commitment to quality and safety. Demonstration projects have shown impressive results in reducing hospital admissions, ER visits, and total spending among other variables. (Patient Centered Primary Care Collaborative, 2013). However, the commitment to comprehensive care translates into a higher primary care workload as the medical home performs many services that were previously referred out to other providers. Can this increase in workload create the same sort of bottleneck effect seen with increased adherence to guidelines and support for patient self-care?

The medical home initiative is simulated alone and then with expanded PCP capacity in FQHC’s. Again, unlimited investment funds are allowed to avoid confounding the results by running out of money. Figure 5 shows that there is the same decrease in sufficiency of PCP capacity for the disadvantaged uninsured when medical homes are implemented alone (green line). Adding PCP capacity through increased efficiency and recruiting more providers for FQHC’s (red line) has the same effect as in the previous
set of simulations of overcoming the primary care bottleneck and producing greater PCP sufficiency for the disadvantaged uninsured group.

The medical home has a slightly different effect on ER visits for non-urgent episodes than in the previous simulations, as shown by the green line in Figure 6. There is a small bump in non-urgent ER visits as medical homes are first implemented, but those visits fall back to a baseline rate as the medical home’s ability to reduce ER visits gains traction. Expanding PCP capacity in FQHC’s (red line) enables medical homes to further reduce non-urgent ER visits to fall below baseline rates.

Figure 5: Sufficiency of PCP’s with Medical Homes Alone (Green) and Together with Expanded PCP Capacity (Red)
Figure 6: Non Urgent Episodes to ER with Medical Homes Alone (Green) and Together with Expanded PCP Capacity (Red)

Results for both increased adherence to guidelines and self-care support for chronic physical illness and medical homes indicate the need for careful planning of the additional capacity required to successfully implement those initiatives. The ACA may create similar increases in demand for primary care and require capacity expansion for underserved, disadvantaged areas in order to avoid this pitfall. (Huang and Finegold, 2013) This may not be easy to do, but is necessary to avoid creating care bottlenecks that make things worse for the disadvantaged uninsured who need the most help from local health reform efforts.

The implementation of the Patient Protection and Affordable Care Act (PPACA) is likely to exacerbate the bottleneck pitfalls described above as its implementation increases the demand for primary care and worsens existing physician shortages in many parts of the country. (Lowrey and Pear, 2012) This possibility increases the urgency of acting to expand the supply of primary care, especially for the disadvantaged, if a community is also planning to implement initiatives such as improved physical illness care, self-care support, and medical homes. The results shown so far are for simulations without the implementation of the PPACA. Figure 7 shows the effects of superimposing PPACA implementation on the care improvement and self-care support initiatives and on medical homes. In these simulations, the number of uninsured in the community is assumed to be reduced by two-thirds. Again, we assume an unlimited investment fund to avoid confounding results by running out of money.

Figure 7 shows that the lack of PCP sufficiency has shifted to the Medicaid population as the ranks of the uninsured disadvantaged are greatly reduced and they no longer have an insufficient supply of PCPs. However, many of those people are now covered by Medicaid and face a shortage of physicians as has been predicted to be a result of PPACA implementation. The PPACA by itself (PPACA baseline—orange line) has only a limited effect in reducing PCP sufficiency for those on Medicaid. But when PPACA implementation is combined with other initiatives, improved physical illness care and self-care support on one hand (brown line) and medical homes on the other (gray line), the adverse effects on PCP sufficiency are much greater than with these initiatives alone (red and green lines) or with the PPACA baseline simulation (orange). Because there are many fewer uninsured after PPACA implementation, non-urgent visits to ER’s are less than they would have been with the initiatives and without the PPACA.
As with the initiatives alone, the adverse effects of the PPACA in adding to the bottlenecks can be neutralized by expanding FQHC capacity through a combination of recruiting more staff and redesign of care processes for greater efficiency. However, expansions in FQHC capacity must be done in a timely manner in conjunction with PPACA implementation and development of various initiatives or those people newly covered by Medicaid will suffer (temporarily) reduced access to primary care due to reduced sufficiency of PCPs.

![Sufficiency of PCPs for demand from Medicaid-only popn](image)

**Figure 7: Effects of the PPACA in Exacerbating Patient Care Bottlenecks with Various Initiatives**

**References**


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Pitfall #3: Missing Opportunities to Reduce Costs with Upstream Interventions

When attempting to reduce health care costs in a community, it’s natural to focus on the very large “downstream” costs of care for people who are already ill. There are, of course, significant opportunities to reduce costs by making care delivery more efficient and less resource intensive. However, a narrow focus on the costs of delivering care can cause a community to miss some important opportunities to reduce health care costs and may even result in care that is more expensive. To see how interventions we hope will save money can result in higher costs, we begin by examining the results of two simulations with the following sets of interventions:

- A pure set of cost reduction interventions including coordination of care, pre-visit screening, and improvements in post-discharge care to reduce readmissions.

- Added to the cost reduction interventions, two that improve care by 1) increasing the adherence to guidelines for care of (chronic) physical illness and 2) providing greater support for self-care by patients with physical illness. The logic of these interventions as cost-savers is that taking better care of people with chronic physical illnesses will reduce the number of urgent episodes they experience and the number of ER visits and inpatient admissions that result. Both simulations include savings capture and reinvestment.

Impacts of these simulations on per capita costs and deaths are shown in Figures 1 and 2. The first simulation (green line) with its pure emphasis on cost reduction has no effect on deaths (superimposed on blue baseline curve), which might be expected, but does have limited impact on costs (4.8% reduction from baseline by 2040). The second simulation (red line) that adds improvements in physical illness care and self-care support does have an effect on deaths (8.7% reduction) and reduces urgent episodes as one might hope (by 5.5%). However, paradoxically, the decrease in cost compared to the baseline is less than with the first set of interventions that were focused on cost reductions alone (only 2.9% vs. 4.8%). Why did this happen when we might have expected a further reduction in cost?

Figures 3 and 4 provide an answer. They show that there are significant increases in the volume of preventive and chronic illness visits and cost of self-care products (primarily prescription drugs) with the addition of improved physical illness care and self-care support. Preventive and chronic illness visits increase by 20% over baseline by
2040 and self-care costs are 16.5% higher than in the baseline compared to a 4.8% reduction in the first simulation with cost-reducing interventions alone.

Layering on additional care delivery improvements such as improved mental illness care can increase costs and dilute funds available for investment. Reduced hospital acquired infections lowers cost a bit, but does not reduce costs further than what was accomplished with the first set of cost-reducing interventions alone. Care delivery improvements have a desirable effect in reducing deaths, but are not cost-saving and actually increase costs because of the volume of preventive and chronic illness care required and cost of medications utilized. Layering on additional cost reducing interventions also do not “move the needle” any further in reducing per capita cost. Where can the leverage come from to produce more significant cost reductions?

Figure 1: Death Rates with Cost Reduction Interventions Alone (Green) and with Cost Reductions Combined with Improved Physical Illness Care and Self Care Support (Red)
Figure 2: Per Capita Costs with Cost Reduction Interventions Alone (Green) and with Cost Reductions Combined with Improved Physical Illness Care and Self Care Support (Red)

Figure 3: Preventive and Chronic Care Visits per Capita with Cost Reduction Interventions Alone (Green) and with Cost Reductions Combined with Improved Physical Illness Care and Self Care Support (Red)
Results shown in Figures 5 and 6 reveal that it requires going upstream and including the healthy behaviors intervention to produce a significant cost reduction. It takes longer to achieve the effect, but adding the healthy behaviors intervention reduces per capita cost as shown in Figure 5 by 9.1% by 2040 compared to 4.8% without that intervention. There is an additional bonus, as shown in Figure 6, in a further reduction in deaths per capita, 19.2% by 2040, when the healthy behaviors intervention is added (vs. 8.7% without). The upstream intervention, enabling healthy behavior reduces cost in the best way possible, by reducing health risk and new cases of illness that would have required care. Having fewer new cases takes longer to reduce costs, but as fewer people develop serious chronic physical illnesses, costs rise more slowly and constant dollar, age standardized costs are less. Figure 7 shows the impact that upstream prevention has on the fraction of people with severe physical illness, a driver of much of the cost of health care. Adding other upstream interventions such as reductions in environmental hazards and crime will produce small additional decreases in deaths and costs. Adding more expensive upstream interventions such as family pathways to advantage will offset some of the cost savings and reduce deaths less by taking funding away from more cost-effective interventions.
Figure 5: Per Capita Cost with Cost Reduction Interventions Alone (Green), Cost Reductions Combined with Improved Physical Illness Care and Self Care Support (Red), and Both with Upstream Prevention Added (Gray)

Figure 6: Death Rate with Cost Reduction Interventions Alone (Green), Cost Reductions Combined with Improved Physical Illness Care and Self Care Support (Red), and Both with Upstream Prevention Added (Gray)
Figure 7: Fraction of the Population with Severe Physical Illness with Cost Reduction Interventions Alone (Green), Cost Reductions Combined with Improved Physical Illness Care and Self Care Support (Red), and Both with Upstream Prevention Added (Gray)
Pitfall #4: Failing to invest enough in high leverage initiatives or spreading resources over too many of them

There are many good ideas about programs to improve health and health care in a community. Many communities will try to achieve consensus and be as inclusive as possible by incorporating the ideas of a diverse set of stakeholders. The result may be that the communities adopt strategies that have too many elements to be effectively funded or implemented.

To demonstrate this failure mode, we’ll simulate two strategies:

• A comprehensive strategy in which every initiative offered by the ReThink Health model is activated at 10% of the possible spending required to cover its designated target population. It may be easier to achieve consensus around this type of strategy because everyone can see their ideas included. Unfortunately, it means very limited resources for each initiative.

• A focused strategy in which only two programs, to enable healthy behaviors and coordinate care, are activated, but at 100% of their required spending.

In both cases, we allow half of the savings generated by our initiatives to be captured and reinvested in the programs.

Figures 1 and 2 demonstrate the impact of the two strategies on two key metrics, an age standardized death rate and per capita cost age standardized and adjusted for health care cost inflation. The comprehensive strategy barely moves the needle in reducing deaths or health care costs. The more focused strategy, only composed of two initiatives, has a significantly greater effect while spending the same cumulative amount. Deaths are reduced by 13% vs. 2% for the comprehensive strategy and costs are reduced 9.5% vs. 1%. Other measures such as the prevalence of severe chronic physical illness show the same patterns.

Two things are going on here. The more important one is that trying to be comprehensive and cover all initiatives takes funds away from the two most cost-effective ones, promoting healthy behavior and coordinating care. Dollars taken away from those initiatives and given to ones that are less cost-effective reduce overall impact.
The other, secondary effect of spreading money over the less cost-effective ones is that smaller amounts of savings are produced and are available to be spent on initiatives. As a result, only $412 million is available to spend (cumulatively) on the comprehensive strategy compared to $502 million with the focused strategy. Furthermore, the savings produced with the comprehensive strategy ultimately covers only 41% of desired investment. That strategy cannot be fully funded. As a test, that strategy was re-run with unlimited funding available. A cumulative total of $750 million was spent, but the results were only a little better than in the previous application of the comprehensive strategy and still much worse than the results obtained with the strategy that concentrated on healthy behavior and coordinated care. Deaths were reduced by 3.7% vs. 2% without unlimited funding and costs were reduced by 1.8% vs. 1%.

![Figure 1: Age Standardized Death Rates for Comprehensive (Green) and Focused (Red) Strategies](image-url)
Figure 2: Per Capita Costs Age Standardized and Adjusted for Health Care Cost Inflation for Comprehensive (Green) and Focused (Red) Strategies
Pitfall #5: Supply Push responses to declining utilization

Reduced health care utilization and costs usually mean less income for someone. Some of those people, specialists for example, are able to adapt their practices to make up the lost income by offering new services and/or the same services more frequently or at a higher fee. Research done at Dartmouth Medical School (Wennberg, Fisher, et al, 2004, 2005, 2006) and elsewhere supports this relationship between the supply of specialists and volume of specialty care provided, independent of the patient population and its patterns of illness. This phenomenon, referred to as “Supply Push”, can undermine an otherwise effective strategy to reduce utilization and cost.

Figure 1 diagrams how supply push relates to other main processes going on in health system change. Investments in the various initiatives have their effect on illness prevalence and severity which lead to reduced utilization. Some of the initiatives affect utilization and cost directly. There is a balancing loop in which reduced utilization affects specialists’ incomes and, in turn, causes them to introduce new tests and procedures or increase their use of existing ones, leading to more office visits and fees for surgical and other procedures. Many of these tests and procedures will also require inpatient stays and outpatient visits in hospital owned and freestanding facilities. Specialists can also benefit from this additional utilization through attending and other fees for hospital patients and if they are part owners of the freestanding surgical and diagnostic facilities. There may also be more referrals among specialists for additional visits as they collectively try to regain income. This additional utilization will offset the reduction in utilization and cost that the initiatives would have otherwise accomplished. This is a prime example of policy resistance.
The effect of supply push is shown in Figure 2 in which a set of programs featuring care coordination and establishment of medical homes reduces the demand for specialty care as duplicative care is eliminated and more care is concentrated in PCP offices and FQHC’s. (Savings capture and reinvestment are also in effect.) The effect of specialist income reduction on intensity of care (gray line) increases substantially as specialist income drops, nearly doubling, and this increase offsets part of the decrease in specialist visits that would have occurred as a result of care coordination and the establishment of medical homes.

One thing that can counteract the supply push effect is to shift the mechanism by which specialists and other physicians are paid from fee-for-service to Contingent Global Payments (CGP). (Robinow, 2010) This mechanism pays physicians a fixed amount per patient and removes the incentive to create more work. Figure 2 also shows the effects of assuming that CGP arrangements cover 50% (green) and 100% (blue) of the population for all payers. 50% penetration of CGP reduces the supply push effect substantially because we assume that CGP arrangements affect the way physicians practice in general and have a “spillover” effect on the care of patients not covered by CGP. In this case, 50% CGP penetration is assumed to create an 82% reduction in the supply push effect. 100% penetration eliminates it entirely. Effects of supply push and 50% and 100% coverage of the population by CGP on deaths and costs are shown in Figures 3 and 4 respectively. In addition to eliminating supply push, CGP produces a
greater impact by boosting the effectiveness of the medical home and care coordination initiatives by creating a climate of medical practice that favors those innovations.

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**Figure 3:** Effect of Supply Push on Deaths in Response to Care Coordination and Medical Home Reducing Demand for Specialty Care (Gray) Compared to Base (Blue); Effects of Consolidated Global Payments Covering 50% (Green) and 100% of the Population (Red) Suppress the Supply Push Effect

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**Figure 4:** Effect of Supply Push on Costs in Response to Care Coordination and Medical Home Reducing Demand for Specialty Care (Gray) Compared to Base (Blue); Effects of Consolidated Global Payments Covering 50% (Green) and 100% of the Population (Red) Suppress the Supply Push Effect
References


Pitfall #6: Comparing alternative strategies using only a short time horizon

Figure 1 shows the effects of two strategies on healthcare costs over time. “Cost cutting” emphasizes cutting health care costs as quickly as possible with coordinated care and pre-visit screening. “Reduce Risk” focuses on reduction of behavioral, environmental, and crime risks, a process that is bound to take much longer. Both capture savings and reinvest them in interventions. The short-term cost cutting strategy, as might be expected, shows results more quickly. It has most of its effects by 2020. The long-term risk reduction strategy only begins to get going by 2020. Anyone evaluating the two between 2015 and 2020 might conclude that the long-term strategy is the weaker one for controlling costs. However, by about 2025, the two curves cross and the long-term strategy has a greater impact on costs in the later years of the simulation.

The long-term risk reduction strategy has its effect by preventing people from getting sick and avoiding the costs of their care altogether while the short-term strategy only chips away at the costs of caring for those who do become ill. The long-term risk reduction strategy also has an effect on other metrics while the short-term strategy’s effects are more limited in scope. Figure 2 compares the effects of the two strategies on death rates. The short-term strategy has no discernible impact while the long-term strategy, given time, has a significant effect in reducing deaths. It has a similarly greater effect on other variables such as the fraction of people with severe physical illness and frequency of urgent episodes.

The short-term cost cutting strategy can have its effect very quickly through changes in policies and regulations that affect the volume of care received by people who are ill. The longer-term risk reduction strategy affects the rates at which people become ill and advance from mild to more severe illnesses. People with severe and mild chronic physical illness accumulate over time as new people become ill. Accumulations over time cannot change instantaneously, but occur gradually, much as water filling a bathtub. As fewer people become ill with the long-term strategy, there are fewer people with chronic illness. Utilization and healthcare costs, determined largely by the number of people with chronic illnesses, slowly drop below what they would have been without the risk reduction programs. Costs with the short-term strategy begin to rise by the end of the simulation as an aging population succumbs to the health risks remaining at their earlier level because that strategy did nothing to reduce them.
Figure 2: Cost Impacts of Short- (Green) and Long-Term (Red) Strategies Over Time

Figure 3: Effect of Short- (Green) and Long-Term (Red) Strategies on Death Rates
Pitfall #7: Overemphasis in upstream programs on Children or Seniors

Just as some communities might overemphasize upstream or downstream programs in their strategies, others might pick particular population groups to sharpen the focus of their population level prevention and conserve resources. Those with a long view could emphasize children and the payoff over a lifetime from intervening to improve a child's health and chances to succeed. Others might concentrate on seniors because of the potential to get an immediate payoff from preventing episodes of care arising from chronic health problems. Again, both might have some beneficial impact, but overemphasizing either one at the expense of other groups could result in suboptimal strategies.

Three simulations were done to illustrate the differences between a strategy that favors a particular age group vs. one that covers the entire population. Each involves only the enable healthy behavior initiative. All include capture and reinvestment of savings.

- Invest in children and youth only
- Invest in seniors only
- Cover entire population with the healthy behavior initiative

As one might expect, enabling the entire population to develop healthier behavior has a larger overall impact than favoring one of the smaller age groups, as shown in Figures 1 and 2 displaying the impacts on deaths and costs respectively.

What is more interesting is that people in those age groups do better or equally well with a strategy covering the entire population than with one focused only on their own age group. For example, in Figure 3, people in the Disadvantaged Senior group experience a greater reduction in risky behavior with the all-ages strategy than the one focused on their age group. This, in turn, leads to a lower rate of severe physical illness for those seniors with the all-ages strategy compared to the one focused on seniors, shown in Figure 4. Why does this happen? Promoting healthier behavior for everyone reduces risk for working age adults as well as seniors. As those adults pass age 65 and become seniors, they bring a lower fraction of risky behavior with them and have the effect of reducing the fraction of seniors with risky behavior over time. There are other benefits as well. For example, having fewer people with physical illness means that seniors generate a greater amount of savings with the all-ages strategy than with the one focused on them, shown in Figure 5. The greater amount of savings, when added to savings generated by other population groups, results in a larger investment fund to support a variety of initiatives.
Figure 1: Death Rates with Youth (Gray), Senior (Green), and All Ages (Red) Healthy Behaviors Strategies

Figure 2: Per Capita Costs with Youth (Gray), Senior (Green), and All Ages (Red) Healthy Behaviors Strategies
Figure 3: High Risk Behavior Fractions for Disadvantaged Seniors with Youth (Gray), Senior (Green), and All Ages (Red) Healthy Behaviors Strategies

Figure 4: Fractions with Severe Physical Illness for Disadvantaged Seniors with Youth (Gray), Senior (Green), and All Ages (Red) Healthy Behaviors Strategies
Figure 5: Cost Savings Available to Community from Disadvantaged Seniors with Youth (Gray), Senior (Green), and All Ages (Red) Healthy Behaviors Strategies

The situation is a bit different for children since it is not possible for anyone to “age in” to that age group and children therefore cannot get the same extra benefit from an all-ages strategy. They get about the same benefit from a focused strategy and one that covers all ages. However, the all-ages strategy produces more benefit for the community overall and children benefit indirectly by having parents who are healthier and not prone to fall into economic disadvantage as a result of disability due to chronic physical or mental illness and medical bankruptcy.
Pitfall #8: Improving overall health, care, or cost while perpetuating inequities

Some approaches to social policy are based on the assumption that “a rising tide lifts all boats”. Improve conditions for everyone and the disadvantaged will be better off too. But can health care strategies improve overall metrics for a population and leave the disadvantaged no better off compared to the rest of the population? Will overall improvements leave those at the lower end of the economic scale at the same relative disadvantage in terms of their health status?

Three simulations help to illustrate how certain strategies can actually increase inequities and how reducing health inequities requires special attention beyond overall improvements in the population’s health.

- The first worsens inequity slightly by combining improved chronic physical illness care with care coordination. This simulation as well as the other two includes capture and reinvestment of savings. Care coordination helps to generate the savings to pay for improved physical illness care.

- A second improves conditions for everyone and gets a small improvement in equity. It uses a combination of improvements in chronic physical illness care and promoting healthy behaviors together with coordinated care to generate the savings required to finance these improvements in care and prevention.

- A final simulation adds focused programs for the disadvantaged: adherence support for the disadvantaged with chronic illnesses and reduction in environmental hazards and crime for the disadvantaged.

Figures 1 and 2 display the results of the three simulations. Figure 1 displays the overall death rate for the population while Figure 2 shows the fraction of deaths attributable to the disadvantaged population. Changes in this latter measure reflect increases or decreases in inequity.

The graphs reveal that the first simulation (gray line) produces a small overall improvement in overall death rate, but a slight worsening of inequity since the advantaged group benefits more due to their better access to care and the disadvantaged end up with a little higher fraction of the deaths. (A bit hard to see because the gray line on Figure 2 is superimposed on the blue baseline.) The second simulation (green line) reduces the overall death rate further, from 2% to 14.6%, and is slightly favorable in reducing inequity, lowering disadvantaged deaths as a fraction of
total deaths by 2.8%. That combination is still not doing much to reduce inequity since the advantaged population also benefits from the healthy behavior initiative.

Targeting additional programming at the disadvantaged population is required to really make a difference in reducing inequity. In the third simulation (red line), adherence support directed at the disadvantaged with chronic physical illness plus programs also directed at them to reduce environmental hazards and crime, produced a much larger reduction in inequity, 11.2%. Benefits for the population as a whole were also greater as a result in terms of reductions in the death rate (from 14.6% to 19.4%) as shown in Figure 1 as well as in severe physical illness (13.2% to 17%), and untreated mental illness (19.9% to 23.3%). There is only a slight improvement in per capita cost (from a 9.1% to 9.5% reduction) because of the additional spending required for the targeted programs. Cumulative spending with targeted programs is greater, $1.08B versus $558M, but these are paid for with savings generated by additional reductions in the cost of caring for the disadvantaged population. The impact of all programs is limited between 2012 and about 2020 until sufficient savings are generated to fund them in the final simulation that ultimately reduces inequity the most.

Figure 1: Overall Death Rates with Strategies that Worsen Inequity (Gray), Improve It Slightly (Green), and Improve It Significantly by Including Targeted Programs (Red)
Figure 2: Disadvantaged Fraction of Deaths with Strategies that Worsen Inequity (Gray), Improve It Slightly (Green), and Improve It Significantly by Including Targeted Programs (Red)